
RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 100-YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A00EVRL.DAT
TIME/DATE OF STUDY: 17:15 12/04/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.876
- 2) 10.00; 3.789
- 3) 15.00; 2.933
- 4) 20.00; 2.419
- 5) 25.00; 2.096
- 6) 30.00; 1.873
- 7) 40.00; 1.617
- 8) 50.00; 1.400
- 9) 60.00; 1.290
- 10) 90.00; 1.088
- 11) 120.00; 0.951
- 12) 180.00; 0.795
- 13) 360.00; 0.588
- 14) 1200.00; 0.256

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

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

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.034
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.70
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 3.70

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

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ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.702
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.90	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	2.60	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.14
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.85
AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 1.10
Tc(MIN.) = 10.51
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 12.88
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 5.3 PEAK FLOW RATE (CFS) = 16.25

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.91 FLOW VELOCITY (FEET/SEC.) = 6.53
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 605.00 DOWNSTREAM ELEVATION (FEET) = 584.00
STREET LENGTH (FEET) = 264.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.49

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.37
HALFSTREET FLOOD WIDTH (FEET) = 11.84
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.75
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.52
STREET FLOW TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 11.16
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.590

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential and Commercial categories.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 6.49
EFFECTIVE AREA (ACRES) = 7.40 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 7.4 PEAK FLOW RATE (CFS) = 22.20

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.54
FLOW VELOCITY (FEET/SEC.) = 6.95 DEPTH*VELOCITY (FT*FT/SEC.) = 2.69
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 584.00 DOWNSTREAM ELEVATION (FEET) = 564.00

STREET LENGTH (FEET) = 494.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 36.64

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.48
HALFSTREET FLOOD WIDTH (FEET) = 17.85
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.03
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.90
STREET FLOW TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 12.53
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.356

SUBAREA LOSS RATE DATA (AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Commercial and Residential categories.

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA (ACRES) = 9.80 SUBAREA RUNOFF (CFS) = 28.88
EFFECTIVE AREA (ACRES) = 17.20 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 49.53

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.52 HALFSTREET FLOOD WIDTH (FEET) = 20.20
FLOW VELOCITY (FEET/SEC.) = 6.46 DEPTH*VELOCITY (FT*FT/SEC.) = 3.38
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 564.00 DOWNSTREAM (FEET) = 520.00
FLOW LENGTH (FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.64
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 49.53
PIPE TRAVEL TIME (MIN.) = 1.66 Tc (MIN.) = 14.19
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.072
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 3.90 0.30 0.100 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 15.10
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 60.24

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.072
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
PUBLIC PARK B 0.30 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
COMMERCIAL B 5.00 0.30 0.100 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 24.45
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE(CFS) = 84.68

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.072
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.80 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.93
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE(CFS) = 89.61

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.83
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.61
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 15.09
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.924
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.80 0.30 0.100 56
COMMERCIAL B 7.60 0.30 0.100 56
PUBLIC PARK B 0.40 0.30 0.850 56
COMMERCIAL B 10.50 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 56.11
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE(CFS) = 141.20

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.09
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.924
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.80 0.30 0.100 56
COMMERCIAL B 12.10 0.30 0.100 56
PUBLIC PARK B 1.00 0.30 0.850 56
COMMERCIAL B 4.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
 SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 63.35
 EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 204.55

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
 FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.94
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 204.55
 PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 15.80
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 15.80
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 32.22
 EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 231.52

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.80
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.851
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 52.78
 EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 284.30

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.85
 ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 284.30
 PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 17.11
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 17.11
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.716
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
 SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 19.76
 EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 290.29

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 17.11
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.716
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

APARTMENTS B 3.20 0.30 0.200 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 21.75
 EFFECTIVE AREA (ACRES) = 130.80 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA (ACRES) = 130.8 PEAK FLOW RATE (CFS) = 312.04

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.11
 RAINFALL INTENSITY (INCH/HR) = 2.72
 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.22
 EFFECTIVE STREAM AREA (ACRES) = 130.80
 TOTAL STREAM AREA (ACRES) = 130.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 312.04

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

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

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 645.00 DOWNSTREAM (FEET) = 625.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.417
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.702
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56	8.68
COMMERCIAL	B	0.30	0.30	0.100	56	5.42
PUBLIC PARK	B	1.30	0.30	0.850	56	8.61
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56	8.68

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798
 SUBAREA RUNOFF (CFS) = 14.75
 TOTAL AREA (ACRES) = 3.00 PEAK FLOW RATE (CFS) = 14.75

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

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

=====

UPSTREAM ELEVATION (FEET) = 625.00 DOWNSTREAM ELEVATION (FEET) = 595.00
 STREET LENGTH (FEET) = 517.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.63
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.41
 HALFSTREET FLOOD WIDTH (FEET) = 13.79
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.24
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.55
 STREET FLOW TRAVEL TIME (MIN.) = 1.38 Tc (MIN.) = 6.80
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.126

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.30	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 17.76
 EFFECTIVE AREA (ACRES) = 6.90 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 6.9 PEAK FLOW RATE (CFS) = 30.95

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.44 HALFSTREET FLOOD WIDTH (FEET) = 15.51
 FLOW VELOCITY (FEET/SEC.) = 6.61 DEPTH*VELOCITY (FT*FT/SEC.) = 2.90
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION (FEET) = 595.00 DOWNSTREAM ELEVATION (FEET) = 585.00
 STREET LENGTH (FEET) = 389.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 48.28
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.55
 HALFSTREET FLOOD WIDTH(FEET) = 21.84
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.42
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 3.00
 STREET FLOW TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 7.99
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.627
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 34.63
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 62.48

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.59 HALFSTREET FLOOD WIDTH(FEET) = 24.18
 FLOW VELOCITY(FEET/SEC.) = 5.77 DEPTH*VELOCITY(FT*FT/SEC.) = 3.43
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.23
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 62.48
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 8.76
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.306
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					

".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 10.88
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 68.91

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.306
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.00	0.30	0.100	56
PUBLIC PARK	B	1.90	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
COMMERCIAL	B	4.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 68.24
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 137.16

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.306
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.50	0.30	0.100	56
PUBLIC PARK	B	1.20	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 35.50
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 172.65

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.306
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.30 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 20.19
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 192.84

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.33
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 192.84
 PIPE TRAVEL TIME(MIN.) = 0.83 Tc(MIN.) = 9.59
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 9.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.958
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.40 0.30 0.100 56
 COMMERCIAL B 11.00 0.30 0.100 56
 PUBLIC PARK B 1.80 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
 COMMERCIAL B 3.20 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.222
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 73.20
 EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 249.95

 FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

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

 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.35
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 249.95
 PIPE TRAVEL TIME(MIN.) = 0.70 Tc(MIN.) = 10.30
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 10.30
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.738
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.10 0.30 0.100 56
 PUBLIC PARK B 1.40 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 COMMERCIAL B 5.10 0.30 0.100 56
 PUBLIC PARK B 1.90 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.60 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.485
 SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 52.38
 EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 288.02

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

 MAINLINE Tc(MIN.) = 10.30
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.738
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.70 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.50 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.244
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 10.89
 EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 298.90

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.30
RAINFALL INTENSITY(INCH/HR) = 3.74
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 298.90

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 559.08 Tc(MIN.) = 10.30
EFFECTIVE AREA(ACRES) = 170.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 87.0 INCH PIPE IS 67.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.18
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 559.08
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 11.22
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.22
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.580
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 56
COMMERCIAL B 3.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 15.01
EFFECTIVE AREA(ACRES) = 175.20 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 559.08
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.22
RAINFALL INTENSITY(INCH/HR) = 3.58
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.20
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 559.08

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.091
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.50 0.30 0.100 56 6.88
PUBLIC PARK B 0.20 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.70 0.30 0.200 56 7.33
RESIDENTIAL
".4 DWELLING/ACRE" B 1.40 0.30 0.900 56 11.02
PUBLIC PARK B 0.10 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 7.33
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA RUNOFF(CFS) = 27.77

TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 27.77

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.88
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.091
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.87
 EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 28.64

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 626.00
 FLOW LENGTH(FEET) = 425.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.68
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 28.64
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.54
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 7.54
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.815
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.40	0.30	0.900	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 38.39
 EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 65.44

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 626.00 DOWNSTREAM(FEET) = 606.00
 FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.38
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 65.44
 PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 8.83
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.83
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.279
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.60	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	6.50	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	8.40	0.30	0.600	56
APARTMENTS	B	0.50	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491
 SUBAREA AREA(ACRES) = 26.70 SUBAREA RUNOFF(CFS) = 99.28
 EFFECTIVE AREA(ACRES) = 42.20 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 42.2 PEAK FLOW RATE(CFS) = 157.25

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.83
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.279
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.00	0.30	0.200	56
RESIDENTIAL					

" .4 DWELLING/ACRE" B 3.80 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
SUBAREA AREA (ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 40.45
EFFECTIVE AREA (ACRES) = 53.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA (ACRES) = 53.2 PEAK FLOW RATE (CFS) = 197.70

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	606.00	DOWNSTREAM(FEET) =	604.00
FLOW LENGTH(FEET) =	222.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	57.0 INCH PIPE IS	45.1 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.15		
ESTIMATED PIPE DIAMETER(INCH) =	57.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	197.70		
PIPE TRAVEL TIME(MIN.) =	0.28	Tc(MIN.) =	9.11
LONGEST FLOWPATH FROM NODE	120.00 TO NODE	124.00 =	2006.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 9.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.162
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	0.30	0.30	0.200	56
COMMERCIAL	B	2.10	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 18.05
EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 210.13

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.162
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.74
EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 210.87

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	604.00	DOWNSTREAM(FEET) =	546.00
FLOW LENGTH(FEET) =	1271.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	45.0 INCH PIPE IS	32.2 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	24.95		
ESTIMATED PIPE DIAMETER(INCH) =	45.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	210.87		
PIPE TRAVEL TIME(MIN.) =	0.85	Tc(MIN.) =	9.96
LONGEST FLOWPATH FROM NODE	120.00 TO NODE	125.00 =	3277.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 9.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.807
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	1.20	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 24.91
EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 217.19

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 9.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.807
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	1.90	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.30	0.30	0.600	56
APARTMENTS	B	5.00	0.30	0.200	56
PUBLIC PARK	B	2.30	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.50	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 44.65
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 261.84

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.807
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	10.20	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 33.30
EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 295.14

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00
FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.84
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 295.14
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 10.33
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 10.33
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.732

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.90	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
APARTMENTS	B	6.00	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 59.84
EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 348.90

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.86
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 348.90
PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 10.84
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

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MAINLINE Tc(MIN.) = 10.84
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.645
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.50	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	1.10	0.30	0.200	56
COMMERCIAL	B	12.70	0.30	0.100	56
PUBLIC PARK	B	0.80	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 65.25
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 405.66

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

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

MAINLINE Tc(MIN.) = 10.84
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.645
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.78
 EFFECTIVE AREA (ACRES) = 131.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA (ACRES) = 131.3 PEAK FLOW RATE (CFS) = 414.45

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

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

MAINLINE Tc(MIN.) = 10.84
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.645
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
COMMERCIAL	B	12.60	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
 SUBAREA AREA (ACRES) = 18.20 SUBAREA RUNOFF (CFS) = 58.53
 EFFECTIVE AREA (ACRES) = 149.50 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 149.5 PEAK FLOW RATE (CFS) = 472.98

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 32.50
 ESTIMATED PIPE DIAMETER (INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 472.98
 PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 11.22

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.22
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.580
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA (ACRES) = 2.60 SUBAREA RUNOFF (CFS) = 8.22
 EFFECTIVE AREA (ACRES) = 152.10 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 152.1 PEAK FLOW RATE (CFS) = 472.98
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.22
 RAINFALL INTENSITY (INCH/HR) = 3.58
 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.43
 EFFECTIVE STREAM AREA (ACRES) = 152.10
 TOTAL STREAM AREA (ACRES) = 152.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 472.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	559.08	11.22	3.580	0.30 (0.09)	0.31	175.2	110.00
1	526.48	18.06	2.618	0.30 (0.09)	0.29	227.3	100.00
2	472.98	11.22	3.580	0.30 (0.13)	0.43	152.1	120.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1032.04	11.22	3.580	0.30 (0.11)	0.37	327.3	120.00
2	1032.04	11.22	3.580	0.30 (0.11)	0.37	327.3	110.00
3	867.73	18.06	2.618	0.30 (0.10)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1032.04 Tc(MIN.) = 11.22
 EFFECTIVE AREA(ACRES) = 327.29 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 379.4
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
 FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 102.0 INCH PIPE IS 77.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.33
 ESTIMATED PIPE DIAMETER(INCH) = 102.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 1032.04
 PIPE TRAVEL TIME(MIN.) = 1.11 Tc(MIN.) = 12.34
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.34
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	1.80	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.60	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
 SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 19.78
 EFFECTIVE AREA(ACRES) = 334.09 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 1032.04
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.34
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56
RESIDENTIAL					

COMMERCIAL	B	2.50	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.50	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.90
 EFFECTIVE AREA(ACRES) = 338.79 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 1032.04
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.34
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.90	0.30	0.400	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	1.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.80	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.386
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 40.36
 EFFECTIVE AREA(ACRES) = 352.49 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 1039.98

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 12.34
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56
 COMMERCIAL B 5.00 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 10.30 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
 SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 61.42
 EFFECTIVE AREA(ACRES) = 373.09 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 1101.40

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.389

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.30	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.30	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487

SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 21.89

EFFECTIVE AREA(ACRES) = 380.59 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 1123.28

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00

FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 90.0 INCH PIPE IS 71.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 29.82

ESTIMATED PIPE DIAMETER(INCH) = 90.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1123.28

PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 13.34

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.218

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
COMMERCIAL	B	1.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598

SUBAREA AREA(ACRES) = 7.00 SUBAREA RUNOFF(CFS) = 19.14

EFFECTIVE AREA(ACRES) = 387.59 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 439.7 PEAK FLOW RATE(CFS) = 1123.28

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.34

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.218

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.50	0.30	0.600	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.30	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.599

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 21.60

EFFECTIVE AREA(ACRES) = 395.49 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 447.6 PEAK FLOW RATE(CFS) = 1123.28

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.312
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.076

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.50	0.30	1.000	66	9.31
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.40	0.30	1.000	65	9.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 6.46

TOTAL AREA (ACRES) = 1.90 PEAK FLOW RATE (CFS) = 6.46

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 635.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00 CHANNEL SLOPE = 0.0950

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.727

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	4.90	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	2.40	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.72

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.67

AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 1.05

Tc (MIN.) = 10.36

SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 22.51

EFFECTIVE AREA (ACRES) = 9.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 9.2 PEAK FLOW RATE (CFS) = 28.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.12 FLOW VELOCITY (FEET/SEC.) = 7.48

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 635.00 DOWNSTREAM (FEET) = 631.00

FLOW LENGTH (FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.90

ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 28.37

PIPE TRAVEL TIME (MIN.) = 1.06 Tc (MIN.) = 11.42

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 11.42

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.546

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	5.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	4.00	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 26.58

EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 53.45

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 631.00 DOWNSTREAM (FEET) = 630.00

FLOW LENGTH (FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.79

ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 53.45

PIPE TRAVEL TIME (MIN.) = 2.48 Tc (MIN.) = 13.90

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.90

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.122

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	0.30	0.30	1.000	63
NATURAL FAIR COVER "CHAPARRAL, NARROWLEAF"	B	5.70	0.30	1.000	72

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	2.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.20 SUBAREA RUNOFF (CFS) = 33.52
EFFECTIVE AREA (ACRES) = 31.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.5 PEAK FLOW RATE (CFS) = 79.99

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.90
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.122
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.20	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.51
EFFECTIVE AREA (ACRES) = 31.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.7 PEAK FLOW RATE (CFS) = 80.50

FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 628.00
FLOW LENGTH (FEET) = 910.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.24
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 80.50
PIPE TRAVEL TIME (MIN.) = 2.43 Tc (MIN.) = 16.33
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 16.33
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.796
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.90	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.40	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	4.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	1.30	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.10 SUBAREA RUNOFF (CFS) = 28.40
EFFECTIVE AREA (ACRES) = 51.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.60	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.80	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.50 SUBAREA RUNOFF (CFS) = 14.60
EFFECTIVE AREA (ACRES) = 38.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 38.2 PEAK FLOW RATE (CFS) = 85.82

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 629.00 DOWNSTREAM (FEET) = 610.00
FLOW LENGTH (FEET) = 796.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.60
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 85.82
PIPE TRAVEL TIME (MIN.) = 0.85 Tc (MIN.) = 17.18
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 17.18
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.709
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.90	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.40	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	4.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	1.30	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.10 SUBAREA RUNOFF (CFS) = 28.40
EFFECTIVE AREA (ACRES) = 51.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 51.3 PEAK FLOW RATE (CFS) = 111.22

FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 410.00

FLOW LENGTH (FEET) = 6198.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.8 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 18.33

ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 111.22

PIPE TRAVEL TIME (MIN.) = 5.64 Tc (MIN.) = 22.82

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	111.22	22.82	2.237	0.30 (0.30)	1.00	51.3	150.00

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1123.28	13.34	3.218	0.30 (0.11)	0.37	395.5	120.00
2	1123.28	13.34	3.218	0.30 (0.11)	0.37	395.5	110.00
3	931.90	20.29	2.401	0.30 (0.11)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1221.21	13.34	3.218	0.30 (0.13)	0.42	425.5	120.00
2	1221.20	13.34	3.218	0.30 (0.13)	0.42	425.5	110.00
3	1039.13	20.29	2.401	0.30 (0.12)	0.41	493.2	100.00
4	976.70	22.82	2.237	0.30 (0.13)	0.42	498.9	150.00

TOTAL AREA (ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1221.21 Tc (MIN.) = 13.336

EFFECTIVE AREA (ACRES) = 425.48 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA (ACRES) = 498.9

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.34

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.218

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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AGRICULTURAL POOR COVER

"FALLOW" B 1.60 0.30 1.000 86

NATURAL FAIR COVER

"OPEN BRUSH" B 1.30 0.30 1.000 66

RESIDENTIAL

".4 DWELLING/ACRE" B 2.60 0.30 0.900 56

NATURAL FAIR COVER

"WOODLAND, GRASS" B 1.90 0.30 1.000 65

AGRICULTURAL POOR COVER

"FALLOW" B 0.70 0.30 1.000 86

NATURAL FAIR COVER

"OPEN BRUSH" B 0.80 0.30 1.000 66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971

SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 23.44

EFFECTIVE AREA (ACRES) = 434.38 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 507.8 PEAK FLOW RATE (CFS) = 1221.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.34

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.218

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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PUBLIC PARK B 0.10 0.30 0.850 56

RESIDENTIAL

".4 DWELLING/ACRE" B 1.50 0.30 0.900 56

NATURAL FAIR COVER

"WOODLAND, GRASS" B 0.40 0.30 1.000 65

NATURAL FAIR COVER

"OPEN BRUSH" B 0.10 0.30 1.000 66

RESIDENTIAL

".4 DWELLING/ACRE" B 0.30 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919

SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 6.36

EFFECTIVE AREA (ACRES) = 436.78 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 510.2 PEAK FLOW RATE (CFS) = 1221.21

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 510.2 TC (MIN.) = 13.34

EFFECTIVE AREA (ACRES) = 436.78 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.432

PEAK FLOW RATE (CFS) = 1221.21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1221.21	13.34	3.218	0.30 (0.13)	0.43	436.8	120.00
2	1221.20	13.34	3.218	0.30 (0.13)	0.43	436.8	110.00
3	1039.13	20.29	2.401	0.30 (0.13)	0.43	504.5	100.00
4	976.70	22.82	2.237	0.30 (0.13)	0.43	510.2	150.00

=====
=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 2-YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A02EVRL.DAT
TIME/DATE OF STUDY: 17:16 12/04/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

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

- 1) 5.00; 1.825
- 2) 10.00; 1.217
- 3) 15.00; 0.932
- 4) 20.00; 0.766
- 5) 25.00; 0.662
- 6) 30.00; 0.587
- 7) 40.00; 0.506
- 8) 50.00; 0.449
- 9) 60.00; 0.395
- 10) 90.00; 0.340
- 11) 120.00; 0.286
- 12) 180.00; 0.232
- 13) 360.00; 0.178
- 14) 1200.00; 0.080

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.288
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.10	0.60	1.000	56	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.68
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 0.68

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.153
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.76
AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.71
Tc(MIN.) = 11.12
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 2.13
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.59
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 2.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.46 FLOW VELOCITY(FEET/SEC.) = 4.17
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 605.00 DOWNSTREAM ELEVATION(FEET) = 584.00
STREET LENGTH(FEET) = 264.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.43
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.23
HALFSTREET FLOOD WIDTH(FEET) = 3.97
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.20
STREET FLOW TRAVEL TIME(MIN.) = 0.86 Tc(MIN.) = 11.98
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.104

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.900	-
USER-DEFINED	-	1.00	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 1.50
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.51
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 3.94

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.25 HALFSTREET FLOOD WIDTH(FEET) = 4.66
FLOW VELOCITY(FEET/SEC.) = 5.09 DEPTH*VELOCITY(FT*FT/SEC.) = 1.25
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 584.00 DOWNSTREAM ELEVATION(FEET) = 564.00
STREET LENGTH(FEET) = 494.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.59

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.32
HALFSTREET FLOOD WIDTH(FEET) = 8.91
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.21
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.35
STREET FLOW TRAVEL TIME(MIN.) = 1.96 Tc(MIN.) = 13.93
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.993

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.900	-
USER-DEFINED	-	6.60	0.60	0.100	-
USER-DEFINED	-	1.80	0.60	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 7.32
EFFECTIVE AREA(ACRES) = 17.20 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 17.2 PEAK FLOW RATE(CFS) = 10.52

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.43
FLOW VELOCITY(FEET/SEC.) = 4.51 DEPTH*VELOCITY(FT*FT/SEC.) = 1.57
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 564.00 DOWNSTREAM(FEET) = 520.00
FLOW LENGTH(FEET) = 1456.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.27
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.52
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 16.30
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.30
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	3.90	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 3.71
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 12.62

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.30
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	0.900	-
USER-DEFINED	-	5.00	0.60	0.100	-
USER-DEFINED	-	2.10	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 5.37
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE(CFS) = 18.00

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.30
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.889
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.80	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 1.34
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE(CFS) = 19.34

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.26
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.34
PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 17.60
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.80	0.60	0.100	-
USER-DEFINED	-	7.60	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	10.50	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 14.98
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE(CFS) = 33.00

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.60
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.846
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.80	0.60	0.100	-
USER-DEFINED	-	12.10	0.60	0.100	-
USER-DEFINED	-	1.00	0.60	0.850	-
USER-DEFINED	-	4.50	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 16.85
EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 49.85

FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.30
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.85
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 18.61
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

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FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.61
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.40 0.60 0.100 -
USER-DEFINED - 6.70 0.60 0.100 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 2.50 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 8.55
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 55.99

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FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.61
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.812
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.20 0.60 0.100 -
USER-DEFINED - 0.70 0.60 0.850 -
USER-DEFINED - 7.60 0.60 0.100 -
USER-DEFINED - 0.30 0.60 0.850 -
USER-DEFINED - 4.70 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.850 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 13.58
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 69.57

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FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.28
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 69.57
PIPE TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 20.49
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

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FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.49
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.756
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.900 -
USER-DEFINED - 2.80 0.60 0.100 -
USER-DEFINED - 0.80 0.60 0.900 -
USER-DEFINED - 0.60 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 4.59
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 69.57
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.49
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.756
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.60 0.200 -
USER-DEFINED - 5.50 0.60 0.200 -
USER-DEFINED - 3.20 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 5.21
EFFECTIVE AREA(ACRES) = 130.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 130.8 PEAK FLOW RATE(CFS) = 73.63

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FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.49
RAINFALL INTENSITY(INCH/HR) = 0.76
AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA(ACRES) = 130.80
TOTAL STREAM AREA(ACRES) = 130.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 73.63

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

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 645.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.417
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.774
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" - 0.40 0.60 0.900 56 8.68
COMMERCIAL - 0.30 0.60 0.100 56 5.42
PUBLIC PARK - 1.30 0.60 0.850 56 8.61
RESIDENTIAL
".4 DWELLING/ACRE" - 1.00 0.60 0.900 56 8.68
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798
SUBAREA RUNOFF(CFS) = 3.50
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 3.50

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

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

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 595.00
STREET LENGTH(FEET) = 517.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.98
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.09
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.65
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.34
STREET FLOW TRAVEL TIME(MIN.) = 1.85 Tc(MIN.) = 7.27
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.549

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.30 0.60 0.100 -
USER-DEFINED - 0.30 0.60 0.900 -
USER-DEFINED - 1.00 0.60 0.100 -
USER-DEFINED - 0.30 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 4.97
EFFECTIVE AREA(ACRES) = 6.90 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 6.9 PEAK FLOW RATE(CFS) = 7.86

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31 HALFSTREET FLOOD WIDTH(FEET) = 8.22
FLOW VELOCITY(FEET/SEC.) = 4.93 DEPTH*VELOCITY(FT*FT/SEC.) = 1.52
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

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

UPSTREAM ELEVATION(FEET) = 595.00 DOWNSTREAM ELEVATION(FEET) = 585.00
STREET LENGTH(FEET) = 389.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.24
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 12.38
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.92
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.50
STREET FLOW TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 8.93
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.348

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

USER-DEFINED - 5.00 0.60 0.100 -
 USER-DEFINED - 2.20 0.60 0.900 -
 USER-DEFINED - 1.00 0.60 0.100 -
 USER-DEFINED - 0.30 0.60 0.900 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 8.77
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 15.38

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.41 HALFSTREET FLOOD WIDTH(FEET) = 13.71
 FLOW VELOCITY(FEET/SEC.) = 4.11 DEPTH*VELOCITY(FT*FT/SEC.) = 1.67
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.79
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 15.38
 PIPE TRAVEL TIME(MIN.) = 1.08 Tc(MIN.) = 10.01
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.01
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	1.10	0.60	0.900	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.46
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 16.02

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.01
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.00	0.60	0.100	-
USER-DEFINED	-	1.90	0.60	0.850	-
USER-DEFINED	-	2.70	0.60	0.900	-
USER-DEFINED	-	4.10	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.900	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 16.67
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 32.69

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.01
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.60	0.100	-
USER-DEFINED	-	1.20	0.60	0.850	-
USER-DEFINED	-	3.80	0.60	0.900	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 7.76
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 40.45

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.01
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 3.11
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 43.56

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.28
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.56
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 11.20
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.20
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.40 0.60 0.100 -
USER-DEFINED - 11.00 0.60 0.100 -
USER-DEFINED - 1.80 0.60 0.850 -
USER-DEFINED - 1.50 0.60 0.900 -
USER-DEFINED - 3.20 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.222
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 19.10
EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 59.53

FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.64
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 59.53
PIPE TRAVEL TIME(MIN.) = 0.99 Tc(MIN.) = 12.19
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

USER-DEFINED - 3.10 0.60 0.100 -
USER-DEFINED - 1.40 0.60 0.850 -
USER-DEFINED - 1.10 0.60 0.900 -
USER-DEFINED - 5.10 0.60 0.100 -
USER-DEFINED - 1.90 0.60 0.850 -
USER-DEFINED - 3.60 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.485
SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 11.68
EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 67.53

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.19
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.70 0.60 0.100 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 0.50 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.244
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 2.81
EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 70.34

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.19
RAINFALL INTENSITY(INCH/HR) = 1.09
AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 70.34

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 73.63 20.49 0.756 0.60(0.13) 0.22 130.8 100.00
2 70.34 12.19 1.092 0.60(0.24) 0.40 91.8 110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	137.70	12.19	1.092	0.60 (0.19)	0.32	169.6	110.00
2	116.17	20.49	0.756	0.60 (0.18)	0.29	222.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 137.70 Tc(MIN.) = 12.19
 EFFECTIVE AREA(ACRES) = 169.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 222.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 137.70
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 13.51
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.51
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.017
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.60	0.100	-
USER-DEFINED	-	3.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 4.05
 EFFECTIVE AREA(ACRES) = 174.30 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 137.70
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 13.51
 RAINFALL INTENSITY(INCH/HR) = 1.02

AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA(ACRES) = 174.30
 TOTAL STREAM AREA(ACRES) = 227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.70

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
 ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.50	0.60	0.100	56	6.88
PUBLIC PARK	-	0.20	0.60	0.850	56	10.93
RESIDENTIAL	-	2.70	0.60	0.200	56	7.33
"11+ DWELLINGS/ACRE"	-	1.40	0.60	0.900	56	11.02
RESIDENTIAL	-	0.10	0.60	0.850	56	10.93
".4 DWELLING/ACRE"	-	1.30	0.60	0.200	56	7.33
PUBLIC PARK	-	1.30	0.60	0.200	56	7.33
RESIDENTIAL	-	1.30	0.60	0.200	56	7.33

"11+ DWELLINGS/ACRE"
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
 SUBAREA RUNOFF(CFS) = 7.63
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 7.63

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 6.88
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.19
 EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 7.82

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

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>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 626.00
FLOW LENGTH(FEET) = 425.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.00
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.82
PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 7.77
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

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FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 7.77
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.489
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.40 0.60 0.200 -
USER-DEFINED - 2.40 0.60 0.900 -
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 10.11
EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 17.32

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FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 626.00 DOWNSTREAM(FEET) = 606.00
FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.73
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.32
PIPE TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 9.53
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

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FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.53
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.274
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

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USER-DEFINED - 7.60 0.60 0.200 -
USER-DEFINED - 1.40 0.60 0.100 -
USER-DEFINED - 2.30 0.60 0.200 -
USER-DEFINED - 6.50 0.60 0.900 -
USER-DEFINED - 8.40 0.60 0.600 -
USER-DEFINED - 0.50 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491
SUBAREA AREA(ACRES) = 26.70 SUBAREA RUNOFF(CFS) = 23.54
EFFECTIVE AREA(ACRES) = 42.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 42.2 PEAK FLOW RATE(CFS) = 37.86

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FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.53
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.274
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.850 -
USER-DEFINED - 2.00 0.60 0.200 -
USER-DEFINED - 3.80 0.60 0.900 -
USER-DEFINED - 3.80 0.60 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 8.80
EFFECTIVE AREA(ACRES) = 53.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 53.2 PEAK FLOW RATE(CFS) = 46.66

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FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.14
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.66
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 9.93
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

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FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.93
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.225
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	1.60	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.200	-
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 4.79
EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 49.10

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.93
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.225
SUBAREA LOSS RATE DATA (AMC II):

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

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.20
EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 49.30

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 604.00 DOWNSTREAM (FEET) = 546.00
FLOW LENGTH (FEET) = 1271.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.48
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 49.30
PIPE TRAVEL TIME (MIN.) = 1.21 Tc (MIN.) = 11.15
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 11.15
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.152
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.200	-
USER-DEFINED	-	1.20	0.60	0.100	-
USER-DEFINED	-	1.20	0.60	0.900	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	1.60	0.60	0.100	-
USER-DEFINED	-	3.00	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 5.62
EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 51.07

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 11.15
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.152
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.900	-
USER-DEFINED	-	0.30	0.60	0.600	-
USER-DEFINED	-	5.00	0.60	0.200	-
USER-DEFINED	-	2.30	0.60	0.850	-
USER-DEFINED	-	3.50	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 10.21
EFFECTIVE AREA (ACRES) = 79.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.49
TOTAL AREA (ACRES) = 79.5 PEAK FLOW RATE (CFS) = 61.28

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 11.15
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.152
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.20	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 7.27
EFFECTIVE AREA (ACRES) = 89.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA (ACRES) = 89.7 PEAK FLOW RATE (CFS) = 68.55

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00
FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.37
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.55
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 11.69
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.69
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.121
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 5.90 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.900 -
USER-DEFINED - 6.00 0.60 0.200 -
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 4.70 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 14.64
EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 80.70

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.71
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.70
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 12.42
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

MAINLINE Tc(MIN.) = 12.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.60 0.100 -
USER-DEFINED - 0.20 0.60 0.850 -
USER-DEFINED - 1.10 0.60 0.200 -
USER-DEFINED - 12.70 0.60 0.100 -
USER-DEFINED - 0.80 0.60 0.850 -
USER-DEFINED - 4.10 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 16.47
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 93.08

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

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

MAINLINE Tc(MIN.) = 12.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.20 0.60 0.100 -
USER-DEFINED - 1.50 0.60 0.850 -
USER-DEFINED - 0.10 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 1.92
EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 95.00

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

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

MAINLINE Tc(MIN.) = 12.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.079
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.100 -
USER-DEFINED - 1.30 0.60 0.100 -
USER-DEFINED - 12.60 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.850 -
USER-DEFINED - 0.10 0.60 0.200 -
USER-DEFINED - 2.10 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 15.33
EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 110.33

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.58
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 110.33
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 12.97
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 12.97
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.048
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 2.14
EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 110.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.97
RAINFALL INTENSITY(INCH/HR) = 1.05
AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.43
EFFECTIVE STREAM AREA(ACRES) = 152.10
TOTAL STREAM AREA(ACRES) = 152.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 110.33

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 137.70 13.51 1.017 0.60(0.19) 0.31 174.3 110.00
1 116.17 21.87 0.727 0.60(0.17) 0.29 227.3 100.00
2 110.33 12.97 1.048 0.60(0.26) 0.43 152.1 120.00

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

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 247.42 12.97 1.048 0.60(0.22) 0.37 319.4 120.00
2 243.73 13.51 1.017 0.60(0.22) 0.37 326.4 110.00
3 181.78 21.87 0.727 0.60(0.21) 0.34 379.4 100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 247.42 Tc(MIN.) = 12.97
EFFECTIVE AREA(ACRES) = 319.43 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 379.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.66
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 247.42
PIPE TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 14.56
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
MAINLINE Tc(MIN.) = 14.56
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.900 -
USER-DEFINED - 1.80 0.60 0.100 -
USER-DEFINED - 1.40 0.60 0.900 -
USER-DEFINED - 0.80 0.60 0.100 -
USER-DEFINED - 1.60 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 3.94
EFFECTIVE AREA(ACRES) = 326.23 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 247.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.56

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	1.50	0.60	0.600	-
USER-DEFINED	-	0.20	0.60	0.500	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.344

SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 3.18

EFFECTIVE AREA(ACRES) = 330.93 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 247.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.56

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.400	-
USER-DEFINED	-	4.70	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	3.80	0.60	0.600	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.386

SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 8.95

EFFECTIVE AREA(ACRES) = 344.63 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 247.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.56

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.500	-
USER-DEFINED	-	0.70	0.60	0.400	-

USER-DEFINED	-	5.00	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	10.30	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.900	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253

SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 14.93

EFFECTIVE AREA(ACRES) = 365.23 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 247.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.56

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.957

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.600	-
USER-DEFINED	-	3.90	0.60	0.500	-
USER-DEFINED	-	2.30	0.60	0.400	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.487

SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 4.49

EFFECTIVE AREA(ACRES) = 372.73 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 247.42

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00

FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.42

ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 247.42

PIPE TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 16.02

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.02

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.898

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.60	0.500	-
USER-DEFINED	-	0.70	0.60	0.400	-

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USER-DEFINED      -      1.30      0.60      0.100      -
USER-DEFINED      -      1.20      0.60      0.900      -
USER-DEFINED      -      0.10      0.60      0.600      -
USER-DEFINED      -      1.30      0.60      0.100      -
USER-DEFINED      -      0.10      0.60      0.850      -
USER-DEFINED      -      3.00      0.60      0.900      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598
SUBAREA AREA (ACRES) = 7.00      SUBAREA RUNOFF (CFS) = 3.40
EFFECTIVE AREA (ACRES) = 379.73      AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.37
TOTAL AREA (ACRES) = 439.7      PEAK FLOW RATE (CFS) = 247.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc (MIN.) = 16.02
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.898
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.50      0.60      0.600      -
USER-DEFINED      -      0.80      0.60      0.100      -
USER-DEFINED      -      1.30      0.60      0.900      -
USER-DEFINED      -      3.30      0.60      0.600      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.599
SUBAREA AREA (ACRES) = 7.90      SUBAREA RUNOFF (CFS) = 3.83
EFFECTIVE AREA (ACRES) = 387.63      AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 0.38
TOTAL AREA (ACRES) = 447.6      PEAK FLOW RATE (CFS) = 247.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10
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>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<
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FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 765.00      DOWNSTREAM (FEET) = 675.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.312
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.301
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS      Tc
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN      (MIN.)
NATURAL FAIR COVER

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"OPEN BRUSH"      -      1.50      0.60      1.000      56      9.31
NATURAL FAIR COVER
"WOODLAND, GRASS"      -      0.40      0.60      1.000      56      9.31
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 1.20
TOTAL AREA (ACRES) = 1.90      PEAK FLOW RATE (CFS) = 1.20

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*****
FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 675.00      DOWNSTREAM (FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00      CHANNEL SLOPE = 0.0950
CHANNEL BASE (FEET) = 0.00      "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040      MAXIMUM DEPTH (FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.164
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      4.90      0.60      1.000      -
USER-DEFINED      -      2.40      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 3.06
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.32
AVERAGE FLOW DEPTH (FEET) = 0.49      TRAVEL TIME (MIN.) = 1.62
Tc (MIN.) = 10.94
SUBAREA AREA (ACRES) = 7.30      SUBAREA RUNOFF (CFS) = 3.70
EFFECTIVE AREA (ACRES) = 9.20      AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60      AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 9.2      PEAK FLOW RATE (CFS) = 4.67

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.57      FLOW VELOCITY (FEET/SEC.) = 4.80
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

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*****
FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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ELEVATION DATA: UPSTREAM (FEET) = 635.00      DOWNSTREAM (FEET) = 631.00
FLOW LENGTH (FEET) = 501.00      MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.10
ESTIMATED PIPE DIAMETER (INCH) = 18.00      NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.67
PIPE TRAVEL TIME (MIN.) = 1.64      Tc (MIN.) = 12.57
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

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*****
FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 12.57
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.070
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.10	0.60	1.000	-
USER-DEFINED	-	4.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 3.85
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 7.75

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 631.00 DOWNSTREAM(FEET) = 630.00
 FLOW LENGTH(FEET) = 711.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 2.92
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.75
 PIPE TRAVEL TIME(MIN.) = 4.06 Tc(MIN.) = 16.63
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.63
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.878
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	5.70	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 3.30
 EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 7.88

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.63
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.878
 SUBAREA LOSS RATE DATA(AMC II):

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

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.05
 EFFECTIVE AREA(ACRES) = 31.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 31.7 PEAK FLOW RATE(CFS) = 7.93

FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 628.00
 FLOW LENGTH(FEET) = 910.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 3.55
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.93
 PIPE TRAVEL TIME(MIN.) = 4.27 Tc(MIN.) = 20.91
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 20.91
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.747
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 0.86
 EFFECTIVE AREA(ACRES) = 38.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 38.2 PEAK FLOW RATE(CFS) = 7.93
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 610.00

FLOW LENGTH(FEET) = 796.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.77
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.93
 PIPE TRAVEL TIME(MIN.) = 1.51 Tc(MIN.) = 22.42
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

 FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 22.42
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.716
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	4.50	0.60	1.000	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	3.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 1.37
 EFFECTIVE AREA(ACRES) = 51.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 51.3 PEAK FLOW RATE(CFS) = 7.93
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 410.00
 FLOW LENGTH(FEET) = 6198.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.83
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 7.93
 PIPE TRAVEL TIME(MIN.) = 10.51 Tc(MIN.) = 32.93
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

 ** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	---------------	---------------	-------------------

1 7.93 32.93 0.563 0.60(0.60) 1.00 51.3 150.00
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	247.42	16.02	0.898	0.60(0.22)	0.38	387.6	120.00
2	243.73	16.56	0.880	0.60(0.22)	0.37	394.6	110.00
3	188.22	25.12	0.660	0.60(0.21)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	253.57	16.02	0.898	0.60(0.25)	0.41	412.6	120.00
2	249.96	16.56	0.880	0.60(0.25)	0.41	420.4	110.00
3	195.31	25.12	0.660	0.60(0.24)	0.41	486.7	100.00
4	160.80	32.93	0.563	0.60(0.25)	0.42	498.9	150.00

TOTAL AREA(ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 253.57 Tc(MIN.) = 16.018
 EFFECTIVE AREA(ACRES) = 412.58 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 498.9
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.02
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.898
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	1.30	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	0.900	-
USER-DEFINED	-	1.90	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.80	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971
 SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 2.53
 EFFECTIVE AREA(ACRES) = 421.48 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 507.8 PEAK FLOW RATE(CFS) = 253.57
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 16.02
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.898

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	1.50	0.60	0.900	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	0.900	-

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

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919

SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 0.75

EFFECTIVE AREA (ACRES) = 423.88 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA (ACRES) = 510.2 PEAK FLOW RATE (CFS) = 253.57

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 510.2 TC (MIN.) = 16.02

EFFECTIVE AREA (ACRES) = 423.88 AREA-AVERAGED Fm (INCH/HR) = 0.26

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.427

PEAK FLOW RATE (CFS) = 253.57

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	253.57	16.02	0.898	0.60 (0.26)	0.43	423.9	120.00
2	249.96	16.56	0.880	0.60 (0.26)	0.43	431.7	110.00
3	195.31	25.12	0.660	0.60 (0.25)	0.42	498.0	100.00
4	160.80	32.93	0.563	0.60 (0.26)	0.43	510.2	150.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1264

Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* -YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A05EVRL.DAT
TIME/DATE OF STUDY: 17:18 12/04/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.642
- 2) 10.00; 1.762
- 3) 15.00; 1.304
- 4) 20.00; 1.115
- 5) 25.00; 0.974
- 6) 30.00; 0.875
- 7) 40.00; 0.748
- 8) 50.00; 0.665
- 9) 60.00; 0.603
- 10) 90.00; 0.500
- 11) 120.00; 0.441
- 12) 180.00; 0.369
- 13) 360.00; 0.272
- 14) 1200.00; 0.119

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	STREET-CROSSFALL: HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	HIKE LIP (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.865
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.10	0.50	1.000	56	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.35
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 1.35

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.686
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.61
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.53
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 1.42
Tc(MIN.) = 10.83
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 4.51
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 5.3 PEAK FLOW RATE(CFS) = 5.69

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.61 FLOW VELOCITY(FEET/SEC.) = 5.04
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 605.00 DOWNSTREAM ELEVATION(FEET) = 584.00
STREET LENGTH(FEET) = 264.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.97

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.29
HALFSTREET FLOOD WIDTH(FEET) = 7.03
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.48
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.58
STREET FLOW TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 11.63

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.612

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.900	-
USER-DEFINED	-	1.00	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA(ACRES) = 2.10 SUBAREA RUNOFF(CFS) = 2.56
EFFECTIVE AREA(ACRES) = 7.40 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 7.4 PEAK FLOW RATE(CFS) = 7.89

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.30 HALFSTREET FLOOD WIDTH(FEET) = 7.59
FLOW VELOCITY(FEET/SEC.) = 5.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.66
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 584.00 DOWNSTREAM ELEVATION(FEET) = 564.00
STREET LENGTH(FEET) = 494.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.71

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 11.76
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.80
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.79
STREET FLOW TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 13.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.455

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.900	-
USER-DEFINED	-	6.60	0.50	0.100	-
USER-DEFINED	-	1.80	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA(ACRES) = 9.80 SUBAREA RUNOFF(CFS) = 11.64
EFFECTIVE AREA(ACRES) = 17.20 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 17.2 PEAK FLOW RATE(CFS) = 18.48

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.40 HALFSTREET FLOOD WIDTH(FEET) = 13.40
FLOW VELOCITY(FEET/SEC.) = 5.14 DEPTH*VELOCITY(FT*FT/SEC.) = 2.07
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 564.00 DOWNSTREAM(FEET) = 520.00
FLOW LENGTH(FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.78
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.48
PIPE TRAVEL TIME(MIN.) = 2.06 Tc(MIN.) = 15.41
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 15.41
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.289
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.60    0.50    0.100  -
USER-DEFINED        -         3.90    0.50    0.100  -
USER-DEFINED        -         0.20    0.50    0.850  -
USER-DEFINED        -         0.90    0.50    0.900  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA (ACRES) = 5.60    SUBAREA RUNOFF (CFS) = 5.85
EFFECTIVE AREA (ACRES) = 22.80    AREA-AVERAGED Fm (INCH/HR) = 0.23
AREA-AVERAGED Fp (INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.46
TOTAL AREA (ACRES) = 22.8    PEAK FLOW RATE (CFS) = 21.75

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*****
FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 15.41
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.289
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.60    0.50    0.100  -
USER-DEFINED        -         0.30    0.50    0.850  -
USER-DEFINED        -         0.40    0.50    0.900  -
USER-DEFINED        -         5.00    0.50    0.100  -
USER-DEFINED        -         2.10    0.50    0.850  -
USER-DEFINED        -         0.80    0.50    0.900  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 9.20    SUBAREA RUNOFF (CFS) = 9.01
EFFECTIVE AREA (ACRES) = 32.00    AREA-AVERAGED Fm (INCH/HR) = 0.22
AREA-AVERAGED Fp (INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 32.0    PEAK FLOW RATE (CFS) = 30.77

```

```

*****
FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81
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```

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 15.41
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.289
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.80    0.50    0.100  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 1.80    SUBAREA RUNOFF (CFS) = 2.01
EFFECTIVE AREA (ACRES) = 33.80    AREA-AVERAGED Fm (INCH/HR) = 0.21
AREA-AVERAGED Fp (INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 33.8    PEAK FLOW RATE (CFS) = 32.77

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*****
FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

```

```

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 520.00 DOWNSTREAM (FEET) = 503.00
FLOW LENGTH (FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.84
ESTIMATED PIPE DIAMETER (INCH) = 27.00    NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 32.77
PIPE TRAVEL TIME (MIN.) = 1.13    Tc (MIN.) = 16.54
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

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*****
FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 16.54
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.246
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.80    0.50    0.100  -
USER-DEFINED        -         7.60    0.50    0.100  -
USER-DEFINED        -         0.40    0.50    0.850  -
USER-DEFINED        -        10.50    0.50    0.100  -
USER-DEFINED        -         0.30    0.50    0.900  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA (ACRES) = 21.60    SUBAREA RUNOFF (CFS) = 23.00
EFFECTIVE AREA (ACRES) = 55.40    AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.31
TOTAL AREA (ACRES) = 55.4    PEAK FLOW RATE (CFS) = 54.47

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```

*****
FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81
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```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 16.54
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.246
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp    Ap    SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         6.80    0.50    0.100  -
USER-DEFINED        -        12.10    0.50    0.100  -
USER-DEFINED        -         1.00    0.50    0.850  -
USER-DEFINED        -         4.50    0.50    0.100  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA (ACRES) = 24.40    SUBAREA RUNOFF (CFS) = 25.92
EFFECTIVE AREA (ACRES) = 79.80    AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.50    AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 79.8    PEAK FLOW RATE (CFS) = 80.40

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```

*****
FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31
-----

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```

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

```

```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.00
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.40
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 17.44
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
-----
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 17.44
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.212
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.40 0.50 0.100 -
USER-DEFINED - 6.70 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.850 -
USER-DEFINED - 2.50 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 13.25
EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 91.20
```

```
*****
FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81
-----
```

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

```
MAINLINE Tc(MIN.) = 17.44
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.212
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.20 0.50 0.100 -
USER-DEFINED - 0.70 0.50 0.850 -
USER-DEFINED - 7.60 0.50 0.100 -
USER-DEFINED - 0.30 0.50 0.850 -
USER-DEFINED - 4.70 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.850 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 21.38
EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 112.59
```

```
*****
FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31
-----
```

```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.41
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 112.59
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 19.09
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
-----
```

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

```
MAINLINE Tc(MIN.) = 19.09
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.900 -
USER-DEFINED - 2.80 0.50 0.100 -
USER-DEFINED - 0.80 0.50 0.900 -
USER-DEFINED - 0.60 0.50 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 7.71
EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 113.92
```

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*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81
-----
```

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

```
MAINLINE Tc(MIN.) = 19.09
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 5.50 0.50 0.200 -
USER-DEFINED - 3.20 0.50 0.200 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 8.59
EFFECTIVE AREA(ACRES) = 130.80 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.22
TOTAL AREA(ACRES) = 130.8 PEAK FLOW RATE(CFS) = 122.52
```

```
*****
FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1
-----
```

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

```

=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 19.09
RAINFALL INTENSITY(INCH/HR) = 1.15
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.22
EFFECTIVE STREAM AREA(ACRES) = 130.80
TOTAL STREAM AREA(ACRES) = 130.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 122.52

```

```

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

```

```

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 645.00 DOWNSTREAM(FEET) = 625.00

```

```

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.417
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.569
SUBAREA Tc AND LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
".4 DWELLING/ACRE"	-	0.40	0.50	0.900	56	8.68
COMMERCIAL	-	0.30	0.50	0.100	56	5.42
PUBLIC PARK	-	1.30	0.50	0.850	56	8.61
RESIDENTIAL						
".4 DWELLING/ACRE"	-	1.00	0.50	0.900	56	8.68
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50						
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798						
SUBAREA RUNOFF(CFS) = 5.86						
TOTAL AREA(ACRES) = 3.00 PEAK FLOW RATE(CFS) = 5.86						

```

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

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

```

```

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 595.00
STREET LENGTH(FEET) = 517.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

```

```

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

```

```

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

```

```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.65

```

```

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.16
AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.12
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.67
STREET FLOW TRAVEL TIME(MIN.) = 1.68 Tc(MIN.) = 7.10
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.272
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.900	-
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.900	-

```

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 3.90 SUBAREA RUNOFF(CFS) = 7.58
EFFECTIVE AREA(ACRES) = 6.90 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 6.9 PEAK FLOW RATE(CFS) = 12.64

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.43
FLOW VELOCITY(FEET/SEC.) = 5.42 DEPTH*VELOCITY(FT*FT/SEC.) = 1.89
LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

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*****
FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62
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>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====

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UPSTREAM ELEVATION(FEET) = 595.00 DOWNSTREAM ELEVATION(FEET) = 585.00
STREET LENGTH(FEET) = 389.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

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```

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.70

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STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 15.20
AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.37
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.89
STREET FLOW TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 8.59
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.011
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.00	0.50	0.100	-
USER-DEFINED	-	2.20	0.50	0.900	-

USER-DEFINED - 1.00 0.50 0.100 -
 USER-DEFINED - 0.30 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 14.10
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 25.12

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.84
 FLOW VELOCITY(FEET/SEC.) = 4.61 DEPTH*VELOCITY(FT*FT/SEC.) = 2.14
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.03
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 25.12
 PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 9.56
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 1.60 0.50 0.100 -
 USER-DEFINED - 0.20 0.50 0.850 -
 USER-DEFINED - 1.10 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 4.21
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 26.95

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 9.00 0.50 0.100 -
 USER-DEFINED - 1.90 0.50 0.850 -
 USER-DEFINED - 2.70 0.50 0.900 -
 USER-DEFINED - 4.10 0.50 0.100 -
 USER-DEFINED - 0.30 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 27.27
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 54.23

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 4.50 0.50 0.100 -
 USER-DEFINED - 1.20 0.50 0.850 -
 USER-DEFINED - 3.80 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 13.53
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 67.76

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.840
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 5.30 0.50 1.000 -
 USER-DEFINED - 0.30 0.50 1.000 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 6.75
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 74.51

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.33
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 74.51
 PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 10.60
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.60
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.707
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.40	0.50	0.100	-
USER-DEFINED	-	11.00	0.50	0.100	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	1.50	0.50	0.900	-
USER-DEFINED	-	3.20	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.222
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 30.03
 EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 98.41

FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.22
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 98.41
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 11.47
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.47
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.628
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.10	0.50	0.100	-
USER-DEFINED	-	1.40	0.50	0.850	-

USER-DEFINED - 1.10 0.50 0.900 -
 USER-DEFINED - 5.10 0.50 0.100 -
 USER-DEFINED - 1.90 0.50 0.850 -
 USER-DEFINED - 3.60 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.485
 SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 20.19
 EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 113.41

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.47
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.628
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.70	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	0.50	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.244
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.47
 EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 117.88

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.47
 RAINFALL INTENSITY(INCH/HR) = 1.63
 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.40
 EFFECTIVE STREAM AREA(ACRES) = 91.80
 TOTAL STREAM AREA(ACRES) = 91.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 117.88

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	122.52	19.09	1.149	0.50(0.11)	0.22	130.8	100.00
2	117.88	11.47	1.628	0.50(0.20)	0.40	91.8	110.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	225.29	11.47	1.628	0.50(0.16)	0.32	170.4	110.00
2	200.89	19.09	1.149	0.50(0.15)	0.29	222.6	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 225.29 Tc(MIN.) = 11.47
 EFFECTIVE AREA(ACRES) = 170.37 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 222.6
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.99
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 225.29
 PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 12.62
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.62
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.522
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	3.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 6.23
 EFFECTIVE AREA(ACRES) = 175.07 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 225.29
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 12.62
 RAINFALL INTENSITY(INCH/HR) = 1.52
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA(ACRES) = 175.07
 TOTAL STREAM AREA(ACRES) = 227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 225.29

 FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
 ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.311
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.50	0.50	0.100	56	6.88
PUBLIC PARK	-	0.20	0.50	0.850	56	10.93
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	2.70	0.50	0.200	56	7.33
RESIDENTIAL ".4 DWELLING/ACRE"	-	1.40	0.50	0.900	56	11.02
PUBLIC PARK	-	0.10	0.50	0.850	56	10.93
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	1.30	0.50	0.200	56	7.33

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
 SUBAREA RUNOFF(CFS) = 11.83
 TOTAL AREA(ACRES) = 6.20 PEAK FLOW RATE(CFS) = 11.83

 FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 6.88
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.311
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
 SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.33
 EFFECTIVE AREA(ACRES) = 6.40 AREA-AVERAGED Fm(INCH/HR) = 0.20
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 6.4 PEAK FLOW RATE(CFS) = 12.17

 FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 626.00
 FLOW LENGTH(FEET) = 425.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.74
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 12.17
 PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 7.69
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

 FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 7.69
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.169
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.40	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.900	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA(ACRES) = 9.10 SUBAREA RUNOFF(CFS) = 16.03
 EFFECTIVE AREA(ACRES) = 15.50 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 15.5 PEAK FLOW RATE(CFS) = 27.37

 FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 626.00 DOWNSTREAM(FEET) = 606.00
 FLOW LENGTH(FEET) = 1030.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.79
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 27.37
 PIPE TRAVEL TIME(MIN.) = 1.59 Tc(MIN.) = 9.28
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.28
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.889
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.60	0.50	0.200	-
USER-DEFINED	-	1.40	0.50	0.100	-
USER-DEFINED	-	2.30	0.50	0.200	-

USER-DEFINED - 6.50 0.50 0.900 -
 USER-DEFINED - 8.40 0.50 0.600 -
 USER-DEFINED - 0.50 0.50 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491
 SUBAREA AREA(ACRES) = 26.70 SUBAREA RUNOFF(CFS) = 39.48
 EFFECTIVE AREA(ACRES) = 42.20 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 42.2 PEAK FLOW RATE(CFS) = 62.95

 FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.28
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.889
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	2.00	0.50	0.200	-
USER-DEFINED	-	3.80	0.50	0.900	-
USER-DEFINED	-	3.80	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
 SUBAREA AREA(ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 15.52
 EFFECTIVE AREA(ACRES) = 53.20 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 53.2 PEAK FLOW RATE(CFS) = 78.47

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
 FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.60
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 78.47
 PIPE TRAVEL TIME(MIN.) = 0.35 Tc(MIN.) = 9.63
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 9.63
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.827
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-

USER-DEFINED - 1.60 0.50 0.100 -
 USER-DEFINED - 0.20 0.50 0.850 -
 USER-DEFINED - 0.30 0.50 0.200 -
 USER-DEFINED - 2.10 0.50 0.100 -
 USER-DEFINED - 0.60 0.50 0.850 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.231
 SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 7.55
 EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 83.08

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.63
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.827
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.200	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.31
 EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 83.39

 FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 604.00 DOWNSTREAM (FEET) = 546.00
 FLOW LENGTH (FEET) = 1271.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.94
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 83.39
 PIPE TRAVEL TIME (MIN.) = 1.06 Tc (MIN.) = 10.69
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 10.69
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.200	-
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	1.20	0.50	0.900	-

USER-DEFINED - 0.10 0.50 0.200 -
 USER-DEFINED - 1.60 0.50 0.100 -
 USER-DEFINED - 3.00 0.50 0.900 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.550
 SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 9.74
 EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 86.38

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 10.69
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.900	-
USER-DEFINED	-	0.30	0.50	0.600	-
USER-DEFINED	-	5.00	0.50	0.200	-
USER-DEFINED	-	2.30	0.50	0.850	-
USER-DEFINED	-	3.50	0.50	0.900	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA (ACRES) = 13.60 SUBAREA RUNOFF (CFS) = 17.55
 EFFECTIVE AREA (ACRES) = 79.50 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.49
 TOTAL AREA (ACRES) = 79.5 PEAK FLOW RATE (CFS) = 103.93

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 10.69
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.20	0.50	0.600	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 12.84
 EFFECTIVE AREA (ACRES) = 89.70 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 89.7 PEAK FLOW RATE (CFS) = 116.76

 FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 546.00 DOWNSTREAM (FEET) = 525.00

FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.70
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 116.76
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 11.17
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

 FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.17
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.655
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.90	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.900	-
USER-DEFINED	-	6.00	0.50	0.200	-
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	4.70	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.395
 SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 24.14
 EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.49
 TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 137.38

 FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
 FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.80
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 137.38
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 11.81
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

MAINLINE Tc(MIN.) = 11.81
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-

USER-DEFINED - 1.10 0.50 0.200 -
 USER-DEFINED - 12.70 0.50 0.100 -
 USER-DEFINED - 0.80 0.50 0.850 -
 USER-DEFINED - 4.10 0.50 0.900 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.303
 SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 26.53
 EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 158.21

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

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

MAINLINE Tc(MIN.) = 11.81
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.20	0.50	0.100	-
USER-DEFINED	-	1.50	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 3.35
 EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 161.56

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

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

MAINLINE Tc(MIN.) = 11.81
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	12.60	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	2.10	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.238
 SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 24.20
 EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 185.76

 FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.08
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 185.76
PIPE TRAVEL TIME(MIN.) = 0.47 Tc(MIN.) = 12.28
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.28
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.553
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.20 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 3.37
EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 185.76
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.28
RAINFALL INTENSITY(INCH/HR) = 1.55
AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.43
EFFECTIVE STREAM AREA(ACRES) = 152.10
TOTAL STREAM AREA(ACRES) = 152.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 185.76

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 225.29 12.62 1.522 0.50(0.16) 0.31 175.1 110.00
1 200.89 20.28 1.107 0.50(0.14) 0.29 227.3 100.00
2 185.76 12.28 1.553 0.50(0.21) 0.43 152.1 120.00

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

** PEAK FLOW RATE TABLE **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 409.97 12.28 1.553 0.50(0.18) 0.37 322.4 120.00
2 406.71 12.62 1.522 0.50(0.18) 0.37 327.2 110.00
3 324.78 20.28 1.107 0.50(0.17) 0.34 379.4 100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 409.97 Tc(MIN.) = 12.28
EFFECTIVE AREA(ACRES) = 322.43 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 379.4
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 54.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.72
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 409.97
PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 13.69
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.69
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.900 -
USER-DEFINED - 1.80 0.50 0.100 -
USER-DEFINED - 1.40 0.50 0.900 -
USER-DEFINED - 0.80 0.50 0.100 -
USER-DEFINED - 1.60 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 7.11
EFFECTIVE AREA(ACRES) = 329.23 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 409.97
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.69
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	1.50	0.50	0.600	-
USER-DEFINED	-	0.20	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 5.30
 EFFECTIVE AREA(ACRES) = 333.93 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 409.97
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.69
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.400	-
USER-DEFINED	-	4.70	0.50	0.100	-
USER-DEFINED	-	1.30	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	3.80	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.386
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 15.18
 EFFECTIVE AREA(ACRES) = 347.63 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 409.97
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.69
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.40	0.50	0.500	-
USER-DEFINED	-	0.70	0.50	0.400	-
USER-DEFINED	-	5.00	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	10.30	0.50	0.200	-

USER-DEFINED - 0.10 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
 SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 24.06
 EFFECTIVE AREA(ACRES) = 368.23 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 411.85

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.69
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.424
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.600	-
USER-DEFINED	-	3.90	0.50	0.500	-
USER-DEFINED	-	2.30	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487
 SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 7.97
 EFFECTIVE AREA(ACRES) = 375.73 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 419.82

 FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00
 FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.46
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 419.82
 PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 14.96
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.96
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	1.20	0.50	0.900	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-

USER-DEFINED - 3.00 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598
 SUBAREA AREA (ACRES) = 7.00 SUBAREA RUNOFF (CFS) = 6.36
 EFFECTIVE AREA (ACRES) = 382.73 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 439.7 PEAK FLOW RATE (CFS) = 419.82
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 14.96
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.308
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.50	0.50	0.600	-
USER-DEFINED	-	0.80	0.50	0.100	-
USER-DEFINED	-	1.30	0.50	0.900	-
USER-DEFINED	-	3.30	0.50	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598
 SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 7.17
 EFFECTIVE AREA (ACRES) = 390.63 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 447.6 PEAK FLOW RATE (CFS) = 419.82
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.312
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.883

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	1.50	0.50	1.000	56	9.31
NATURAL FAIR COVER "WOODLAND, GRASS"	-	0.40	0.50	1.000	56	9.31

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.36
 TOTAL AREA (ACRES) = 1.90 PEAK FLOW RATE (CFS) = 2.36

 FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

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

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 635.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00 CHANNEL SLOPE = 0.0950
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MAXIMUM DEPTH (FEET) = 20.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.701

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.90	0.50	1.000	-
USER-DEFINED	-	2.40	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.32
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.17
 AVERAGE FLOW DEPTH (FEET) = 0.64 TRAVEL TIME (MIN.) = 1.36
 Tc (MIN.) = 10.67
 SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 7.89
 EFFECTIVE AREA (ACRES) = 9.20 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 9.2 PEAK FLOW RATE (CFS) = 9.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 5.76
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

 FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 635.00 DOWNSTREAM (FEET) = 631.00
 FLOW LENGTH (FEET) = 501.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.11
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 9.94
 PIPE TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 12.04
 LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

 FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 12.04
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.576
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -       5.10     0.50      1.000     -
USER-DEFINED  -       4.00     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 9.10     SUBAREA RUNOFF (CFS) = 8.81
EFFECTIVE AREA (ACRES) = 18.30  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 18.3     PEAK FLOW RATE (CFS) = 17.71

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FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 631.00  DOWNSTREAM(FEET) = 630.00
FLOW LENGTH(FEET) = 711.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.60
ESTIMATED PIPE DIAMETER(INCH) = 33.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.71
PIPE TRAVEL TIME(MIN.) = 3.29  Tc(MIN.) = 15.33
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

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FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.33
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.292
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -       0.30   0.50  1.000  -
USER-DEFINED      -       5.70   0.50  1.000  -
USER-DEFINED      -       3.40   0.50  1.000  -
USER-DEFINED      -       0.10   0.50  1.000  -
USER-DEFINED      -       2.10   0.50  1.000  -
USER-DEFINED      -       1.60   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.20  SUBAREA RUNOFF (CFS) = 9.40
EFFECTIVE AREA (ACRES) = 31.50  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.5     PEAK FLOW RATE (CFS) = 22.44

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FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.33
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.292
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN

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USER-DEFINED      -       0.20   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.20  SUBAREA RUNOFF (CFS) = 0.14
EFFECTIVE AREA (ACRES) = 31.70  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.7     PEAK FLOW RATE (CFS) = 22.58

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FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 630.00  DOWNSTREAM(FEET) = 628.00
FLOW LENGTH(FEET) = 910.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.51
ESTIMATED PIPE DIAMETER(INCH) = 33.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.58
PIPE TRAVEL TIME(MIN.) = 3.36  Tc(MIN.) = 18.69
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

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FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 18.69
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.165
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/  SCS SOIL  AREA  Fp  Ap  SCS
LAND USE          GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED      -       1.60   0.50  1.000  -
USER-DEFINED      -       1.60   0.50  1.000  -
USER-DEFINED      -       1.80   0.50  1.000  -
USER-DEFINED      -       1.50   0.50  1.000  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.50  SUBAREA RUNOFF (CFS) = 3.89
EFFECTIVE AREA (ACRES) = 38.20  AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50  AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 38.2     PEAK FLOW RATE (CFS) = 22.84

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FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 629.00  DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 796.00  MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.01
ESTIMATED PIPE DIAMETER(INCH) = 21.00  NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.84
PIPE TRAVEL TIME(MIN.) = 1.21  Tc(MIN.) = 19.89
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

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FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.89

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.119

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.90	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	4.50	0.50	1.000	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	3.70	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 7.30

EFFECTIVE AREA(ACRES) = 51.30 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.000

TOTAL AREA(ACRES) = 51.3 PEAK FLOW RATE(CFS) = 28.57

FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 410.00

FLOW LENGTH(FEET) = 6198.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.4 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 13.43

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

PIPE-FLOW(CFS) = 28.57

PIPE TRAVEL TIME(MIN.) = 7.69 Tc(MIN.) = 27.58

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	28.57	27.58	0.923	0.50(0.50)	1.00	51.3	150.00

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	419.82	14.96	1.308	0.50(0.19)	0.37	390.6	120.00
2	414.48	15.30	1.293	0.50(0.19)	0.37	395.4	110.00
3	347.17	23.09	1.028	0.50(0.18)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	448.39	14.96	1.308	0.50(0.21)	0.42	418.4	120.00
2	443.05	15.30	1.293	0.50(0.21)	0.42	423.8	110.00
3	375.74	23.09	1.028	0.50(0.21)	0.41	490.5	100.00
4	332.86	27.58	0.923	0.50(0.21)	0.42	498.9	150.00

TOTAL AREA(ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 448.39 Tc(MIN.) = 14.955

EFFECTIVE AREA(ACRES) = 418.45 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 498.9

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.96

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.50	1.000	-
USER-DEFINED	-	1.30	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	0.900	-
USER-DEFINED	-	1.90	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	0.80	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971

SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 6.59

EFFECTIVE AREA(ACRES) = 427.35 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 507.8 PEAK FLOW RATE(CFS) = 448.39

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.96

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.308

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	1.50	0.50	0.900	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919

SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 1.83
 EFFECTIVE AREA (ACRES) = 429.75 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 510.2 PEAK FLOW RATE (CFS) = 448.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 510.2 TC (MIN.) = 14.96
 EFFECTIVE AREA (ACRES) = 429.75 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.430
 PEAK FLOW RATE (CFS) = 448.39

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	448.39	14.96	1.308	0.50 (0.22)	0.43	429.7	120.00
2	443.05	15.30	1.293	0.50 (0.21)	0.43	435.1	110.00
3	375.74	23.09	1.028	0.50 (0.21)	0.42	501.8	100.00
4	332.86	27.58	0.923	0.50 (0.22)	0.43	510.2	150.00

=====
 END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 10-YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A10EVRL.DAT
TIME/DATE OF STUDY: 17:19 12/04/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.775
- 2) 10.00; 2.517
- 3) 15.00; 1.863
- 4) 20.00; 1.593
- 5) 25.00; 1.391
- 6) 30.00; 1.250
- 7) 40.00; 1.068
- 8) 50.00; 0.950
- 9) 60.00; 0.862
- 10) 90.00; 0.714
- 11) 120.00; 0.630
- 12) 180.00; 0.528
- 13) 360.00; 0.388
- 14) 1200.00; 0.170

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.665
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.34
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 2.34

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.433
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.90	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	2.60	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.39
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.23
AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 1.23
Tc(MIN.) = 10.64
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 8.08
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 5.3 PEAK FLOW RATE (CFS) = 10.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.76 FLOW VELOCITY (FEET/SEC.) = 5.88
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 605.00 DOWNSTREAM ELEVATION (FEET) = 584.00
STREET LENGTH (FEET) = 264.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.26

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.33
HALFSTREET FLOOD WIDTH (FEET) = 9.53
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.10
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.03
STREET FLOW TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 11.36
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.339

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 4.13
EFFECTIVE AREA (ACRES) = 7.40 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 7.4 PEAK FLOW RATE (CFS) = 13.87

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 10.12
FLOW VELOCITY (FEET/SEC.) = 6.26 DEPTH*VELOCITY (FT*FT/SEC.) = 2.15
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 584.00 DOWNSTREAM ELEVATION (FEET) = 564.00

STREET LENGTH (FEET) = 494.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 22.95

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.43
HALFSTREET FLOOD WIDTH (FEET) = 14.73
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.39
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.29
STREET FLOW TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 12.89
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.139

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	6.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA (ACRES) = 9.80 SUBAREA RUNOFF (CFS) = 18.15
EFFECTIVE AREA (ACRES) = 17.20 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 30.69

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.60
FLOW VELOCITY (FEET/SEC.) = 5.78 DEPTH*VELOCITY (FT*FT/SEC.) = 2.65
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 564.00 DOWNSTREAM (FEET) = 520.00
FLOW LENGTH (FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.26
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 30.69
PIPE TRAVEL TIME (MIN.) = 1.83 Tc (MIN.) = 14.72
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 3.90 0.30 0.100 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 9.19
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 36.17

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
PUBLIC PARK B 0.30 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
COMMERCIAL B 5.00 0.30 0.100 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 14.74
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE(CFS) = 50.91

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.900
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.80 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.03
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE(CFS) = 53.93

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.12
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 53.93
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 15.74
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.74
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.80 0.30 0.100 56
COMMERCIAL B 7.60 0.30 0.100 56
PUBLIC PARK B 0.40 0.30 0.850 56
COMMERCIAL B 10.50 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 34.71
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE(CFS) = 86.31

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.74
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.80 0.30 0.100 56
COMMERCIAL B 12.10 0.30 0.100 56
PUBLIC PARK B 1.00 0.30 0.850 56
COMMERCIAL B 4.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
 SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 39.17
 EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 125.48

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
 FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.71
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 125.48
 PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 16.55
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.55
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 19.98
 EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 142.33

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.55
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.779
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 32.62
 EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 174.96

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.49
 ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 174.96
 PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 18.03
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.03
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
 SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 12.17
 EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 178.96

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.03
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.699
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

APARTMENTS B 3.20 0.30 0.200 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 13.43
 EFFECTIVE AREA (ACRES) = 130.80 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA (ACRES) = 130.8 PEAK FLOW RATE (CFS) = 192.39

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 18.03
 RAINFALL INTENSITY (INCH/HR) = 1.70
 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.22
 EFFECTIVE STREAM AREA (ACRES) = 130.80
 TOTAL STREAM AREA (ACRES) = 130.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 192.39

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

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

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 645.00 DOWNSTREAM (FEET) = 625.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.417
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.670
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56	8.68
COMMERCIAL	B	0.30	0.30	0.100	56	5.42
PUBLIC PARK	B	1.30	0.30	0.850	56	8.61
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56	8.68

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798
 SUBAREA RUNOFF (CFS) = 9.26
 TOTAL AREA (ACRES) = 3.00 PEAK FLOW RATE (CFS) = 9.26

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

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

=====

UPSTREAM ELEVATION (FEET) = 625.00 DOWNSTREAM ELEVATION (FEET) = 595.00
 STREET LENGTH (FEET) = 517.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.91
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.36
 HALFSTREET FLOOD WIDTH (FEET) = 11.29
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.60
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.04
 STREET FLOW TRAVEL TIME (MIN.) = 1.54 Tc (MIN.) = 6.96
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.283

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.30	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 11.29
 EFFECTIVE AREA (ACRES) = 6.90 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 6.9 PEAK FLOW RATE (CFS) = 19.50

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.70
 FLOW VELOCITY (FEET/SEC.) = 5.97 DEPTH*VELOCITY (FT*FT/SEC.) = 2.32
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION (FEET) = 595.00 DOWNSTREAM ELEVATION (FEET) = 585.00
 STREET LENGTH (FEET) = 389.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.39
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.49
 HALFSTREET FLOOD WIDTH(FEET) = 18.16
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 4.84
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.36
 STREET FLOW TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 8.30
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.946
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 21.76
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 39.17

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 20.12
 FLOW VELOCITY(FEET/SEC.) = 5.14 DEPTH*VELOCITY(FT*FT/SEC.) = 2.68
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 13.82
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 39.17
 PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 9.14
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.14
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.733
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					

".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.78
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 43.00

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.14
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.733
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.00	0.30	0.100	56
PUBLIC PARK	B	1.90	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
COMMERCIAL	B	4.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 42.75
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 85.75

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.14
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.733
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.50	0.30	0.100	56
PUBLIC PARK	B	1.20	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.80	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 22.04
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 107.79

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.14
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.733
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.30 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 12.26
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 120.05

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.33
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 120.05
 PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 10.07
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.07
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.508
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.40 0.30 0.100 56
 COMMERCIAL B 11.00 0.30 0.100 56
 PUBLIC PARK B 1.80 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
 COMMERCIAL B 3.20 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.222
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 45.93
 EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 155.59

 FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.76
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 155.59
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 10.85
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.85
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.406
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.10 0.30 0.100 56
 PUBLIC PARK B 1.40 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 COMMERCIAL B 5.10 0.30 0.100 56
 PUBLIC PARK B 1.90 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.60 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.485
 SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 32.96
 EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 181.93

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.85
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.406
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.70 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.50 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.244
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.93
 EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 188.86

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.85
RAINFALL INTENSITY(INCH/HR) = 2.41
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 188.86

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 354.66 Tc(MIN.) = 10.85
EFFECTIVE AREA(ACRES) = 170.49 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 55.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.57
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 354.66
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 11.88
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.272

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 56
COMMERCIAL B 3.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 9.48
EFFECTIVE AREA(ACRES) = 175.19 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 354.66
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.88
RAINFALL INTENSITY(INCH/HR) = 2.27
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.19
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 354.66

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.302
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.50 0.30 0.100 56 6.88
PUBLIC PARK B 0.20 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.70 0.30 0.200 56 7.33
RESIDENTIAL
".4 DWELLING/ACRE" B 1.40 0.30 0.900 56 11.02
PUBLIC PARK B 0.10 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 7.33
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA RUNOFF(CFS) = 17.79

TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 17.79

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 6.88

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.302

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

RESIDENTIAL

" .4 DWELLING/ACRE" B 0.20 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.55

EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 18.33

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 626.00

FLOW LENGTH (FEET) = 425.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 9.69

ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 18.33

PIPE TRAVEL TIME (MIN.) = 0.73 Tc (MIN.) = 7.61

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 7.61

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.118

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.40	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.40	0.30	0.900	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.40 0.30 0.200 56

RESIDENTIAL

" .4 DWELLING/ACRE" B 2.40 0.30 0.900 56

COMMERCIAL B 0.70 0.30 0.100 56

RESIDENTIAL

" .4 DWELLING/ACRE" B 0.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 24.50

EFFECTIVE AREA (ACRES) = 15.50 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 41.77

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 626.00 DOWNSTREAM (FEET) = 606.00

FLOW LENGTH (FEET) = 1030.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 12.19

ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 41.77

PIPE TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 9.02

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.02

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.764

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.60	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.30	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	6.50	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	8.40	0.30	0.600	56
APARTMENTS	B	0.50	0.30	0.200	56

APARTMENTS

COMMERCIAL B 1.40 0.30 0.100 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.30 0.30 0.200 56

RESIDENTIAL

" .4 DWELLING/ACRE" B 6.50 0.30 0.900 56

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 8.40 0.30 0.600 56

APARTMENTS B 0.50 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491

SUBAREA AREA (ACRES) = 26.70 SUBAREA RUNOFF (CFS) = 62.87

EFFECTIVE AREA (ACRES) = 42.20 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46

TOTAL AREA (ACRES) = 42.2 PEAK FLOW RATE (CFS) = 99.70

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.02

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.764

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.00	0.30	0.200	56
RESIDENTIAL					

COMMERCIAL

PUBLIC PARK B 1.10 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.00 0.30 0.200 56

RESIDENTIAL

" .4 DWELLING/ACRE" B 3.80 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.80 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
 SUBAREA AREA (ACRES) = 11.00 SUBAREA RUNOFF (CFS) = 25.45
 EFFECTIVE AREA (ACRES) = 53.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 53.2 PEAK FLOW RATE (CFS) = 125.16

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
 FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.73
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 125.16
 PIPE TRAVEL TIME (MIN.) = 0.32 Tc (MIN.) = 9.33
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

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MAINLINE Tc (MIN.) = 9.33
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.684
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	0.30	0.30	0.200	56
COMMERCIAL	B	2.10	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
 SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 11.53
 EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 132.89

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 9.33
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.684
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.47
 EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 133.36

 FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 604.00 DOWNSTREAM(FEET) = 546.00
 FLOW LENGTH(FEET) = 1271.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.80
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 133.36
 PIPE TRAVEL TIME (MIN.) = 0.97 Tc (MIN.) = 10.31
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

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MAINLINE Tc (MIN.) = 10.31
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.477
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	1.20	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
 SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 15.81
 EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 138.29

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 10.31
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.477
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	1.90	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.30	0.30	0.600	56
APARTMENTS	B	5.00	0.30	0.200	56
PUBLIC PARK	B	2.30	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.50	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 28.37
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 166.66

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.31
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.477
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	10.20	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 21.09
EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 187.75

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00
FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.52
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 187.75
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 10.72
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.423

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.90	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
APARTMENTS	B	6.00	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 38.15
EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 221.51

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.82
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 221.51
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 11.29
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

MAINLINE Tc(MIN.) = 11.29
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.348
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.50	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	1.10	0.30	0.200	56
COMMERCIAL	B	12.70	0.30	0.100	56
PUBLIC PARK	B	0.80	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 41.45
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 255.73

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

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

MAINLINE Tc(MIN.) = 11.29
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.348
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 5.52
 EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 261.25

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

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

MAINLINE Tc(MIN.) = 11.29
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.348
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
COMMERCIAL	B	12.60	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
 SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 37.29
 EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 298.54

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 28.98
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 298.54
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 11.72

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.72
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.293
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.21
 EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 298.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.72
 RAINFALL INTENSITY (INCH/HR) = 2.29
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.43
 EFFECTIVE STREAM AREA(ACRES) = 152.10
 TOTAL STREAM AREA(ACRES) = 152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 298.54

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	354.66	11.88	2.272	0.30(0.09)	0.31	175.2	110.00
1	322.84	19.08	1.642	0.30(0.09)	0.29	227.3	100.00
2	298.54	11.72	2.293	0.30(0.13)	0.43	152.1	120.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	651.79	11.72	2.293	0.30(0.11)	0.37	324.9	120.00
2	650.32	11.88	2.272	0.30(0.11)	0.37	327.3	110.00
3	531.70	19.08	1.642	0.30(0.10)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 651.79 Tc(MIN.) = 11.72
 EFFECTIVE AREA(ACRES) = 324.93 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 379.4
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
 FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 67.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.70
 ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 651.79
 PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 12.98
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.98
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	1.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.60	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
 SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 12.06
 EFFECTIVE AREA(ACRES) = 331.73 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 651.79
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.98
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56

COMMERCIAL	B	2.50	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.50	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 8.56
 EFFECTIVE AREA(ACRES) = 336.43 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 651.79
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.98
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.90	0.30	0.400	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	1.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.80	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.386
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 24.80
 EFFECTIVE AREA(ACRES) = 350.13 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 651.79
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.98
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56

RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56
 COMMERCIAL B 5.00 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 10.30 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
 SUBAREA AREA (ACRES) = 20.60 SUBAREA RUNOFF (CFS) = 38.03
 EFFECTIVE AREA (ACRES) = 370.73 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 425.2 PEAK FLOW RATE (CFS) = 673.47

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 12.98
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.127
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.30 0.30 0.600 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 3.90 0.30 0.500 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 2.30 0.30 0.400 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 13.37
 EFFECTIVE AREA (ACRES) = 378.23 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 432.7 PEAK FLOW RATE (CFS) = 686.84

 FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 455.00 DOWNSTREAM (FEET) = 410.00
 FLOW LENGTH (FEET) = 1786.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 26.40
 ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 686.84
 PIPE TRAVEL TIME (MIN.) = 1.13 Tc (MIN.) = 14.11
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 14.11
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.980
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.30 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.20 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56
 COMMERCIAL B 1.30 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.00 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598
 SUBAREA AREA (ACRES) = 7.00 SUBAREA RUNOFF (CFS) = 11.34
 EFFECTIVE AREA (ACRES) = 385.23 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 439.7 PEAK FLOW RATE (CFS) = 686.84
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 14.11
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.980
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.50 0.30 0.600 56
 COMMERCIAL B 0.80 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.30 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.30 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.599
 SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 12.80
 EFFECTIVE AREA (ACRES) = 393.13 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 447.6 PEAK FLOW RATE (CFS) = 686.84
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

 FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 675.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 9.312

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.690

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.50	0.30	1.000	66	9.31
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.40	0.30	1.000	65	9.31

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF (CFS) = 4.09
TOTAL AREA (ACRES) = 1.90 PEAK FLOW RATE (CFS) = 4.09

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 635.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00 CHANNEL SLOPE = 0.0950

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.453

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	4.90	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	2.40	0.30	1.000	65

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.17
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.95
AVERAGE FLOW DEPTH (FEET) = 0.79 TRAVEL TIME (MIN.) = 1.18
 T_c (MIN.) = 10.49
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 14.14
EFFECTIVE AREA (ACRES) = 9.20 AREA-AVERAGED F_m (INCH/HR) = 0.30
AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED A_p = 1.00
TOTAL AREA (ACRES) = 9.2 PEAK FLOW RATE (CFS) = 17.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 6.71

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 635.00 DOWNSTREAM (FEET) = 631.00

FLOW LENGTH (FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 6.93

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

PIPE-FLOW (CFS) = 17.83

PIPE TRAVEL TIME (MIN.) = 1.20 T_c (MIN.) = 11.70

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 11.70

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.295

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	5.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	4.00	0.30	1.000	65

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 16.34
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED F_m (INCH/HR) = 0.30
AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED A_p = 1.00
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 32.86

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 631.00 DOWNSTREAM (FEET) = 630.00

FLOW LENGTH (FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.22

ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 32.86

PIPE TRAVEL TIME (MIN.) = 2.81 T_c (MIN.) = 14.50

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 14.50

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.928

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	0.30	0.30	1.000	63
NATURAL FAIR COVER					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"CHAPARRAL,NARROWLEAF"	B	5.70	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	2.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 19.34
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 46.15

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.928
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"WOODLAND,GRASS"	B	0.20	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.29
EFFECTIVE AREA(ACRES) = 31.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 31.7 PEAK FLOW RATE(CFS) = 46.45

FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 628.00
FLOW LENGTH(FEET) = 910.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.48
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 46.45
PIPE TRAVEL TIME(MIN.) = 2.77 Tc(MIN.) = 17.27
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.27
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.740
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"CHAPARRAL,BROADLEAF"	B	1.60	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.80	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 8.43
EFFECTIVE AREA(ACRES) = 38.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 38.2 PEAK FLOW RATE(CFS) = 49.52

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 796.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.68
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.52
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 18.24
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 18.24
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.688
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"CHAPARRAL,BROADLEAF"	B	1.90	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.40	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	4.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	1.30	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 16.36
EFFECTIVE AREA(ACRES) = 51.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 51.3 PEAK FLOW RATE (CFS) = 64.08

FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 410.00
FLOW LENGTH (FEET) = 6198.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 16.15
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 64.08
PIPE TRAVEL TIME (MIN.) = 6.40 Tc (MIN.) = 24.64
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.08	24.64	1.406	0.30 (0.30)	1.00	51.3	150.00

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	686.84	14.11	1.980	0.30 (0.11)	0.37	393.1	120.00
2	683.99	14.27	1.959	0.30 (0.11)	0.37	395.5	110.00
3	573.32	21.58	1.529	0.30 (0.11)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	742.59	14.11	1.980	0.30 (0.13)	0.42	422.5	120.00
2	739.67	14.27	1.959	0.30 (0.13)	0.42	425.2	110.00
3	635.72	21.58	1.529	0.30 (0.12)	0.41	492.5	100.00
4	587.61	24.64	1.406	0.30 (0.13)	0.42	498.9	150.00

TOTAL AREA (ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 742.59 Tc (MIN.) = 14.107
EFFECTIVE AREA (ACRES) = 422.51 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 498.9
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 14.11
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.980

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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AGRICULTURAL POOR COVER					
"FALLOW"	B	1.60	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.60	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	1.90	0.30	1.000	65
AGRICULTURAL POOR COVER					
"FALLOW"	B	0.70	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971
SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 13.53
EFFECTIVE AREA (ACRES) = 431.41 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 507.8 PEAK FLOW RATE (CFS) = 742.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 14.11
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.980

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.40	0.30	1.000	65
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 3.68
EFFECTIVE AREA (ACRES) = 433.81 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 510.2 PEAK FLOW RATE (CFS) = 742.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 510.2 TC (MIN.) = 14.11
EFFECTIVE AREA (ACRES) = 433.81 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.432
PEAK FLOW RATE (CFS) = 742.59

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	742.59	14.11	1.980	0.30 (0.13)	0.43	433.8	120.00
2	739.67	14.27	1.959	0.30 (0.13)	0.43	436.5	110.00
3	635.72	21.58	1.529	0.30 (0.13)	0.43	503.8	100.00
4	587.61	24.64	1.406	0.30 (0.13)	0.43	510.2	150.00

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 25-YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A25EVRL.DAT
TIME/DATE OF STUDY: 09:16 12/05/2018

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.829
- 2) 10.00; 3.154
- 3) 15.00; 2.415
- 4) 20.00; 2.000
- 5) 25.00; 1.745
- 6) 30.00; 1.534
- 7) 40.00; 1.333
- 8) 50.00; 1.181
- 9) 60.00; 1.055
- 10) 90.00; 0.886
- 11) 120.00; 0.775
- 12) 180.00; 0.646
- 13) 360.00; 0.475
- 14) 1200.00; 0.208

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE (FT) (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.351
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66	9.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.02
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 3.02

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.070
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.90	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	2.60	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.55
AVERAGE FLOW DEPTH(FEET) = 0.70 TRAVEL TIME(MIN.) = 1.16
Tc(MIN.) = 10.57
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 10.49
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 5.3 PEAK FLOW RATE (CFS) = 13.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 6.22
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 605.00 DOWNSTREAM ELEVATION (FEET) = 584.00
STREET LENGTH (FEET) = 264.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.89

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.36
HALFSTREET FLOOD WIDTH (FEET) = 10.82
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.41
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.28
STREET FLOW TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 11.26

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.968

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.32
EFFECTIVE AREA (ACRES) = 7.40 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 7.4 PEAK FLOW RATE (CFS) = 18.06

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 11.45
FLOW VELOCITY (FEET/SEC.) = 6.62 DEPTH*VELOCITY (FT*FT/SEC.) = 2.43
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 584.00 DOWNSTREAM ELEVATION (FEET) = 564.00

STREET LENGTH (FEET) = 494.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 29.86

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.46
HALFSTREET FLOOD WIDTH (FEET) = 16.45
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.72
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.61
STREET FLOW TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 12.69

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.756

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	6.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA (ACRES) = 9.80 SUBAREA RUNOFF (CFS) = 23.59
EFFECTIVE AREA (ACRES) = 17.20 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 40.24

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.49 HALFSTREET FLOOD WIDTH (FEET) = 18.55
FLOW VELOCITY (FEET/SEC.) = 6.16 DEPTH*VELOCITY (FT*FT/SEC.) = 3.04
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 564.00 DOWNSTREAM (FEET) = 520.00
FLOW LENGTH (FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.23
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 40.24
PIPE TRAVEL TIME (MIN.) = 1.71 Tc (MIN.) = 14.40
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.40
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 3.90 0.30 0.100 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 12.23
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 48.57

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.40
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
PUBLIC PARK B 0.30 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
COMMERCIAL B 5.00 0.30 0.100 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 19.74
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE(CFS) = 68.31

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.40
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.504
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.80 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.01
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE(CFS) = 72.31

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.00
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.31
PIPE TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 15.36
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.80 0.30 0.100 56
COMMERCIAL B 7.60 0.30 0.100 56
PUBLIC PARK B 0.40 0.30 0.850 56
COMMERCIAL B 10.50 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 45.64
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE(CFS) = 114.36

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.36
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.385
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.80 0.30 0.100 56
COMMERCIAL B 12.10 0.30 0.100 56
PUBLIC PARK B 1.00 0.30 0.850 56
COMMERCIAL B 4.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.131
 SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 51.52
 EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 165.88

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
 FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.66
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 165.88
 PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.12
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.12
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.322
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.106
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 26.18
 EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 187.51

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.12
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.322
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.150
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 42.83
 EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 230.35

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 53.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19
 ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 230.35
 PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 17.51
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.51
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.235
 SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 15.96
 EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 234.53

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.51
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.207
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

APARTMENTS B 3.20 0.30 0.200 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 17.58
 EFFECTIVE AREA (ACRES) = 130.80 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA (ACRES) = 130.8 PEAK FLOW RATE (CFS) = 252.12

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.51
 RAINFALL INTENSITY (INCH/HR) = 2.21
 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.22
 EFFECTIVE STREAM AREA (ACRES) = 130.80
 TOTAL STREAM AREA (ACRES) = 130.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 252.12

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

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

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 645.00 DOWNSTREAM (FEET) = 625.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.417
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.689
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56	8.68
COMMERCIAL	B	0.30	0.30	0.100	56	5.42
PUBLIC PARK	B	1.30	0.30	0.850	56	8.61
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56	8.68

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.798
 SUBAREA RUNOFF (CFS) = 12.01
 TOTAL AREA (ACRES) = 3.00 PEAK FLOW RATE (CFS) = 12.01

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

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

=====

UPSTREAM ELEVATION (FEET) = 625.00 DOWNSTREAM ELEVATION (FEET) = 595.00
 STREET LENGTH (FEET) = 517.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.28
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.39
 HALFSTREET FLOOD WIDTH (FEET) = 12.62
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.97
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.32
 STREET FLOW TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 6.86
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.206

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.30	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 14.53
 EFFECTIVE AREA (ACRES) = 6.90 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 6.9 PEAK FLOW RATE (CFS) = 25.24

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 14.18
 FLOW VELOCITY (FEET/SEC.) = 6.34 DEPTH*VELOCITY (FT*FT/SEC.) = 2.64
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION (FEET) = 595.00 DOWNSTREAM ELEVATION (FEET) = 585.00
 STREET LENGTH (FEET) = 389.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 39.34
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.52
 HALFSTREET FLOOD WIDTH(FEET) = 20.20
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.13
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.68
 STREET FLOW TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 8.13
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.782
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 28.16
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 50.77

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.56 HALFSTREET FLOOD WIDTH(FEET) = 22.30
 FLOW VELOCITY(FEET/SEC.) = 5.47 DEPTH*VELOCITY(FT*FT/SEC.) = 3.07
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.77
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 50.77
 PIPE TRAVEL TIME(MIN.) = 0.79 Tc(MIN.) = 8.92
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.92
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.517
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					

".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.82
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 55.91

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.92
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.517
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.00	0.30	0.100	56
PUBLIC PARK	B	1.90	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
COMMERCIAL	B	4.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 55.45
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 111.36

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.92
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.517
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.50	0.30	0.100	56
PUBLIC PARK	B	1.20	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 28.75
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 140.11

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.92
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.517
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.30 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 16.21
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 156.32

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.39
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 156.32
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 9.79
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.79
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.224
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.40 0.30 0.100 56
 COMMERCIAL B 11.00 0.30 0.100 56
 PUBLIC PARK B 1.80 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
 COMMERCIAL B 3.20 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.222
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 59.39
 EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 202.17

 FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.13
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 202.17
 PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 10.53
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.53
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.10 0.30 0.100 56
 PUBLIC PARK B 1.40 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 COMMERCIAL B 5.10 0.30 0.100 56
 PUBLIC PARK B 1.90 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.60 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.485
 SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 42.73
 EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 235.28

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.53
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.076
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.70 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.50 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.244
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 8.92
 EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 244.19

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.53
RAINFALL INTENSITY(INCH/HR) = 3.08
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 244.19

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 457.31 Tc(MIN.) = 10.53
EFFECTIVE AREA(ACRES) = 170.45 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 62.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.42
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 457.31
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 11.50
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.932
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 56
COMMERCIAL B 3.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.28
EFFECTIVE AREA(ACRES) = 175.15 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 457.31
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.50
RAINFALL INTENSITY(INCH/HR) = 2.93
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.15
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 457.31

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.199
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.50 0.30 0.100 56 6.88
PUBLIC PARK B 0.20 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.70 0.30 0.200 56 7.33
RESIDENTIAL
".4 DWELLING/ACRE" B 1.40 0.30 0.900 56 11.02
PUBLIC PARK B 0.10 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 7.33
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA RUNOFF(CFS) = 22.79

TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 22.79

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 6.88

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.199

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

RESIDENTIAL

".4 DWELLING/ACRE" B 0.20 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.71

EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 23.50

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 626.00

FLOW LENGTH (FEET) = 425.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 10.41

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

PIPE-FLOW (CFS) = 23.50

PIPE TRAVEL TIME (MIN.) = 0.68 Tc (MIN.) = 7.56

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 7.56

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.971

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.40	0.30	0.900	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.40 0.30 0.200 56

RESIDENTIAL

".4 DWELLING/ACRE" B 2.40 0.30 0.900 56

COMMERCIAL B 0.70 0.30 0.100 56

RESIDENTIAL

".4 DWELLING/ACRE" B 0.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 31.49

EFFECTIVE AREA (ACRES) = 15.50 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 53.67

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 626.00 DOWNSTREAM (FEET) = 606.00

FLOW LENGTH (FEET) = 1030.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 12.59

ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 53.67

PIPE TRAVEL TIME (MIN.) = 1.36 Tc (MIN.) = 8.92

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 8.92

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.515

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.60	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	6.50	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	8.40	0.30	0.600	56
APARTMENTS	B	0.50	0.30	0.200	56

APARTMENTS

COMMERCIAL B 1.40 0.30 0.100 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.30 0.30 0.200 56

RESIDENTIAL

".4 DWELLING/ACRE" B 6.50 0.30 0.900 56

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 8.40 0.30 0.600 56

APARTMENTS B 0.50 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491

SUBAREA AREA (ACRES) = 26.70 SUBAREA RUNOFF (CFS) = 80.92

EFFECTIVE AREA (ACRES) = 42.20 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46

TOTAL AREA (ACRES) = 42.2 PEAK FLOW RATE (CFS) = 128.22

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 8.92

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.515

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.00	0.30	0.200	56
RESIDENTIAL					

COMMERCIAL

PUBLIC PARK B 1.10 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.00 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.80 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.80 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
 SUBAREA AREA (ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 32.89
 EFFECTIVE AREA (ACRES) = 53.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 53.2 PEAK FLOW RATE (CFS) = 161.11

 FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 606.00 DOWNSTREAM(FEET) = 604.00
 FLOW LENGTH(FEET) = 222.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.62
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 161.11
 PIPE TRAVEL TIME(MIN.) = 0.29 Tc(MIN.) = 9.22
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 124.00 = 2006.00 FEET.

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.22
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.416
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	0.30	0.30	0.200	56
COMMERCIAL	B	2.10	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
 SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 14.76
 EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 171.17

 FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.22
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.416
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.60
 EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 171.77

 FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) = 604.00 DOWNSTREAM(FEET) = 546.00
 FLOW LENGTH(FEET) = 1271.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.75
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 171.77
 PIPE TRAVEL TIME(MIN.) = 0.89 Tc(MIN.) = 10.11
 LONGEST FLOWPATH FROM NODE 120.00 TO NODE 125.00 = 3277.00 FEET.

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 10.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	1.20	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
 SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 20.34
 EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 177.49

 FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 10.11
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	1.90	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.30	0.30	0.600	56
APARTMENTS	B	5.00	0.30	0.200	56
PUBLIC PARK	B	2.30	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.50	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 36.46
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 213.96

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.11
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.138
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	10.20	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 27.15
EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 241.11

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00
FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.77
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 241.11
PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 10.50
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.50
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.080

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.90	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
APARTMENTS	B	6.00	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 49.04
EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 285.45

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.66
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 285.45
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 11.04
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

MAINLINE Tc(MIN.) = 11.04
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.50	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	1.10	0.30	0.200	56
COMMERCIAL	B	12.70	0.30	0.100	56
PUBLIC PARK	B	0.80	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 53.40
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 331.06

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

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

MAINLINE Tc(MIN.) = 11.04
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 7.16
 EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 338.21

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

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

MAINLINE Tc(MIN.) = 11.04
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.000
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
COMMERCIAL	B	12.60	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
 SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 47.96
 EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 386.18

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.13
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 386.18
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 11.44

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.44
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.941
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 6.73
 EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 386.18
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.44
 RAINFALL INTENSITY(INCH/HR) = 2.94
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.43
 EFFECTIVE STREAM AREA(ACRES) = 152.10
 TOTAL STREAM AREA(ACRES) = 152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 386.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	457.31	11.50	2.932	0.30(0.09)	0.31	175.1	110.00
1	424.49	18.50	2.124	0.30(0.09)	0.29	227.3	100.00
2	386.18	11.44	2.941	0.30(0.13)	0.43	152.1	120.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	842.54	11.44	2.941	0.30(0.11)	0.37	326.3	120.00
2	842.29	11.50	2.932	0.30(0.11)	0.37	327.2	110.00
3	698.52	18.50	2.124	0.30(0.10)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 842.54 Tc(MIN.) = 11.44
 EFFECTIVE AREA(ACRES) = 326.35 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 379.4
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
 FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 93.0 INCH PIPE IS 73.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.07
 ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 842.54
 PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.62
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.62
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.766
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	1.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.60	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
 SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 15.97
 EFFECTIVE AREA(ACRES) = 333.15 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 842.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.62
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.766
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56

COMMERCIAL	B	2.50	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.50	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 11.27
 EFFECTIVE AREA(ACRES) = 337.85 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 842.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.62
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.766
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.90	0.30	0.400	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	1.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.80	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.386
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 32.68
 EFFECTIVE AREA(ACRES) = 351.55 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 842.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.62
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.766
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56

RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56
 COMMERCIAL B 5.00 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 10.30 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
 SUBAREA AREA (ACRES) = 20.60 SUBAREA RUNOFF (CFS) = 49.88
 EFFECTIVE AREA (ACRES) = 372.15 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 425.2 PEAK FLOW RATE (CFS) = 890.11

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 12.62
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.766
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.30 0.30 0.600 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 3.90 0.30 0.500 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 2.30 0.30 0.400 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487
 SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 17.69
 EFFECTIVE AREA (ACRES) = 379.65 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 432.7 PEAK FLOW RATE (CFS) = 907.80

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 455.00 DOWNSTREAM (FEET) = 410.00
 FLOW LENGTH (FEET) = 1786.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 65.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 28.43
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 907.80
 PIPE TRAVEL TIME (MIN.) = 1.05 Tc (MIN.) = 13.67
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.67
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.612
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 1.30 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.20 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56
 COMMERCIAL B 1.30 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.00 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598
 SUBAREA AREA (ACRES) = 7.00 SUBAREA RUNOFF (CFS) = 15.32
 EFFECTIVE AREA (ACRES) = 386.65 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 439.7 PEAK FLOW RATE (CFS) = 907.80
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.67
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.612
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.50 0.30 0.600 56
 COMMERCIAL B 0.80 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.30 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.30 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.599
 SUBAREA AREA (ACRES) = 7.90 SUBAREA RUNOFF (CFS) = 17.29
 EFFECTIVE AREA (ACRES) = 394.55 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 447.6 PEAK FLOW RATE (CFS) = 907.80
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 675.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$

SUBAREA ANALYSIS USED MINIMUM T_c (MIN.) = 9.312

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.384

SUBAREA T_c AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN	T_c (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.50	0.30	1.000	66	9.31
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.40	0.30	1.000	65	9.31

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
SUBAREA RUNOFF (CFS) = 5.27
TOTAL AREA (ACRES) = 1.90 PEAK FLOW RATE (CFS) = 5.27

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 635.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00 CHANNEL SLOPE = 0.0950

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.092

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	4.90	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	2.40	0.30	1.000	65

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.33
AVERAGE FLOW DEPTH (FEET) = 0.87 TRAVEL TIME (MIN.) = 1.11
 T_c (MIN.) = 10.42
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 18.34
EFFECTIVE AREA (ACRES) = 9.20 AREA-AVERAGED F_m (INCH/HR) = 0.30
AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED A_p = 1.00
TOTAL AREA (ACRES) = 9.2 PEAK FLOW RATE (CFS) = 23.12

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.04 FLOW VELOCITY (FEET/SEC.) = 7.12

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 635.00 DOWNSTREAM (FEET) = 631.00

FLOW LENGTH (FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.45

ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 23.12

PIPE TRAVEL TIME (MIN.) = 1.12 T_c (MIN.) = 11.54

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 11.54

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.926

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	5.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	4.00	0.30	1.000	65

SUBAREA AVERAGE PVIOUS LOSS RATE, F_p (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, A_p = 1.000
SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 21.51
EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED F_m (INCH/HR) = 0.30
AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED A_p = 1.00
TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 43.25

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 631.00 DOWNSTREAM (FEET) = 630.00

FLOW LENGTH (FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.9 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.56

ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 43.25

PIPE TRAVEL TIME (MIN.) = 2.60 T_c (MIN.) = 14.14

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE T_c (MIN.) = 14.14

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.542

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	F_p (INCH/HR)	A_p (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	0.30	0.30	1.000	63
NATURAL FAIR COVER					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"CHAPARRAL,NARROWLEAF"	B	5.70	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	2.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 26.64
EFFECTIVE AREA(ACRES) = 31.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 31.5 PEAK FLOW RATE(CFS) = 63.57

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.14
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.542
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
"WOODLAND,GRASS"	B	0.20	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.40
EFFECTIVE AREA(ACRES) = 31.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 31.7 PEAK FLOW RATE(CFS) = 63.97

FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 628.00
FLOW LENGTH(FEET) = 910.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.94
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 63.97
PIPE TRAVEL TIME(MIN.) = 2.55 Tc(MIN.) = 16.69
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.69
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.275
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.60	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.80	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.50 SUBAREA RUNOFF(CFS) = 11.55
EFFECTIVE AREA(ACRES) = 38.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 38.2 PEAK FLOW RATE(CFS) = 67.89

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 796.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.72
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 67.89
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 17.59
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.200
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.90	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.40	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	4.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	1.30	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 13.10 SUBAREA RUNOFF(CFS) = 22.40
EFFECTIVE AREA(ACRES) = 51.30 AREA-AVERAGED Fm(INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 51.3 PEAK FLOW RATE (CFS) = 87.71

FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 610.00 DOWNSTREAM (FEET) = 410.00
FLOW LENGTH (FEET) = 6198.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.29
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 87.71
PIPE TRAVEL TIME (MIN.) = 5.97 Tc (MIN.) = 23.57
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	87.71	23.57	1.818	0.30 (0.30)	1.00	51.3	150.00

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	907.80	13.67	2.612	0.30 (0.11)	0.37	394.5	120.00
2	906.98	13.73	2.603	0.30 (0.11)	0.37	395.4	110.00
3	746.72	20.84	1.957	0.30 (0.11)	0.36	447.6	100.00

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	985.27	13.67	2.612	0.30 (0.13)	0.42	424.3	120.00
2	984.49	13.73	2.603	0.30 (0.13)	0.42	425.3	110.00
3	831.39	20.84	1.957	0.30 (0.12)	0.41	493.0	100.00
4	778.32	23.57	1.818	0.30 (0.13)	0.42	498.9	150.00

TOTAL AREA (ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 985.27 Tc (MIN.) = 13.670
EFFECTIVE AREA (ACRES) = 424.31 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 498.9
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 13.67
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.612

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
AGRICULTURAL POOR COVER					
"FALLOW"	B	1.60	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.30	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.60	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	1.90	0.30	1.000	65
AGRICULTURAL POOR COVER					
"FALLOW"	B	0.70	0.30	1.000	86
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.80	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971
SUBAREA AREA (ACRES) = 8.90 SUBAREA RUNOFF (CFS) = 18.59
EFFECTIVE AREA (ACRES) = 433.21 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 507.8 PEAK FLOW RATE (CFS) = 985.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 13.67
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.612

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.40	0.30	1.000	65
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA (ACRES) = 2.40 SUBAREA RUNOFF (CFS) = 5.05
EFFECTIVE AREA (ACRES) = 435.61 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 510.2 PEAK FLOW RATE (CFS) = 985.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF STUDY SUMMARY:
TOTAL AREA (ACRES) = 510.2 TC (MIN.) = 13.67
EFFECTIVE AREA (ACRES) = 435.61 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.432
PEAK FLOW RATE (CFS) = 985.27

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	985.27	13.67	2.612	0.30 (0.13)	0.43	435.6	120.00
2	984.49	13.73	2.603	0.30 (0.13)	0.43	436.6	110.00
3	831.39	20.84	1.957	0.30 (0.13)	0.43	504.3	100.00
4	778.32	23.57	1.818	0.30 (0.13)	0.43	510.2	150.00

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

Michael Baker International
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA A *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 50-YR EV DECEMBER 2018 FKAZI *

FILE NAME: 3A50EVRL.DAT
TIME/DATE OF STUDY: 09:15 12/05/2018

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.329
- 2) 10.00; 3.431
- 3) 15.00; 2.636
- 4) 20.00; 2.205
- 5) 25.00; 1.909
- 6) 30.00; 1.717
- 7) 40.00; 1.455
- 8) 50.00; 1.293
- 9) 60.00; 1.185
- 10) 90.00; 0.982
- 11) 120.00; 0.852
- 12) 180.00; 0.728
- 13) 360.00; 0.537
- 14) 1200.00; 0.235

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 100.00 TO NODE 101.00 IS CODE = 21

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

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 327.00
ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 642.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.413
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.654
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66	9.41

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.32
TOTAL AREA(ACRES) = 1.10 PEAK FLOW RATE(CFS) = 3.32

FLOW PROCESS FROM NODE 101.00 TO NODE 102.00 IS CODE = 51

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

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ELEVATION DATA: UPSTREAM(FEET) = 642.00 DOWNSTREAM(FEET) = 605.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 385.00 CHANNEL SLOPE = 0.0961
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.345
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.90	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	2.60	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.983
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.09
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.69
AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 1.13
Tc(MIN.) = 10.54
SUBAREA AREA(ACRES) = 4.20 SUBAREA RUNOFF(CFS) = 11.53
EFFECTIVE AREA(ACRES) = 5.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99

TOTAL AREA (ACRES) = 5.3 PEAK FLOW RATE (CFS) = 14.54

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 6.37
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 102.00 = 712.00 FEET.

FLOW PROCESS FROM NODE 102.00 TO NODE 103.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 605.00 DOWNSTREAM ELEVATION (FEET) = 584.00
STREET LENGTH (FEET) = 264.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.46

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.36
HALFSTREET FLOOD WIDTH (FEET) = 11.29
AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.55
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.39
STREET FLOW TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 11.21
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.238

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.519
SUBAREA AREA (ACRES) = 2.10 SUBAREA RUNOFF (CFS) = 5.83
EFFECTIVE AREA (ACRES) = 7.40 AREA-AVERAGED Fm (INCH/HR) = 0.26
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.85
TOTAL AREA (ACRES) = 7.4 PEAK FLOW RATE (CFS) = 19.86

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 11.99
FLOW VELOCITY (FEET/SEC.) = 6.72 DEPTH*VELOCITY (FT*FT/SEC.) = 2.53
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 103.00 = 976.00 FEET.

FLOW PROCESS FROM NODE 103.00 TO NODE 104.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 584.00 DOWNSTREAM ELEVATION (FEET) = 564.00

STREET LENGTH (FEET) = 494.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.80

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.47
HALFSTREET FLOOD WIDTH (FEET) = 17.07
AVERAGE FLOW VELOCITY (FEET/SEC.) = 5.87
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.74
STREET FLOW TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 12.61
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.015

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	6.60	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.271
SUBAREA AREA (ACRES) = 9.80 SUBAREA RUNOFF (CFS) = 25.88
EFFECTIVE AREA (ACRES) = 17.20 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA (ACRES) = 17.2 PEAK FLOW RATE (CFS) = 44.25

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 19.26
FLOW VELOCITY (FEET/SEC.) = 6.31 DEPTH*VELOCITY (FT*FT/SEC.) = 3.20
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 104.00 = 1470.00 FEET.

FLOW PROCESS FROM NODE 104.00 TO NODE 105.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 564.00 DOWNSTREAM (FEET) = 520.00
FLOW LENGTH (FEET) = 1456.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.46
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 44.25
PIPE TRAVEL TIME (MIN.) = 1.68 Tc (MIN.) = 14.29
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 105.00 = 2926.00 FEET.

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 3.90 0.30 0.100 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.255
SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 13.47
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 53.59

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
PUBLIC PARK B 0.30 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
COMMERCIAL B 5.00 0.30 0.100 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.20 SUBAREA RUNOFF(CFS) = 21.76
EFFECTIVE AREA(ACRES) = 32.00 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 32.0 PEAK FLOW RATE(CFS) = 75.35

FLOW PROCESS FROM NODE 105.00 TO NODE 105.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.80 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.40
EFFECTIVE AREA(ACRES) = 33.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 33.8 PEAK FLOW RATE(CFS) = 79.75

FLOW PROCESS FROM NODE 105.00 TO NODE 106.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 520.00 DOWNSTREAM(FEET) = 503.00
FLOW LENGTH(FEET) = 804.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.65
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.75
PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 15.21
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 106.00 = 3730.00 FEET.

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.21
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.618
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.80 0.30 0.100 56
COMMERCIAL B 7.60 0.30 0.100 56
PUBLIC PARK B 0.40 0.30 0.850 56
COMMERCIAL B 10.50 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 21.60 SUBAREA RUNOFF(CFS) = 50.17
EFFECTIVE AREA(ACRES) = 55.40 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 55.4 PEAK FLOW RATE(CFS) = 125.96

FLOW PROCESS FROM NODE 106.00 TO NODE 106.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.21
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.618
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 6.80 0.30 0.100 56
COMMERCIAL B 12.10 0.30 0.100 56
PUBLIC PARK B 1.00 0.30 0.850 56
COMMERCIAL B 4.50 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
 SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 56.63
 EFFECTIVE AREA(ACRES) = 79.80 AREA-AVERAGED Fm(INCH/HR) = 0.08
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 79.8 PEAK FLOW RATE(CFS) = 182.59

 FLOW PROCESS FROM NODE 106.00 TO NODE 107.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 503.00 DOWNSTREAM(FEET) = 485.00
 FLOW LENGTH(FEET) = 808.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.31
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 182.59
 PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 15.94
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 107.00 = 4538.00 FEET.

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.94
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.555
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.40	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
COMMERCIAL	B	2.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 28.84
 EFFECTIVE AREA(ACRES) = 92.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
 TOTAL AREA(ACRES) = 92.5 PEAK FLOW RATE(CFS) = 206.87

 FLOW PROCESS FROM NODE 107.00 TO NODE 107.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.94
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.555
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.20	0.30	0.100	56
PUBLIC PARK	B	0.70	0.30	0.850	56
COMMERCIAL	B	7.60	0.30	0.100	56
PUBLIC PARK	B	0.30	0.30	0.850	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	0.40	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 47.21
 EFFECTIVE AREA(ACRES) = 113.40 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 113.4 PEAK FLOW RATE(CFS) = 254.08

 FLOW PROCESS FROM NODE 107.00 TO NODE 108.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 933.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.52
 ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 254.08
 PIPE TRAVEL TIME(MIN.) = 1.35 Tc(MIN.) = 17.29
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.29
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.50	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	2.80	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
COMMERCIAL	B	0.60	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
 SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 17.69
 EFFECTIVE AREA(ACRES) = 121.70 AREA-AVERAGED Fm(INCH/HR) = 0.07
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA(ACRES) = 121.7 PEAK FLOW RATE(CFS) = 259.89

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.29
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.438
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.40	0.30	0.200	56
APARTMENTS	B	5.50	0.30	0.200	56

APARTMENTS B 3.20 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 19.48
 EFFECTIVE AREA (ACRES) = 130.80 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.22
 TOTAL AREA (ACRES) = 130.8 PEAK FLOW RATE (CFS) = 279.37

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.29
 RAINFALL INTENSITY (INCH/HR) = 2.44
 AREA-AVERAGED Fm (INCH/HR) = 0.07
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.22
 EFFECTIVE STREAM AREA (ACRES) = 130.80
 TOTAL STREAM AREA (ACRES) = 130.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 279.37

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

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

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 645.00 DOWNSTREAM (FEET) = 625.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 5.417
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 5.171
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56	8.68
COMMERCIAL	B	0.30	0.30	0.100	56	5.42
PUBLIC PARK	B	1.30	0.30	0.850	56	8.61
RESIDENTIAL						
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56	8.68

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.798
 SUBAREA RUNOFF (CFS) = 13.31
 TOTAL AREA (ACRES) = 3.00 PEAK FLOW RATE (CFS) = 13.31

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

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

=====

UPSTREAM ELEVATION (FEET) = 625.00 DOWNSTREAM ELEVATION (FEET) = 595.00
 STREET LENGTH (FEET) = 517.00 CURB HEIGHT (INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.33
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.40
 HALFSTREET FLOOD WIDTH (FEET) = 13.24
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 6.06
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.42
 STREET FLOW TRAVEL TIME (MIN.) = 1.42 Tc (MIN.) = 6.84
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.631

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.30	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA (ACRES) = 3.90 SUBAREA RUNOFF (CFS) = 16.02
 EFFECTIVE AREA (ACRES) = 6.90 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
 TOTAL AREA (ACRES) = 6.9 PEAK FLOW RATE (CFS) = 27.88

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.43 HALFSTREET FLOOD WIDTH (FEET) = 14.80
 FLOW VELOCITY (FEET/SEC.) = 6.48 DEPTH*VELOCITY (FT*FT/SEC.) = 2.77
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 112.00 = 847.00 FEET.

 FLOW PROCESS FROM NODE 112.00 TO NODE 113.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION (FEET) = 595.00 DOWNSTREAM ELEVATION (FEET) = 585.00
 STREET LENGTH (FEET) = 389.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 43.43
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.54
 HALFSTREET FLOOD WIDTH(FEET) = 20.98
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 5.27
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 2.83
 STREET FLOW TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 8.07
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.164

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.335
 SUBAREA AREA(ACRES) = 8.50 SUBAREA RUNOFF(CFS) = 31.08
 EFFECTIVE AREA(ACRES) = 15.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 15.4 PEAK FLOW RATE(CFS) = 56.06

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.16
 FLOW VELOCITY(FEET/SEC.) = 5.62 DEPTH*VELOCITY(FT*FT/SEC.) = 3.24
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 113.00 = 1236.00 FEET.

 FLOW PROCESS FROM NODE 113.00 TO NODE 114.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 702.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.03
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 56.06
 PIPE TRAVEL TIME(MIN.) = 0.78 Tc(MIN.) = 8.85
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 114.00 = 1938.00 FEET.

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.85
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.868
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					

".4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
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SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 9.74
 EFFECTIVE AREA(ACRES) = 18.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 18.3 PEAK FLOW RATE(CFS) = 61.70

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.85
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.868
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.00	0.30	0.100	56
PUBLIC PARK	B	1.90	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
COMMERCIAL	B	4.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
 SUBAREA AREA(ACRES) = 18.00 SUBAREA RUNOFF(CFS) = 61.15
 EFFECTIVE AREA(ACRES) = 36.30 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 36.3 PEAK FLOW RATE(CFS) = 122.85

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.85
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.868
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.50	0.30	0.100	56
PUBLIC PARK	B	1.20	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.80	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.515
 SUBAREA AREA(ACRES) = 9.50 SUBAREA RUNOFF(CFS) = 31.75
 EFFECTIVE AREA(ACRES) = 45.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 45.8 PEAK FLOW RATE(CFS) = 154.60

 FLOW PROCESS FROM NODE 114.00 TO NODE 114.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 8.85
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.868
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.30 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 5.60 SUBAREA RUNOFF(CFS) = 17.98
 EFFECTIVE AREA(ACRES) = 51.40 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 51.4 PEAK FLOW RATE(CFS) = 172.58

 FLOW PROCESS FROM NODE 114.00 TO NODE 115.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1017.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.12
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 172.58
 PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 9.69
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 115.00 = 2955.00 FEET.

 FLOW PROCESS FROM NODE 115.00 TO NODE 115.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 9.69
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.548
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.40 0.30 0.100 56
 COMMERCIAL B 11.00 0.30 0.100 56
 PUBLIC PARK B 1.80 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
 COMMERCIAL B 3.20 0.30 0.100 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.222
 SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 65.49
 EFFECTIVE AREA(ACRES) = 72.30 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA(ACRES) = 72.3 PEAK FLOW RATE(CFS) = 223.28

 FLOW PROCESS FROM NODE 115.00 TO NODE 108.00 IS CODE = 31

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

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 1110.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.07
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 223.28
 PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 10.40
 LONGEST FLOWPATH FROM NODE 110.00 TO NODE 108.00 = 4065.00 FEET.

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.40
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.367
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 3.10 0.30 0.100 56
 PUBLIC PARK B 1.40 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 COMMERCIAL B 5.10 0.30 0.100 56
 PUBLIC PARK B 1.90 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.60 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.485
 SUBAREA AREA(ACRES) = 16.20 SUBAREA RUNOFF(CFS) = 46.97
 EFFECTIVE AREA(ACRES) = 88.50 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA(ACRES) = 88.5 PEAK FLOW RATE(CFS) = 258.47

 FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.40
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.367
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 2.70 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.50 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.244
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.78
 EFFECTIVE AREA(ACRES) = 91.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
 TOTAL AREA(ACRES) = 91.8 PEAK FLOW RATE(CFS) = 268.26

FLOW PROCESS FROM NODE 108.00 TO NODE 108.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.40
RAINFALL INTENSITY(INCH/HR) = 3.37
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.40
EFFECTIVE STREAM AREA(ACRES) = 91.80
TOTAL STREAM AREA(ACRES) = 91.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 268.26

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

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

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp(Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Rows 1 and 2.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 502.05 Tc(MIN.) = 10.40
EFFECTIVE AREA(ACRES) = 170.47 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 222.6
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 108.00 = 5471.00 FEET.

FLOW PROCESS FROM NODE 108.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 473.00
FLOW LENGTH(FEET) = 900.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 64.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 502.05
PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 11.35
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.35
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.216
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.10 0.30 0.100 56
COMMERCIAL B 3.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 13.48
EFFECTIVE AREA(ACRES) = 175.17 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 227.3 PEAK FLOW RATE(CFS) = 502.05
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.35
RAINFALL INTENSITY(INCH/HR) = 3.22
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 175.17
TOTAL STREAM AREA(ACRES) = 227.30
PEAK FLOW RATE(CFS) AT CONFLUENCE = 502.05

FLOW PROCESS FROM NODE 120.00 TO NODE 121.00 IS CODE = 21

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

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
ELEVATION DATA: UPSTREAM(FEET) = 640.00 DOWNSTREAM(FEET) = 634.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.880
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.616
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.50 0.30 0.100 56 6.88
PUBLIC PARK B 0.20 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.70 0.30 0.200 56 7.33
RESIDENTIAL
".4 DWELLING/ACRE" B 1.40 0.30 0.900 56 11.02
PUBLIC PARK B 0.10 0.30 0.850 56 10.93
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 7.33
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA RUNOFF(CFS) = 25.12

TOTAL AREA (ACRES) = 6.20 PEAK FLOW RATE (CFS) = 25.12

FLOW PROCESS FROM NODE 121.00 TO NODE 121.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 6.88

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.616

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

RESIDENTIAL

".4 DWELLING/ACRE" B 0.20 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.78

EFFECTIVE AREA (ACRES) = 6.40 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA (ACRES) = 6.4 PEAK FLOW RATE (CFS) = 25.90

FLOW PROCESS FROM NODE 121.00 TO NODE 122.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 626.00

FLOW LENGTH (FEET) = 425.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 10.57

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

PIPE-FLOW (CFS) = 25.90

PIPE TRAVEL TIME (MIN.) = 0.67 Tc (MIN.) = 7.55

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 122.00 = 754.00 FEET.

FLOW PROCESS FROM NODE 122.00 TO NODE 122.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 7.55

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.361

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.40	0.30	0.900	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.40 0.30 0.200 56

RESIDENTIAL

".4 DWELLING/ACRE" B 2.40 0.30 0.900 56

COMMERCIAL B 0.70 0.30 0.100 56

RESIDENTIAL

".4 DWELLING/ACRE" B 0.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 34.68

EFFECTIVE AREA (ACRES) = 15.50 AREA-AVERAGED Fm (INCH/HR) = 0.12

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41

TOTAL AREA (ACRES) = 15.5 PEAK FLOW RATE (CFS) = 59.11

FLOW PROCESS FROM NODE 122.00 TO NODE 123.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 626.00 DOWNSTREAM (FEET) = 606.00

FLOW LENGTH (FEET) = 1030.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.20

ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 59.11

PIPE TRAVEL TIME (MIN.) = 1.30 Tc (MIN.) = 8.85

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 123.00 = 1784.00 FEET.

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 8.85

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.868

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.60	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	6.50	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	8.40	0.30	0.600	56
APARTMENTS	B	0.50	0.30	0.200	56

APARTMENTS

COMMERCIAL B 1.40 0.30 0.100 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.30 0.30 0.200 56

RESIDENTIAL

".4 DWELLING/ACRE" B 6.50 0.30 0.900 56

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 8.40 0.30 0.600 56

APARTMENTS B 0.50 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.491

SUBAREA AREA (ACRES) = 26.70 SUBAREA RUNOFF (CFS) = 89.40

EFFECTIVE AREA (ACRES) = 42.20 AREA-AVERAGED Fm (INCH/HR) = 0.14

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46

TOTAL AREA (ACRES) = 42.2 PEAK FLOW RATE (CFS) = 141.63

FLOW PROCESS FROM NODE 123.00 TO NODE 123.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 8.85

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.868

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.00	0.30	0.200	56
RESIDENTIAL					

COMMERCIAL

PUBLIC PARK B 1.10 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 2.00 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.80 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 3.80 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.642
SUBAREA AREA (ACRES) = 11.00 SUBAREA RUNOFF(CFS) = 36.38
EFFECTIVE AREA (ACRES) = 53.20 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA (ACRES) = 53.2 PEAK FLOW RATE (CFS) = 178.01

FLOW PROCESS FROM NODE 123.00 TO NODE 124.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	606.00	DOWNSTREAM(FEET) =	604.00
FLOW LENGTH(FEET) =	222.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	57.0 INCH PIPE IS	41.1 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	13.00		
ESTIMATED PIPE DIAMETER(INCH) =	57.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	178.01		
PIPE TRAVEL TIME(MIN.) =	0.28	Tc(MIN.) =	9.13
LONGEST FLOWPATH FROM NODE	120.00 TO NODE	124.00 =	2006.00 FEET.

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 9.13
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.760
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	0.30	0.30	0.200	56
COMMERCIAL	B	2.10	0.30	0.100	56
PUBLIC PARK	B	0.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.231
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 16.27
EFFECTIVE AREA (ACRES) = 58.10 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.1 PEAK FLOW RATE (CFS) = 189.11

FLOW PROCESS FROM NODE 124.00 TO NODE 124.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 9.13
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.760
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF(CFS) = 0.67
EFFECTIVE AREA (ACRES) = 58.30 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 58.3 PEAK FLOW RATE (CFS) = 189.78

FLOW PROCESS FROM NODE 124.00 TO NODE 125.00 IS CODE = 31

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

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ELEVATION DATA: UPSTREAM(FEET) =	604.00	DOWNSTREAM(FEET) =	546.00
FLOW LENGTH(FEET) =	1271.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	42.0 INCH PIPE IS	32.1 INCHES	
PIPE-FLOW VELOCITY(FEET/SEC.) =	24.07		
ESTIMATED PIPE DIAMETER(INCH) =	42.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	189.78		
PIPE TRAVEL TIME(MIN.) =	0.88	Tc(MIN.) =	10.01
LONGEST FLOWPATH FROM NODE	120.00 TO NODE	125.00 =	3277.00 FEET.

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

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MAINLINE Tc(MIN.) = 10.01
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.429
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
COMMERCIAL	B	1.20	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.60	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.550
SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 22.32
EFFECTIVE AREA (ACRES) = 65.90 AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 65.9 PEAK FLOW RATE (CFS) = 194.74

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 10.01
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.429
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
APARTMENTS	B	1.90	0.30	0.200	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.30	0.30	0.600	56
APARTMENTS	B	5.00	0.30	0.200	56
PUBLIC PARK	B	2.30	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	3.50	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 13.60 SUBAREA RUNOFF(CFS) = 40.02
EFFECTIVE AREA(ACRES) = 79.50 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 79.5 PEAK FLOW RATE(CFS) = 234.76

FLOW PROCESS FROM NODE 125.00 TO NODE 125.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.01
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.429
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	10.20	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 29.82
EFFECTIVE AREA(ACRES) = 89.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 89.7 PEAK FLOW RATE(CFS) = 264.58

FLOW PROCESS FROM NODE 125.00 TO NODE 126.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 546.00 DOWNSTREAM(FEET) = 525.00
FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.52
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 264.58
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 10.40
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 126.00 = 3839.00 FEET.

FLOW PROCESS FROM NODE 126.00 TO NODE 126.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 10.40
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.368

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.90	0.30	0.200	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
APARTMENTS	B	6.00	0.30	0.200	56
COMMERCIAL	B	1.10	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 53.81
EFFECTIVE AREA(ACRES) = 108.10 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 108.1 PEAK FLOW RATE(CFS) = 313.49

FLOW PROCESS FROM NODE 126.00 TO NODE 127.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 514.00
FLOW LENGTH(FEET) = 607.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 46.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.26
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 313.49
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 10.92
LONGEST FLOWPATH FROM NODE 120.00 TO NODE 127.00 = 4446.00 FEET.

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

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

MAINLINE Tc(MIN.) = 10.92
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.284
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.50	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
APARTMENTS	B	1.10	0.30	0.200	56
COMMERCIAL	B	12.70	0.30	0.100	56
PUBLIC PARK	B	0.80	0.30	0.850	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	4.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 58.63
EFFECTIVE AREA(ACRES) = 128.50 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 128.5 PEAK FLOW RATE(CFS) = 364.00

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

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

MAINLINE Tc(MIN.) = 10.92
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.284
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.20	0.30	0.100	56
PUBLIC PARK	B	1.50	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
 SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 7.88
 EFFECTIVE AREA(ACRES) = 131.30 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
 TOTAL AREA(ACRES) = 131.3 PEAK FLOW RATE(CFS) = 371.88

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

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

MAINLINE Tc(MIN.) = 10.92
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.284
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
COMMERCIAL	B	12.60	0.30	0.100	56
PUBLIC PARK	B	1.10	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
 SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 52.63
 EFFECTIVE AREA(ACRES) = 149.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 149.5 PEAK FLOW RATE(CFS) = 424.51

FLOW PROCESS FROM NODE 127.00 TO NODE 128.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 514.00 DOWNSTREAM(FEET) = 473.00
 FLOW LENGTH(FEET) = 741.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 31.43
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 424.51
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 11.31

LONGEST FLOWPATH FROM NODE 120.00 TO NODE 128.00 = 5187.00 FEET.

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 11.31
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.222
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.223
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 7.38
 EFFECTIVE AREA(ACRES) = 152.10 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA(ACRES) = 152.1 PEAK FLOW RATE(CFS) = 424.51
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 128.00 TO NODE 128.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.31
 RAINFALL INTENSITY(INCH/HR) = 3.22
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.43
 EFFECTIVE STREAM AREA(ACRES) = 152.10
 TOTAL STREAM AREA(ACRES) = 152.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 424.51

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	502.05	11.35	3.216	0.30(0.09)	0.31	175.2	110.00
1	470.88	18.26	2.355	0.30(0.09)	0.29	227.3	100.00
2	424.51	11.31	3.222	0.30(0.13)	0.43	152.1	120.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	925.88	11.31	3.222	0.30(0.11)	0.37	326.7	120.00
2	925.77	11.35	3.216	0.30(0.11)	0.37	327.3	110.00
3	776.37	18.26	2.355	0.30(0.10)	0.34	379.4	100.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 925.88 Tc(MIN.) = 11.31
 EFFECTIVE AREA(ACRES) = 326.71 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 379.4
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 128.00 = 6371.00 FEET.

 FLOW PROCESS FROM NODE 128.00 TO NODE 129.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM(FEET) = 473.00 DOWNSTREAM(FEET) = 455.00
 FLOW LENGTH(FEET) = 1494.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 96.0 INCH PIPE IS 76.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.53
 ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 925.88
 PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 12.47
 LONGEST FLOWPATH FROM NODE 100.00 TO NODE 129.00 = 7865.00 FEET.

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.47
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.60	0.30	0.900	56
COMMERCIAL	B	1.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.40	0.30	0.900	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.60	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.524
 SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 17.63
 EFFECTIVE AREA(ACRES) = 333.51 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 386.2 PEAK FLOW RATE(CFS) = 925.88
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.47
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56
RESIDENTIAL					

COMMERCIAL B 2.50 0.30 0.100 56
 PUBLIC PARK B 0.30 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.50 0.30 0.600 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.344
 SUBAREA AREA(ACRES) = 4.70 SUBAREA RUNOFF(CFS) = 12.42
 EFFECTIVE AREA(ACRES) = 338.21 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 390.9 PEAK FLOW RATE(CFS) = 925.88
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.47
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.90	0.30	0.400	56
COMMERCIAL	B	4.70	0.30	0.100	56
PUBLIC PARK	B	1.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.90	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.80	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.386
 SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 36.03
 EFFECTIVE AREA(ACRES) = 351.91 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 404.6 PEAK FLOW RATE(CFS) = 927.20

 FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

=====

MAINLINE Tc(MIN.) = 12.47
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.40	0.30	0.500	56
RESIDENTIAL					

"8-10 DWELLINGS/ACRE" B 0.70 0.30 0.400 56
 COMMERCIAL B 5.00 0.30 0.100 56
 PUBLIC PARK B 0.10 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 10.30 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
 SUBAREA AREA(ACRES) = 20.60 SUBAREA RUNOFF(CFS) = 54.92
 EFFECTIVE AREA(ACRES) = 372.51 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA(ACRES) = 425.2 PEAK FLOW RATE(CFS) = 982.11

FLOW PROCESS FROM NODE 129.00 TO NODE 129.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.47

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.038

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.30	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.90	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.30	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.487

SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 19.52

EFFECTIVE AREA(ACRES) = 380.01 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36

TOTAL AREA(ACRES) = 432.7 PEAK FLOW RATE(CFS) = 1001.64

FLOW PROCESS FROM NODE 129.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 410.00

FLOW LENGTH(FEET) = 1786.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 87.0 INCH PIPE IS 67.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 29.11

ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 1001.64

PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 13.49

LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.49

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.876

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
COMMERCIAL	B	1.30	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	3.00	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.598

SUBAREA AREA(ACRES) = 7.00 SUBAREA RUNOFF(CFS) = 16.99

EFFECTIVE AREA(ACRES) = 387.01 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 439.7 PEAK FLOW RATE(CFS) = 1001.64

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.49

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.876

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.50	0.30	0.600	56
COMMERCIAL	B	0.80	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.30	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.599

SUBAREA AREA(ACRES) = 7.90 SUBAREA RUNOFF(CFS) = 19.17

EFFECTIVE AREA(ACRES) = 394.91 AREA-AVERAGED Fm(INCH/HR) = 0.11

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37

TOTAL AREA(ACRES) = 447.6 PEAK FLOW RATE(CFS) = 1001.64

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 10

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

FLOW PROCESS FROM NODE 150.00 TO NODE 151.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 765.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.312
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.692

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	1.50	0.30	1.000	66	9.31
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.40	0.30	1.000	65	9.31

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 5.80

TOTAL AREA (ACRES) = 1.90 PEAK FLOW RATE (CFS) = 5.80

FLOW PROCESS FROM NODE 151.00 TO NODE 152.00 IS CODE = 51

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

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

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 635.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 421.00 CHANNEL SLOPE = 0.0950

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.368

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	4.90	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	2.40	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.89

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.49

AVERAGE FLOW DEPTH (FEET) = 0.90 TRAVEL TIME (MIN.) = 1.08

Tc (MIN.) = 10.39

SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 20.16

EFFECTIVE AREA (ACRES) = 9.20 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 9.2 PEAK FLOW RATE (CFS) = 25.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.08 FLOW VELOCITY (FEET/SEC.) = 7.28

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 152.00 = 751.00 FEET.

FLOW PROCESS FROM NODE 152.00 TO NODE 153.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 635.00 DOWNSTREAM (FEET) = 631.00

FLOW LENGTH (FEET) = 501.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.4 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.52

ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 25.41

PIPE TRAVEL TIME (MIN.) = 1.11 Tc (MIN.) = 11.50

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 153.00 = 1252.00 FEET.

FLOW PROCESS FROM NODE 153.00 TO NODE 153.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 11.50

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.192

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	5.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND, GRASS"	B	4.00	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 9.10 SUBAREA RUNOFF (CFS) = 23.69

EFFECTIVE AREA (ACRES) = 18.30 AREA-AVERAGED Fm (INCH/HR) = 0.30

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 18.3 PEAK FLOW RATE (CFS) = 47.63

FLOW PROCESS FROM NODE 153.00 TO NODE 154.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 631.00 DOWNSTREAM (FEET) = 630.00

FLOW LENGTH (FEET) = 711.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.62

ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 47.63

PIPE TRAVEL TIME (MIN.) = 2.56 Tc (MIN.) = 14.07

LONGEST FLOWPATH FROM NODE 150.00 TO NODE 154.00 = 1963.00 FEET.

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 14.07

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.784

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	0.30	0.30	1.000	63
NATURAL FAIR COVER "CHAPARRAL, NARROWLEAF"	B	5.70	0.30	1.000	72

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
NATURAL FAIR COVER					
"WOODLAND,GRASS"	B	0.10	0.30	1.000	65
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	2.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.20 SUBAREA RUNOFF(CFS) = 29.51
EFFECTIVE AREA (ACRES) = 31.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.5 PEAK FLOW RATE (CFS) = 70.43

FLOW PROCESS FROM NODE 154.00 TO NODE 154.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.07
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.784
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.20 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 0.20 SUBAREA RUNOFF (CFS) = 0.45
EFFECTIVE AREA (ACRES) = 31.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 31.7 PEAK FLOW RATE (CFS) = 70.87

FLOW PROCESS FROM NODE 154.00 TO NODE 155.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 628.00
FLOW LENGTH (FEET) = 910.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.02
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 70.87
PIPE TRAVEL TIME (MIN.) = 2.52 Tc (MIN.) = 16.59
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 155.00 = 2873.00 FEET.

FLOW PROCESS FROM NODE 155.00 TO NODE 155.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.59
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.499
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.60	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.60	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.80	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.50	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.50 SUBAREA RUNOFF (CFS) = 12.87
EFFECTIVE AREA (ACRES) = 38.20 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 38.2 PEAK FLOW RATE (CFS) = 75.61

FLOW PROCESS FROM NODE 155.00 TO NODE 156.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM (FEET) = 629.00 DOWNSTREAM (FEET) = 610.00
FLOW LENGTH (FEET) = 796.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.87
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 75.61
PIPE TRAVEL TIME (MIN.) = 0.89 Tc (MIN.) = 17.48
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 156.00 = 3669.00 FEET.

FLOW PROCESS FROM NODE 156.00 TO NODE 156.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.48
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.422
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.90 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 0.40 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 1.30 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.50 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 1.30 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 3.70 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 13.10 SUBAREA RUNOFF (CFS) = 25.02
EFFECTIVE AREA (ACRES) = 51.30 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 51.3 PEAK FLOW RATE (CFS) = 97.99

FLOW PROCESS FROM NODE 156.00 TO NODE 130.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 410.00
FLOW LENGTH(FEET) = 6198.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.09
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 97.99
PIPE TRAVEL TIME(MIN.) = 5.71 Tc(MIN.) = 23.19
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 97.99 23.19 2.016 0.30(0.30) 1.00 51.3 150.00
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 1001.64 13.49 2.876 0.30(0.11) 0.37 394.9 120.00
2 1001.14 13.53 2.870 0.30(0.11) 0.37 395.5 110.00
3 835.90 20.54 2.173 0.30(0.11) 0.36 447.6 100.00
LONGEST FLOWPATH FROM NODE 100.00 TO NODE 130.00 = 9651.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 1087.20 13.49 2.876 0.30(0.13) 0.42 424.8 120.00
2 1086.75 13.53 2.870 0.30(0.13) 0.42 425.4 110.00
3 930.63 20.54 2.173 0.30(0.12) 0.41 493.0 100.00
4 870.49 23.19 2.016 0.30(0.13) 0.42 498.9 150.00
TOTAL AREA (ACRES) = 498.9

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1087.20 Tc(MIN.) = 13.493
EFFECTIVE AREA(ACRES) = 424.76 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 498.9
LONGEST FLOWPATH FROM NODE 150.00 TO NODE 130.00 = 9867.00 FEET.

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.49

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.876

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
AGRICULTURAL POOR COVER
"FALLOW" B 1.60 0.30 1.000 86
NATURAL FAIR COVER
"OPEN BRUSH" B 1.30 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 2.60 0.30 0.900 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 1.90 0.30 1.000 65
AGRICULTURAL POOR COVER
"FALLOW" B 0.70 0.30 1.000 86
NATURAL FAIR COVER
"OPEN BRUSH" B 0.80 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.971
SUBAREA AREA(ACRES) = 8.90 SUBAREA RUNOFF(CFS) = 20.70
EFFECTIVE AREA(ACRES) = 433.66 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 507.8 PEAK FLOW RATE(CFS) = 1087.20
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 130.00 TO NODE 130.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.49

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.876

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.40 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.919
SUBAREA AREA(ACRES) = 2.40 SUBAREA RUNOFF(CFS) = 5.62
EFFECTIVE AREA(ACRES) = 436.06 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 510.2 PEAK FLOW RATE(CFS) = 1087.20
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 510.2 TC(MIN.) = 13.49
EFFECTIVE AREA(ACRES) = 436.06 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.432
PEAK FLOW RATE(CFS) = 1087.20

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1087.20	13.49	2.876	0.30(0.13)	0.43	436.1	120.00
2	1086.75	13.53	2.870	0.30(0.13)	0.43	436.7	110.00
3	930.63	20.54	2.173	0.30(0.13)	0.43	504.3	100.00
4	870.49	23.19	2.016	0.30(0.13)	0.43	510.2	150.00

=====
=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 100-YR EV FEB 2023 ROKAMOTO *

FILE NAME: 3B00EVRL.DAT
TIME/DATE OF STUDY: 07:41 02/15/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.007
- 2) 10.00; 3.854
- 3) 15.00; 2.975
- 4) 20.00; 2.446
- 5) 25.00; 2.115
- 6) 30.00; 1.889
- 7) 40.00; 1.633
- 8) 50.00; 1.411
- 9) 60.00; 1.307
- 10) 90.00; 1.106
- 11) 120.00; 0.970
- 12) 180.00; 0.813
- 13) 360.00; 0.605
- 14) 1200.00; 0.265

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.488
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56	9.94
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 7.32
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 7.32

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.04
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.46

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.44
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.71
 STREET FLOW TRAVEL TIME (MIN.) = 1.93 Tc (MIN.) = 8.14
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.656
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 13.37
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 19.57

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 14.41
 FLOW VELOCITY (FEET/SEC.) = 4.78 DEPTH*VELOCITY (FT*FT/SEC.) = 2.01
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 24.46
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.46
 HALFSTREET FLOOD WIDTH (FEET) = 16.60
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.61
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.11
 STREET FLOW TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 9.54
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.054
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56

COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 9.76
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 26.74

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.23
 FLOW VELOCITY (FEET/SEC.) = 4.70 DEPTH*VELOCITY (FT*FT/SEC.) = 2.21
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.54
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.054
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	2.50	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 14.83
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 41.57

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.54
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.054
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

```
" .4 DWELLING/ACRE"      B      2.60    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      9.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      1.50    0.30    0.900    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 13.40    SUBAREA RUNOFF(CFS) = 45.64
EFFECTIVE AREA(ACRES) = 25.10    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.65
TOTAL AREA(ACRES) = 25.1    PEAK FLOW RATE(CFS) = 87.21
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FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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=====
ELEVATION DATA: UPSTREAM(FEET) = 375.00    DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.19
ESTIMATED PIPE DIAMETER(INCH) = 39.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 87.21
PIPE TRAVEL TIME(MIN.) = 1.43    Tc(MIN.) = 10.96
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.
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FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN.) = 10.96
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.684
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        2.40    0.30    0.100    56
COMMERCIAL          B        0.20    0.30    0.100    56
COMMERCIAL          B        0.30    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        2.10    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.50    0.30    0.900    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80    SUBAREA RUNOFF(CFS) = 18.45
EFFECTIVE AREA(ACRES) = 30.90    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9    PEAK FLOW RATE(CFS) = 97.30
```

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*****
FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31
-----
```

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 353.00    DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55
ESTIMATED PIPE DIAMETER(INCH) = 45.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 97.30
PIPE TRAVEL TIME(MIN.) = 1.47    Tc(MIN.) = 12.44
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81
-----
```

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

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=====
MAINLINE Tc(MIN.) = 12.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.426
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        1.40    0.30    0.100    56
COMMERCIAL          B        1.10    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.90    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.60    0.30    0.900    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        0.20    0.30    0.400    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20    SUBAREA RUNOFF(CFS) = 18.17
EFFECTIVE AREA(ACRES) = 37.10    AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1    PEAK FLOW RATE(CFS) = 108.28
```

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*****
FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31
-----
```

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

```
=====
ELEVATION DATA: UPSTREAM(FEET) = 343.00    DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.85
ESTIMATED PIPE DIAMETER(INCH) = 57.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 108.28
PIPE TRAVEL TIME(MIN.) = 1.94    Tc(MIN.) = 14.38
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.
```

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*****
FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81
-----
```

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

```
=====
MAINLINE Tc(MIN.) = 14.38
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.084
SUBAREA LOSS RATE DATA(AMC II):
```

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 8.45
EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 108.28
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 331.00
FLOW LENGTH (FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.46
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 108.28
PIPE TRAVEL TIME (MIN.) = 1.40 Tc (MIN.) = 15.78
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81

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

MAINLINE Tc (MIN.) = 15.78
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.893
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA (ACRES) = 5.80 SUBAREA RUNOFF (CFS) = 14.82
EFFECTIVE AREA (ACRES) = 46.10 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55

TOTAL AREA (ACRES) = 46.1 PEAK FLOW RATE (CFS) = 113.21

FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 331.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 38.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.23
ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 113.21
PIPE TRAVEL TIME (MIN.) = 0.37 Tc (MIN.) = 16.15
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 16.15
RAINFALL INTENSITY (INCH/HR) = 2.85
AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA (ACRES) = 46.10
TOTAL STREAM AREA (ACRES) = 46.10
PEAK FLOW RATE (CFS) AT CONFLUENCE = 113.21

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

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 426.00 DOWNSTREAM (FEET) = 423.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.407
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.540
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56	8.41
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56	8.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF (CFS) = 6.85
TOTAL AREA (ACRES) = 1.70 PEAK FLOW RATE (CFS) = 6.85

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FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.62
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.85
PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 9.79
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

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*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 9.79
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.942
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.10   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.40   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.80   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 15.03
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 20.97

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*****
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 421.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 567.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.00
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 20.97
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 10.98
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

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*****
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 10.98

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* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.682
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.90   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       5.70   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 24.78
EFFECTIVE AREA(ACRES) = 13.60 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 44.34

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*****
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 409.00
FLOW LENGTH(FEET) = 747.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.63
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.34
PIPE TRAVEL TIME(MIN.) = 1.44 Tc(MIN.) = 12.42
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

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*****
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.42
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.429
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL
"11+ DWELLINGS/ACRE"   B       0.60   0.30  0.100  56
COMMERCIAL
"11+ DWELLINGS/ACRE"   B       0.30   0.30  0.100  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       0.20   0.30  0.200  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       2.90   0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B      11.40   0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       0.90   0.30  0.400  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 48.62
EFFECTIVE AREA(ACRES) = 29.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 29.9 PEAK FLOW RATE(CFS) = 89.86

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FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 409.00 DOWNSTREAM(FEET) = 382.00
FLOW LENGTH(FEET) = 1002.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.54
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 89.86
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 13.43
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.251
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 7.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.60 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 10.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 93.68
EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 178.75

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.43
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.251
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.85

EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 179.60

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.91
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 179.60
PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 15.13
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

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

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

MAINLINE Tc(MIN.) = 15.13
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.961
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.70 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 26.60
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 189.61

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

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

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.78
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 189.61
PIPE TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 17.51
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.


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*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         0.20   0.30   0.100   56
COMMERCIAL          B         2.40   0.30   0.100   56
PUBLIC PARK         B         1.20   0.30   0.850   56
PUBLIC PARK         B         1.70   0.30   0.850   56
PUBLIC PARK         B         8.50   0.30   0.850   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.70   0.30   0.200   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 33.12
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 206.06

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         2.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         2.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        24.00   0.30   0.200   56
RESIDENTIAL
".4 DWELLING/ACRE" B         0.10   0.30   0.900   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.20   0.30   0.500   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.10   0.30   0.500   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 71.97
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 118.6 PEAK FLOW RATE(CFS) = 278.03

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.51
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         0.50   0.30   0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         1.40   0.30   0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         7.40   0.30   0.400   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 21.68
EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 299.71

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 347.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.22
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 299.71
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 18.71
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.71
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.582
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.20   0.30   0.100   56
COMMERCIAL          B         0.70   0.30   0.100   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.30   0.30   0.200   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 11.68
EFFECTIVE AREA(ACRES) = 133.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 133.0 PEAK FLOW RATE(CFS) = 299.71
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.71
RAINFALL INTENSITY(INCH/HR) = 2.58
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 133.00
TOTAL STREAM AREA(ACRES) = 133.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 299.71

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 113.21 16.15 2.853 0.30( 0.16) 0.55 46.1 203.00
2 299.71 18.71 2.582 0.30( 0.10) 0.34 133.0 210.00

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

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 400.16 16.15 2.853 0.30( 0.12) 0.40 160.9 203.00
2 401.50 18.71 2.582 0.30( 0.12) 0.40 179.1 210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 401.50 Tc(MIN.) = 18.71
EFFECTIVE AREA(ACRES) = 179.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 293.00
FLOW LENGTH(FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.07
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 401.50
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 18.88
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.88
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.564
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.60 0.30 0.100 56
COMMERCIAL B 5.60 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 1.60 0.30 1.000 66
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.70 0.30 1.000 65
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.20 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 32.92
EFFECTIVE AREA(ACRES) = 193.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 427.08

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 429.58 16.32 2.835 0.30( 0.12) 0.39 175.6 203.00
2 427.08 18.88 2.564 0.30( 0.12) 0.39 193.8 210.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 429.58 Tc(MIN.) = 16.32
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.39 EFFECTIVE AREA(ACRES) = 175.58

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.32
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.835
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 7.30 0.30 0.850 56
PUBLIC PARK B 0.80 0.30 0.850 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 38.44
EFFECTIVE AREA(ACRES) = 192.18 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 468.02

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FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.32

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.835

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.10 0.30 1.000 65

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.40 0.30 1.000 65

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 7.91

EFFECTIVE AREA(ACRES) = 195.48 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 475.93

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 16.32

EFFECTIVE AREA(ACRES) = 195.48 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.434

PEAK FLOW RATE(CFS) = 475.93

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	475.93	16.32	2.835	0.30(0.13)	0.43	195.5	203.00
2	468.57	18.88	2.564	0.30(0.13)	0.43	213.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 2-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3B02EVRL.DAT
TIME/DATE OF STUDY: 06:04 05/09/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

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

- 1) 5.00; 1.853
- 2) 10.00; 1.236
- 3) 15.00; 0.943
- 4) 20.00; 0.773
- 5) 25.00; 0.666
- 6) 30.00; 0.591
- 7) 40.00; 0.509
- 8) 50.00; 0.452
- 9) 60.00; 0.396
- 10) 90.00; 0.342
- 11) 120.00; 0.286
- 12) 180.00; 0.226
- 13) 360.00; 0.166
- 14) 1200.00; 0.082

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.704
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.30	0.60	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	0.20	0.60	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	-	0.10	0.60	0.900	56	9.94
COMMERCIAL	-	0.30	0.60	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	0.60	0.60	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 2.13
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 2.13

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.76
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.27
HALFSTREET FLOOD WIDTH(FEET) = 6.28

AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.44
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.95
 STREET FLOW TRAVEL TIME (MIN.) = 2.49 Tc (MIN.) = 8.70
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.397
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	0.80	0.60	0.200	-
USER-DEFINED	-	0.40	0.60	0.900	-
USER-DEFINED	-	1.20	0.60	0.900	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 3.24
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 4.95

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.30 HALFSTREET FLOOD WIDTH (FEET) = 7.47
 FLOW VELOCITY (FEET/SEC.) = 3.58 DEPTH*VELOCITY (FT*FT/SEC.) = 1.06
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.01
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.32
 HALFSTREET FLOOD WIDTH (FEET) = 8.84
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.37
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.08
 STREET FLOW TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 10.61
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.200
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.200	-

USER-DEFINED - 0.20 0.60 0.900 -
 USER-DEFINED - 1.50 0.60 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 2.12
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 6.22

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.32 HALFSTREET FLOOD WIDTH (FEET) = 9.03
 FLOW VELOCITY (FEET/SEC.) = 3.37 DEPTH*VELOCITY (FT*FT/SEC.) = 1.09
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 10.61
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.200
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	2.50	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.100	-
USER-DEFINED	-	0.30	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	0.20	0.60	0.200	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 4.18
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 10.40

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 10.61
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.200
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.60	0.900	-
USER-DEFINED	-	9.30	0.60	0.900	-
USER-DEFINED	-	1.50	0.60	0.900	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
 SUBAREA AREA (ACRES) = 13.40 SUBAREA RUNOFF (CFS) = 7.97
 EFFECTIVE AREA (ACRES) = 25.10 AREA-AVERAGED Fm (INCH/HR) = 0.39
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.65
 TOTAL AREA (ACRES) = 25.1 PEAK FLOW RATE (CFS) = 18.37

```

FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.37
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 12.74
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.

```

FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.74
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.076
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         2.40   0.60   0.100  -
USER-DEFINED        -         0.20   0.60   0.100  -
USER-DEFINED        -         0.30   0.60   0.100  -
USER-DEFINED        -         2.10   0.60   0.900  -
USER-DEFINED        -         0.30   0.60   0.900  -
USER-DEFINED        -         0.50   0.60   0.900  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 4.05
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 19.59

```

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.67
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.59
PIPE TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 14.96
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.

```

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 14.96

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```

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.946
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         1.40   0.60   0.100  -
USER-DEFINED        -         1.10   0.60   0.100  -
USER-DEFINED        -         1.90   0.60   0.900  -
USER-DEFINED        -         1.60   0.60   0.900  -
USER-DEFINED        -         0.20   0.60   0.400  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 3.40
EFFECTIVE AREA(ACRES) = 37.10 AREA-AVERAGED Fm(INCH/HR) = 0.37
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 19.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.12
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.59
PIPE TRAVEL TIME(MIN.) = 2.98 Tc(MIN.) = 17.94
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.

```

FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 17.94
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.843
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.30   0.60   0.100  -
USER-DEFINED        -         0.60   0.60   0.100  -
USER-DEFINED        -         0.70   0.60   0.100  -
USER-DEFINED        -         0.40   0.60   0.900  -
USER-DEFINED        -         0.80   0.60   0.900  -
USER-DEFINED        -         0.40   0.60   0.900  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.56
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 19.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 331.00
FLOW LENGTH(FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.52
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.59
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 20.07
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

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*****
FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.07
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.772
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.100 -
USER-DEFINED - 0.40 0.60 0.200 -
USER-DEFINED - 0.40 0.60 0.100 -
USER-DEFINED - 2.20 0.60 0.100 -
USER-DEFINED - 0.70 0.60 0.200 -
USER-DEFINED - 1.10 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 3.48
EFFECTIVE AREA(ACRES) = 46.10 AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 46.1 PEAK FLOW RATE(CFS) = 19.59
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 331.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.88
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.59
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 20.65
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2

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```

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 20.65
RAINFALL INTENSITY(INCH/HR) = 0.76
AREA-AVERAGED Fm(INCH/HR) = 0.33
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 46.10
TOTAL STREAM AREA(ACRES) = 46.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.59

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*****
FLOW PROCESS FROM NODE 210.00 TO NODE 211.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 423.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.407
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.433
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 0.50 0.60 0.200 56 8.41
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 1.20 0.60 0.200 56 8.41
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 2.01
TOTAL AREA(ACRES) = 1.70 PEAK FLOW RATE(CFS) = 2.01

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*****
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.48
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.01
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.25
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

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*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.25
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.221
SUBAREA LOSS RATE DATA(AMC II):

```

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 1.10 0.60 0.200 -
 USER-DEFINED - 1.40 0.60 0.200 -
 USER-DEFINED - 1.80 0.60 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 4.26
 EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 5.95

 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 421.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 567.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.02
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 5.95
 PIPE TRAVEL TIME (MIN.) = 1.57 Tc (MIN.) = 11.82
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

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

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

=====

MAINLINE Tc (MIN.) = 11.82
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.129
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 1.90 0.60 0.200 -
 USER-DEFINED - 5.70 0.60 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 7.60 SUBAREA RUNOFF (CFS) = 6.90
 EFFECTIVE AREA (ACRES) = 13.60 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 13.6 PEAK FLOW RATE (CFS) = 12.35

 FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 415.00 DOWNSTREAM (FEET) = 409.00
 FLOW LENGTH (FEET) = 747.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.35
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 12.35
 PIPE TRAVEL TIME (MIN.) = 1.96 Tc (MIN.) = 13.78
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

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

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

=====

MAINLINE Tc (MIN.) = 13.78
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.014
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 0.60 0.60 0.100 -
 USER-DEFINED - 0.30 0.60 0.100 -
 USER-DEFINED - 0.20 0.60 0.200 -
 USER-DEFINED - 2.90 0.60 0.400 -
 USER-DEFINED - 11.40 0.60 0.400 -
 USER-DEFINED - 0.90 0.60 0.400 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
 SUBAREA AREA (ACRES) = 16.30 SUBAREA RUNOFF (CFS) = 11.53
 EFFECTIVE AREA (ACRES) = 29.90 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 29.9 PEAK FLOW RATE (CFS) = 22.48

 FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 409.00 DOWNSTREAM (FEET) = 382.00
 FLOW LENGTH (FEET) = 1002.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.62
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 22.48
 PIPE TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 15.22
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

 FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 15.22
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.936
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 2.40 0.60 0.200 -
 USER-DEFINED - 7.10 0.60 0.500 -
 USER-DEFINED - 3.60 0.60 0.500 -
 USER-DEFINED - 0.30 0.60 0.500 -
 USER-DEFINED - 10.50 0.60 0.400 -
 USER-DEFINED - 9.40 0.60 0.400 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 20.51
EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 40.87

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 15.22
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.936
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.19
EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 41.06

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

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

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

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.26
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.06
PIPE TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 17.68
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

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

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

MAINLINE Tc(MIN.) = 17.68
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.852
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.70 0.60 0.200 -
USER-DEFINED - 0.40 0.60 0.200 -
USER-DEFINED - 1.70 0.60 0.200 -
USER-DEFINED - 0.40 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 6.66
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 42.94

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

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

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

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.04
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 42.94
PIPE TRAVEL TIME(MIN.) = 3.50 Tc(MIN.) = 21.17
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.

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

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

MAINLINE Tc(MIN.) = 21.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 2.40 0.60 0.100 -
USER-DEFINED - 1.20 0.60 0.850 -
USER-DEFINED - 1.70 0.60 0.850 -
USER-DEFINED - 8.50 0.60 0.850 -
USER-DEFINED - 0.70 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 4.45
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 42.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

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

MAINLINE Tc(MIN.) = 21.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.60 0.200 -
USER-DEFINED - 2.90 0.60 0.200 -
USER-DEFINED - 24.00 0.60 0.200 -
USER-DEFINED - 0.10 0.60 0.900 -
USER-DEFINED - 0.20 0.60 0.500 -
USER-DEFINED - 0.10 0.60 0.500 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 16.98
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 118.6 PEAK FLOW RATE(CFS) = 57.46

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

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

MAINLINE Tc(MIN.) = 21.17
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.748
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.400 -
USER-DEFINED - 1.40 0.60 0.400 -
USER-DEFINED - 7.40 0.60 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 4.25
EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 61.72

FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 347.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.71
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 61.72
PIPE TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 22.94
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 22.94
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.710
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.20 0.60 0.100 -
USER-DEFINED - 0.70 0.60 0.100 -
USER-DEFINED - 0.90 0.60 0.200 -
USER-DEFINED - 0.30 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124

SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 2.92
EFFECTIVE AREA(ACRES) = 133.00 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 133.0 PEAK FLOW RATE(CFS) = 61.72
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 22.94
RAINFALL INTENSITY(INCH/HR) = 0.71
AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 133.00
TOTAL STREAM AREA(ACRES) = 133.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.72

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	19.59	20.65	0.759	0.60(0.33)	0.55	46.1	203.00
2	61.72	22.94	0.710	0.60(0.21)	0.34	133.0	210.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	80.55	20.65	0.759	0.60(0.24)	0.40	165.8	203.00
2	79.08	22.94	0.710	0.60(0.24)	0.40	179.1	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 80.55 Tc(MIN.) = 20.65
EFFECTIVE AREA(ACRES) = 165.80 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 293.00
FLOW LENGTH(FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.75
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.55
PIPE TRAVEL TIME(MIN.) = 0.25 Tc(MIN.) = 20.90

LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 20.90

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.754

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.60	0.100	-
USER-DEFINED	-	4.60	0.60	0.100	-
USER-DEFINED	-	5.60	0.60	0.100	-
USER-DEFINED	-	1.60	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253

SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 7.96

EFFECTIVE AREA(ACRES) = 180.50 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39

TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 84.58

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 20.90

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.754

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.30	0.60	0.850	-
USER-DEFINED	-	0.80	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	4.00	0.60	0.900	-
USER-DEFINED	-	4.20	0.60	0.900	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.875

SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 3.42

EFFECTIVE AREA(ACRES) = 197.10 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 88.00

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 20.90

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.754

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED	-	0.50	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	0.500	-

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

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.576

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 1.21

EFFECTIVE AREA(ACRES) = 200.40 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 89.21

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 20.90

EFFECTIVE AREA(ACRES) = 200.40 AREA-AVERAGED Fm(INCH/HR) = 0.26

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.432

PEAK FLOW RATE(CFS) = 89.21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (ACRES)	Ae (ACRES)	HEADWATER NODE
1	89.21	20.90	0.754	0.60(0.26)	0.43	200.4	203.00
2	86.32	23.19	0.705	0.60(0.26)	0.43	213.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 5-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 3B05EVRL.DAT
TIME/DATE OF STUDY: 12:45 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.698
- 2) 10.00; 1.793
- 3) 15.00; 1.317
- 4) 20.00; 1.127
- 5) 25.00; 0.982
- 6) 30.00; 0.881
- 7) 40.00; 0.754
- 8) 50.00; 0.672
- 9) 60.00; 0.610
- 10) 90.00; 0.507
- 11) 120.00; 0.449
- 12) 180.00; 0.377
- 13) 360.00; 0.279
- 14) 1200.00; 0.123

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.480
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	0.30	0.50	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	0.20	0.50	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	-	0.10	0.50	0.900	56	9.94
COMMERCIAL	-	0.30	0.50	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	0.60	0.50	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 3.21
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.21

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.90
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 8.22

AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.70
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.14
 STREET FLOW TRAVEL TIME (MIN.) = 2.32 Tc (MIN.) = 8.53
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.060
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.100	-
USER-DEFINED	-	0.80	0.50	0.200	-
USER-DEFINED	-	0.40	0.50	0.900	-
USER-DEFINED	-	1.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 5.36
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 8.00

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.33 HALFSTREET FLOOD WIDTH (FEET) = 9.59
 FLOW VELOCITY (FEET/SEC.) = 3.94 DEPTH*VELOCITY (FT*FT/SEC.) = 1.31
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.85
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.36
 HALFSTREET FLOOD WIDTH (FEET) = 11.21
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.74
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.36
 STREET FLOW TRAVEL TIME (MIN.) = 1.72 Tc (MIN.) = 10.24
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.200	-

USER-DEFINED - 0.20 0.50 0.900 -
 USER-DEFINED - 1.50 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 3.70
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 10.45

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 11.52
 FLOW VELOCITY (FEET/SEC.) = 3.79 DEPTH*VELOCITY (FT*FT/SEC.) = 1.39
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 10.24
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	2.50	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	0.20	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 6.32
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 16.77

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 10.24
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.770
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.60	0.50	0.900	-
USER-DEFINED	-	9.30	0.50	0.900	-
USER-DEFINED	-	1.50	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
 SUBAREA AREA (ACRES) = 13.40 SUBAREA RUNOFF (CFS) = 15.91
 EFFECTIVE AREA (ACRES) = 25.10 AREA-AVERAGED Fm (INCH/HR) = 0.32
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.65
 TOTAL AREA (ACRES) = 25.1 PEAK FLOW RATE (CFS) = 32.68

```

FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.10
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 32.68
PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 12.07
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.

```

FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
-----
MAINLINE Tc(MIN.) = 12.07
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.596
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.40 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 2.10 0.50 0.900 -
USER-DEFINED - 0.30 0.50 0.900 -
USER-DEFINED - 0.50 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 7.02
EFFECTIVE AREA(ACRES) = 30.90 AREA-AVERAGED Fm(INCH/HR) = 0.31
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9 PEAK FLOW RATE(CFS) = 35.78

```

FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 353.00 DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.91
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.78
PIPE TRAVEL TIME(MIN.) = 1.91 Tc(MIN.) = 13.98
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.

```

FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
-----
MAINLINE Tc(MIN.) = 13.98

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```

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.414
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 0.100 -
USER-DEFINED - 1.10 0.50 0.100 -
USER-DEFINED - 1.90 0.50 0.900 -
USER-DEFINED - 1.60 0.50 0.900 -
USER-DEFINED - 0.20 0.50 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 6.32
EFFECTIVE AREA(ACRES) = 37.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1 PEAK FLOW RATE(CFS) = 37.04

```

FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 343.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.04
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.04
PIPE TRAVEL TIME(MIN.) = 2.53 Tc(MIN.) = 16.51
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.

```

FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
-----
MAINLINE Tc(MIN.) = 16.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.260
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 0.70 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.900 -
USER-DEFINED - 0.80 0.50 0.900 -
USER-DEFINED - 0.40 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 2.91
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 37.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

```

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 340.00 DOWNSTREAM(FEET) = 331.00
FLOW LENGTH(FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.75
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 37.04
PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 18.34
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

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*****
FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.190
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 0.40 0.50 0.100 -
USER-DEFINED - 2.20 0.50 0.100 -
USER-DEFINED - 0.70 0.50 0.200 -
USER-DEFINED - 1.10 0.50 0.400 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 5.75
EFFECTIVE AREA(ACRES) = 46.10 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.55
TOTAL AREA(ACRES) = 46.1 PEAK FLOW RATE(CFS) = 38.03

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*****
FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31
-----

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 331.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.03
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 38.03
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
-----

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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.82

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RAINFALL INTENSITY(INCH/HR) = 1.17
AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA(ACRES) = 46.10
TOTAL STREAM AREA(ACRES) = 46.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 38.03

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

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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 423.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.407
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.081
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 0.50 0.50 0.200 56 8.41
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 1.20 0.50 0.200 56 8.41
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 3.03
TOTAL AREA(ACRES) = 1.70 PEAK FLOW RATE(CFS) = 3.03

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*****
FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
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```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.89
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.03
PIPE TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 10.06
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

```

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

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.06
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.788
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

```



```

USER-DEFINED      -      1.10      0.50      0.200      -
USER-DEFINED      -      1.40      0.50      0.200      -
USER-DEFINED      -      1.80      0.50      0.200      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 4.30      SUBAREA RUNOFF (CFS) = 6.53
EFFECTIVE AREA (ACRES) = 6.00      AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 6.0      PEAK FLOW RATE (CFS) = 9.11

```

```

*****
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31
-----

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```

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

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```

ELEVATION DATA: UPSTREAM(FEET) = 421.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 567.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.55
ESTIMATED PIPE DIAMETER(INCH) = 18.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.11
PIPE TRAVEL TIME(MIN.) = 1.44      Tc(MIN.) = 11.50
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

```

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

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

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MAINLINE Tc(MIN.) = 11.50
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.650
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      1.90      0.50      0.200      -
USER-DEFINED      -      5.70      0.50      0.200      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 7.60      SUBAREA RUNOFF (CFS) = 10.60
EFFECTIVE AREA (ACRES) = 13.60      AREA-AVERAGED Fm (INCH/HR) = 0.10
AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 13.6      PEAK FLOW RATE (CFS) = 18.98

```

```

*****
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31
-----

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```

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

```

```

ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 409.00
FLOW LENGTH(FEET) = 747.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.98
ESTIMATED PIPE DIAMETER(INCH) = 24.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.98
PIPE TRAVEL TIME(MIN.) = 1.78      Tc(MIN.) = 13.28
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 13.28
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.481
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      0.60      0.50      0.100      -
USER-DEFINED      -      0.30      0.50      0.100      -
USER-DEFINED      -      0.20      0.50      0.200      -
USER-DEFINED      -      2.90      0.50      0.400      -
USER-DEFINED      -      11.40      0.50      0.400      -
USER-DEFINED      -      0.90      0.50      0.400      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA AREA (ACRES) = 16.30      SUBAREA RUNOFF (CFS) = 18.93
EFFECTIVE AREA (ACRES) = 29.90      AREA-AVERAGED Fm (INCH/HR) = 0.15
AREA-AVERAGED Fp (INCH/HR) = 0.50      AREA-AVERAGED Ap = 0.30
TOTAL AREA (ACRES) = 29.9      PEAK FLOW RATE (CFS) = 35.82

```

```

*****
FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31
-----

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```

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

```

```

ELEVATION DATA: UPSTREAM(FEET) = 409.00 DOWNSTREAM(FEET) = 382.00
FLOW LENGTH(FEET) = 1002.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.29
ESTIMATED PIPE DIAMETER(INCH) = 27.00      NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.82
PIPE TRAVEL TIME(MIN.) = 1.26      Tc(MIN.) = 14.54
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

```

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*****
FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.54
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.361
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL      AREA      Fp      Ap      SCS
LAND USE      GROUP      (ACRES)      (INCH/HR)      (DECIMAL)      CN
USER-DEFINED      -      2.40      0.50      0.200      -
USER-DEFINED      -      7.10      0.50      0.500      -
USER-DEFINED      -      3.60      0.50      0.500      -
USER-DEFINED      -      0.30      0.50      0.500      -
USER-DEFINED      -      10.50      0.50      0.400      -
USER-DEFINED      -      9.40      0.50      0.400      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA (ACRES) = 33.30      SUBAREA RUNOFF (CFS) = 34.51

```

EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 67.12

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 14.54
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.361
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.30 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 67.43

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.52
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 67.43
PIPE TRAVEL TIME(MIN.) = 2.13 Tc(MIN.) = 16.67
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

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

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

MAINLINE Tc(MIN.) = 16.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.254
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.70 0.50 0.200 -
USER-DEFINED - 0.40 0.50 0.200 -
USER-DEFINED - 1.70 0.50 0.200 -
USER-DEFINED - 0.40 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 10.54
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.17
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 71.83

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

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

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.72
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 71.83
PIPE TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 19.67
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.

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

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

MAINLINE Tc(MIN.) = 19.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.140
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 0.100 -
USER-DEFINED - 2.40 0.50 0.100 -
USER-DEFINED - 1.20 0.50 0.850 -
USER-DEFINED - 1.70 0.50 0.850 -
USER-DEFINED - 8.50 0.50 0.850 -
USER-DEFINED - 0.70 0.50 0.200 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 10.54
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 74.81

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

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

MAINLINE Tc(MIN.) = 19.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.140
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.90 0.50 0.200 -
USER-DEFINED - 2.90 0.50 0.200 -
USER-DEFINED - 24.00 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.900 -
USER-DEFINED - 0.20 0.50 0.500 -
USER-DEFINED - 0.10 0.50 0.500 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 28.19
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.17

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
TOTAL AREA (ACRES) = 118.6 PEAK FLOW RATE (CFS) = 103.00

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

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

=====

MAINLINE Tc (MIN.) = 19.67
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.140
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.50	0.400	-
USER-DEFINED	-	1.40	0.50	0.400	-
USER-DEFINED	-	7.40	0.50	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 9.30 SUBAREA RUNOFF (CFS) = 7.86
EFFECTIVE AREA (ACRES) = 127.90 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
TOTAL AREA (ACRES) = 127.9 PEAK FLOW RATE (CFS) = 110.86

FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 347.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 34.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.22
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 110.86
PIPE TRAVEL TIME (MIN.) = 1.57 Tc (MIN.) = 21.23
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81

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

=====

MAINLINE Tc (MIN.) = 21.23
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.091
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.20	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	0.100	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.200	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 4.73
EFFECTIVE AREA (ACRES) = 133.00 AREA-AVERAGED Fm (INCH/HR) = 0.17
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.34
TOTAL AREA (ACRES) = 133.0 PEAK FLOW RATE (CFS) = 110.86

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 21.23
RAINFALL INTENSITY (INCH/HR) = 1.09
AREA-AVERAGED Fm (INCH/HR) = 0.17
AREA-AVERAGED Fp (INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA (ACRES) = 133.00
TOTAL STREAM AREA (ACRES) = 133.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 110.86

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	38.03	18.82	1.172	0.50 (0.27)	0.55	46.1	203.00
2	110.86	21.23	1.091	0.50 (0.17)	0.34	133.0	210.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	144.92	18.82	1.172	0.50 (0.20)	0.40	164.0	203.00
2	145.49	21.23	1.091	0.50 (0.20)	0.40	179.1	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 145.49 Tc (MIN.) = 21.23
EFFECTIVE AREA (ACRES) = 179.10 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
TOTAL AREA (ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31

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

=====

ELEVATION DATA: UPSTREAM (FEET) = 330.00 DOWNSTREAM (FEET) = 293.00
FLOW LENGTH (FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 29.62
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 145.49
PIPE TRAVEL TIME (MIN.) = 0.22 Tc (MIN.) = 21.45
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 21.45
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.085
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.50 0.100 -
USER-DEFINED - 4.60 0.50 0.100 -
USER-DEFINED - 5.60 0.50 0.100 -
USER-DEFINED - 1.60 0.50 1.000 -
USER-DEFINED - 0.70 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 12.68
EFFECTIVE AREA(ACRES) = 193.80 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 155.59

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	155.81	19.04	1.163	0.50(0.19)	0.39	178.7	203.00
2	155.59	21.45	1.085	0.50(0.19)	0.39	193.8	210.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 155.81 Tc(MIN.) = 19.04
AREA-AVERAGED Fm(INCH/HR) = 0.19 AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.39 EFFECTIVE AREA(ACRES) = 178.71

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 19.04
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.30 0.50 0.850 -
USER-DEFINED - 0.80 0.50 0.850 -
USER-DEFINED - 0.20 0.50 0.850 -
USER-DEFINED - 0.10 0.50 0.900 -
USER-DEFINED - 4.00 0.50 0.900 -
USER-DEFINED - 4.20 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 10.84
EFFECTIVE AREA(ACRES) = 195.31 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 166.66

FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

=====
MAINLINE Tc(MIN.) = 19.04
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.163
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.500 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 2.30 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 2.60
EFFECTIVE AREA(ACRES) = 198.61 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 169.26
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 19.04
EFFECTIVE AREA(ACRES) = 198.61 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.433
PEAK FLOW RATE(CFS) = 169.26

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	169.26	19.04	1.163	0.50(0.22)	0.43	198.6	203.00
2	167.62	21.45	1.085	0.50(0.21)	0.43	213.7	210.00

=====
END OF RATIONAL METHOD ANALYSIS
=====

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 10-YR EV FEB 2023 ROKAMOTO *

FILE NAME: 3B10EVRL.DAT
TIME/DATE OF STUDY: 07:39 02/15/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.855
- 2) 10.00; 2.561
- 3) 15.00; 1.881
- 4) 20.00; 1.610
- 5) 25.00; 1.403
- 6) 30.00; 1.259
- 7) 40.00; 1.077
- 8) 50.00; 0.959
- 9) 60.00; 0.872
- 10) 90.00; 0.725
- 11) 120.00; 0.642
- 12) 180.00; 0.539
- 13) 360.00; 0.399
- 14) 1200.00; 0.175

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.543
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56	9.94
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 4.70
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.70

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.93
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.34
HALFSTREET FLOOD WIDTH(FEET) = 10.12

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.03
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.38
 STREET FLOW TRAVEL TIME (MIN.) = 2.13 Tc (MIN.) = 8.34
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.992
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 8.43
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 12.38

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.37 HALFSTREET FLOOD WIDTH (FEET) = 11.76
 FLOW VELOCITY (FEET/SEC.) = 4.34 DEPTH*VELOCITY (FT*FT/SEC.) = 1.62
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.43
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.41
 HALFSTREET FLOOD WIDTH (FEET) = 13.71
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.12
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.68
 STREET FLOW TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 9.90
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.588

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56

COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 6.07
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 16.71

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 14.18
 FLOW VELOCITY (FEET/SEC.) = 4.20 DEPTH*VELOCITY (FT*FT/SEC.) = 1.75
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.90
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.588

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	2.50	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 9.42
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 26.13

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.90
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.588

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

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".4 DWELLING/ACRE"      B      2.60    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      9.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      1.50    0.30    0.900    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 13.40    SUBAREA RUNOFF(CFS) = 27.95
EFFECTIVE AREA(ACRES) = 25.10    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.65
TOTAL AREA(ACRES) = 25.1    PEAK FLOW RATE(CFS) = 54.08

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FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 375.00    DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.62
ESTIMATED PIPE DIAMETER(INCH) = 33.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.08
PIPE TRAVEL TIME(MIN.) = 1.61    Tc(MIN.) = 11.50
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.

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FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.50
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.356
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        2.40    0.30    0.100    56
COMMERCIAL          B        0.20    0.30    0.100    56
COMMERCIAL          B        0.30    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        2.10    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.50    0.30    0.900    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80    SUBAREA RUNOFF(CFS) = 11.52
EFFECTIVE AREA(ACRES) = 30.90    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9    PEAK FLOW RATE(CFS) = 60.37

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FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 353.00    DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.09
ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 60.37
PIPE TRAVEL TIME(MIN.) = 1.69    Tc(MIN.) = 13.19
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.

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FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.19
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        1.40    0.30    0.100    56
COMMERCIAL          B        1.10    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.90    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.60    0.30    0.900    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        0.20    0.30    0.400    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20    SUBAREA RUNOFF(CFS) = 10.93
EFFECTIVE AREA(ACRES) = 37.10    AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1    PEAK FLOW RATE(CFS) = 64.92

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FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 343.00    DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.78
ESTIMATED PIPE DIAMETER(INCH) = 45.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 64.92
PIPE TRAVEL TIME(MIN.) = 2.25    Tc(MIN.) = 15.44
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.

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FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.44
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.857
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 4.92
EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 64.92
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 331.00
FLOW LENGTH (FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.27
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 64.92
PIPE TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 17.00
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81

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

MAINLINE Tc (MIN.) = 17.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.773
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA (ACRES) = 5.80 SUBAREA RUNOFF (CFS) = 8.98
EFFECTIVE AREA (ACRES) = 46.10 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55

TOTAL AREA (ACRES) = 46.1 PEAK FLOW RATE (CFS) = 66.74

FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 331.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.12
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 66.74
PIPE TRAVEL TIME (MIN.) = 0.42 Tc (MIN.) = 17.42
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 17.42
RAINFALL INTENSITY (INCH/HR) = 1.75
AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA (ACRES) = 46.10
TOTAL STREAM AREA (ACRES) = 46.10
PEAK FLOW RATE (CFS) AT CONFLUENCE = 66.74

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

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 426.00 DOWNSTREAM (FEET) = 423.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.407
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.973
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56	8.41
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56	8.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF (CFS) = 4.46
TOTAL AREA (ACRES) = 1.70 PEAK FLOW RATE (CFS) = 4.46

FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
 FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 4.28
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.46
 PIPE TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 9.91
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

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

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

 MAINLINE Tc(MIN.) = 9.91
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.585
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.40 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.80 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 9.77
 EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
 TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 13.64

 FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 421.00 DOWNSTREAM(FEET) = 415.00
 FLOW LENGTH(FEET) = 567.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.25
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 13.64
 PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 11.21
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

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

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

 MAINLINE Tc(MIN.) = 11.21

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.90 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 5.70 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 15.98
 EFFECTIVE AREA(ACRES) = 13.60 AREA-AVERAGED Fm(INCH/HR) = 0.06
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
 TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 28.60

 FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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

 ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 409.00
 FLOW LENGTH(FEET) = 747.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.93
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 28.60
 PIPE TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 12.78
 LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

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

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

 MAINLINE Tc(MIN.) = 12.78
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.183
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 0.60 0.30 0.100 56
 COMMERCIAL B 0.30 0.30 0.100 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 2.90 0.30 0.400 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 11.40 0.30 0.400 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
 SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 30.35
 EFFECTIVE AREA(ACRES) = 29.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 29.9 PEAK FLOW RATE(CFS) = 56.34

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 409.00 DOWNSTREAM(FEET) = 382.00
FLOW LENGTH(FEET) = 1002.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.69
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 56.34
PIPE TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 13.92
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.92
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.028
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 7.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.60 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 10.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 57.03
EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 109.20

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.92
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.028
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.52

EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 109.72

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.59
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 109.72
PIPE TRAVEL TIME(MIN.) = 1.92 Tc(MIN.) = 15.83
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

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

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

MAINLINE Tc(MIN.) = 15.83
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.836
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.70 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 16.27
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 114.99

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

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

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.06
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 114.99
PIPE TRAVEL TIME(MIN.) = 2.69 Tc(MIN.) = 18.52
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.

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*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B       0.20   0.30   0.100  56
COMMERCIAL         B       2.40   0.30   0.100  56
PUBLIC PARK        B       1.20   0.30   0.850  56
PUBLIC PARK        B       1.70   0.30   0.850  56
PUBLIC PARK        B       8.50   0.30   0.850  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       0.70   0.30   0.200  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 19.64
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 124.97

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       2.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       2.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       24.00  0.30   0.200  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.10   0.30   0.900  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       0.20   0.30   0.500  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       0.10   0.30   0.500  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 44.27
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 118.6 PEAK FLOW RATE(CFS) = 169.23

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 18.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.690
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       0.50   0.30   0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       1.40   0.30   0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       7.40   0.30   0.400  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 13.14
EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 182.38

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 347.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.04
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 182.38
PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 19.90
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.616
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL         B       3.20   0.30   0.100  56
COMMERCIAL         B       0.70   0.30   0.100  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       0.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       0.30   0.30   0.200  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 7.25
EFFECTIVE AREA(ACRES) = 133.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 133.0 PEAK FLOW RATE(CFS) = 182.38
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.90
RAINFALL INTENSITY(INCH/HR) = 1.62
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 133.00
TOTAL STREAM AREA(ACRES) = 133.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 182.38

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 66.74 17.42 1.750 0.30( 0.16) 0.55 46.1 203.00
2 182.38 19.90 1.616 0.30( 0.10) 0.34 133.0 210.00

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

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 240.59 17.42 1.750 0.30( 0.12) 0.40 162.6 203.00
2 243.47 19.90 1.616 0.30( 0.12) 0.40 179.1 210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 243.47 Tc(MIN.) = 19.90
EFFECTIVE AREA(ACRES) = 179.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 293.00
FLOW LENGTH(FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.19
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 243.47
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 20.09
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 20.09
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.60 0.30 0.100 56
COMMERCIAL B 5.60 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 1.60 0.30 1.000 66
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.70 0.30 1.000 65
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.20 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 20.25
EFFECTIVE AREA(ACRES) = 193.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 260.02

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 20.09
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.606
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 7.30 0.30 0.850 56
PUBLIC PARK B 0.80 0.30 0.850 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 20.08
EFFECTIVE AREA(ACRES) = 210.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 280.10

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 280.87 17.62 1.739 0.30( 0.13) 0.43 193.9 203.00
2 280.10 20.09 1.606 0.30( 0.13) 0.42 210.4 210.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 280.87 Tc(MIN.) = 17.62
AREA-AVERAGED Fm(INCH/HR) = 0.13 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.43 EFFECTIVE AREA(ACRES) = 193.85

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FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 17.62

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.739

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.10 0.30 1.000 65

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.40 0.30 1.000 65

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.65

EFFECTIVE AREA(ACRES) = 197.15 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 285.52

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 17.62

EFFECTIVE AREA(ACRES) = 197.15 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.433

PEAK FLOW RATE(CFS) = 285.52

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	285.52	17.62	1.739	0.30(0.13)	0.43	197.2	203.00
2	284.35	20.09	1.606	0.30(0.13)	0.43	213.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 25-YR EV FEB 2023 ROKAMOTO *

FILE NAME: 3B25EVRL.DAT
TIME/DATE OF STUDY: 07:40 02/15/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.920
- 2) 10.00; 3.206
- 3) 15.00; 2.446
- 4) 20.00; 2.021
- 5) 25.00; 1.761
- 6) 30.00; 1.545
- 7) 40.00; 1.345
- 8) 50.00; 1.192
- 9) 60.00; 1.068
- 10) 90.00; 0.900
- 11) 120.00; 0.790
- 12) 180.00; 0.660
- 13) 360.00; 0.488
- 14) 1200.00; 0.215

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.506
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56	9.94
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 6.00
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 6.00

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.45
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 11.37

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.25
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.55
 STREET FLOW TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 8.23
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.814
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 10.87
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 15.94

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.16
 FLOW VELOCITY (FEET/SEC.) = 4.58 DEPTH*VELOCITY (FT*FT/SEC.) = 1.82
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 19.89
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.44
 HALFSTREET FLOOD WIDTH (FEET) = 15.27
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.37
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.90
 STREET FLOW TRAVEL TIME (MIN.) = 1.47 Tc (MIN.) = 9.70
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.309

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56

COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 7.88
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 21.64

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 15.82
 FLOW VELOCITY (FEET/SEC.) = 4.45 DEPTH*VELOCITY (FT*FT/SEC.) = 1.98
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.70
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.309
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	2.50	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 12.08
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 33.72

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.70
 * 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.309
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					


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".4 DWELLING/ACRE"      B      2.60   0.30   0.900   56
RESIDENTIAL
".4 DWELLING/ACRE"      B      9.30   0.30   0.900   56
RESIDENTIAL
".4 DWELLING/ACRE"      B      1.50   0.30   0.900   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 13.40   SUBAREA RUNOFF(CFS) = 36.65
EFFECTIVE AREA(ACRES) = 25.10   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.65
TOTAL AREA(ACRES) = 25.1   PEAK FLOW RATE(CFS) = 70.37

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FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 375.00   DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.45
ESTIMATED PIPE DIAMETER(INCH) = 36.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.37
PIPE TRAVEL TIME(MIN.) = 1.51   Tc(MIN.) = 11.21
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.

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FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.21
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.022
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        2.40   0.30   0.100   56
COMMERCIAL          B        0.20   0.30   0.100   56
COMMERCIAL          B        0.30   0.30   0.100   56
RESIDENTIAL
".4 DWELLING/ACRE"  B        2.10   0.30   0.900   56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.30   0.30   0.900   56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.50   0.30   0.900   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80   SUBAREA RUNOFF(CFS) = 14.99
EFFECTIVE AREA(ACRES) = 30.90   AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9   PEAK FLOW RATE(CFS) = 78.89

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FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 353.00   DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.99
ESTIMATED PIPE DIAMETER(INCH) = 42.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 78.89
PIPE TRAVEL TIME(MIN.) = 1.55   Tc(MIN.) = 12.76
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.

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FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.76
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.787
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        1.40   0.30   0.100   56
COMMERCIAL          B        1.10   0.30   0.100   56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.90   0.30   0.900   56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.60   0.30   0.900   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        0.20   0.30   0.400   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20   SUBAREA RUNOFF(CFS) = 14.61
EFFECTIVE AREA(ACRES) = 37.10   AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1   PEAK FLOW RATE(CFS) = 86.96

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FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 343.00   DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.35
ESTIMATED PIPE DIAMETER(INCH) = 51.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 86.96
PIPE TRAVEL TIME(MIN.) = 2.08   Tc(MIN.) = 14.83
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.

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FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.83
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.471
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 6.69
EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 86.96
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 331.00
FLOW LENGTH (FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.92
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 86.96
PIPE TRAVEL TIME (MIN.) = 1.46 Tc (MIN.) = 16.30
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81

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

MAINLINE Tc (MIN.) = 16.30
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.336
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA (ACRES) = 5.80 SUBAREA RUNOFF (CFS) = 11.92
EFFECTIVE AREA (ACRES) = 46.10 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55

TOTAL AREA (ACRES) = 46.1 PEAK FLOW RATE (CFS) = 90.10

FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 331.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.62
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 90.10
PIPE TRAVEL TIME (MIN.) = 0.40 Tc (MIN.) = 16.69
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 16.69
RAINFALL INTENSITY (INCH/HR) = 2.30
AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA (ACRES) = 46.10
TOTAL STREAM AREA (ACRES) = 46.10
PEAK FLOW RATE (CFS) AT CONFLUENCE = 90.10

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

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 426.00 DOWNSTREAM (FEET) = 423.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.407
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.752
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56	8.41
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56	8.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF (CFS) = 5.65
TOTAL AREA (ACRES) = 1.70 PEAK FLOW RATE (CFS) = 5.65

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FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.50
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.65
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 9.83
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

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*****
FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 9.83
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.263
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.10   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.40   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.80   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 12.40
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 17.30

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*****
FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 421.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 567.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.78
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.30
PIPE TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 11.05
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

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*****
FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 11.05

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* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.047
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       1.90   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       5.70   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 20.43
EFFECTIVE AREA(ACRES) = 13.60 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 36.56

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*****
FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 409.00
FLOW LENGTH(FEET) = 747.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.43
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.56
PIPE TRAVEL TIME(MIN.) = 1.48 Tc(MIN.) = 12.52
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

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*****
FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.52
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.822
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE         GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL
"11+ DWELLINGS/ACRE"   B       0.60   0.30  0.100  56
COMMERCIAL
"11+ DWELLINGS/ACRE"   B       0.30   0.30  0.100  56
RESIDENTIAL
"11+ DWELLINGS/ACRE"   B       0.20   0.30  0.200  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B       2.90   0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B      11.40   0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B       0.90   0.30  0.400  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 39.73
EFFECTIVE AREA(ACRES) = 29.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 29.9 PEAK FLOW RATE(CFS) = 73.54

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FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 409.00 DOWNSTREAM(FEET) = 382.00
FLOW LENGTH(FEET) = 1002.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.68
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 73.54
PIPE TRAVEL TIME(MIN.) = 1.07 Tc(MIN.) = 13.59
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 7.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.60 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 10.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 75.97
EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 145.16

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 13.59
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.69

EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 145.84

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 40.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.42
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 145.84
PIPE TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 15.37
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

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

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

MAINLINE Tc(MIN.) = 15.37
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.415
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.70 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 21.59
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 153.39

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

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

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 36.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.11
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 153.39
PIPE TRAVEL TIME(MIN.) = 2.49 Tc(MIN.) = 17.85
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.

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*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.85
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         0.20   0.30   0.100   56
COMMERCIAL          B         2.40   0.30   0.100   56
PUBLIC PARK         B         1.20   0.30   0.850   56
PUBLIC PARK         B         1.70   0.30   0.850   56
PUBLIC PARK         B         8.50   0.30   0.850   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.70   0.30   0.200   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 26.43
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 165.80

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.85
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         2.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         2.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         24.00  0.30   0.200   56
RESIDENTIAL
".4 DWELLING/ACRE"   B         0.10   0.30   0.900   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.20   0.30   0.500   56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.10   0.30   0.500   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 58.22
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 118.6 PEAK FLOW RATE(CFS) = 224.02

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.85
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.204
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         0.50   0.30   0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         1.40   0.30   0.400   56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B         7.40   0.30   0.400   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 17.44
EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 241.46

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 347.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.19
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 241.46
PIPE TRAVEL TIME(MIN.) = 1.28 Tc(MIN.) = 19.13
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.13
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.095
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         3.20   0.30   0.100   56
COMMERCIAL          B         0.70   0.30   0.100   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.90   0.30   0.200   56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B         0.30   0.30   0.200   56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 9.44
EFFECTIVE AREA(ACRES) = 133.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 133.0 PEAK FLOW RATE(CFS) = 241.46
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 19.13
RAINFALL INTENSITY(INCH/HR) = 2.09
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 133.00
TOTAL STREAM AREA(ACRES) = 133.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 241.46

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 90.10 16.69 2.302 0.30( 0.16) 0.55 46.1 203.00
2 241.46 19.13 2.095 0.30( 0.10) 0.34 133.0 210.00

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

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 322.71 16.69 2.302 0.30( 0.12) 0.40 162.1 203.00
2 322.82 19.13 2.095 0.30( 0.12) 0.40 179.1 210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 322.82 Tc(MIN.) = 19.13
EFFECTIVE AREA(ACRES) = 179.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 293.00
FLOW LENGTH(FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 36.31
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 322.82
PIPE TRAVEL TIME(MIN.) = 0.18 Tc(MIN.) = 19.31
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.31
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.079
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.60 0.30 0.100 56
COMMERCIAL B 5.60 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 1.60 0.30 1.000 66
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.70 0.30 1.000 65
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.20 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 26.51
EFFECTIVE AREA(ACRES) = 193.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 342.53

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 345.37 16.87 2.287 0.30( 0.12) 0.39 176.8 203.00
2 342.53 19.31 2.079 0.30( 0.12) 0.39 193.8 210.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 345.37 Tc(MIN.) = 16.87
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.39 EFFECTIVE AREA(ACRES) = 176.84

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.87
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.287
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 7.30 0.30 0.850 56
PUBLIC PARK B 0.80 0.30 0.850 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 30.24
EFFECTIVE AREA(ACRES) = 193.44 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 375.61

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FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 16.87

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.287

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.10 0.30 1.000 65

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.40 0.30 1.000 65

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.28

EFFECTIVE AREA(ACRES) = 196.74 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 381.89

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 16.87

EFFECTIVE AREA(ACRES) = 196.74 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.434

PEAK FLOW RATE(CFS) = 381.89

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	381.89	16.87	2.287	0.30(0.13)	0.43	196.7	203.00
2	375.34	19.31	2.079	0.30(0.13)	0.43	213.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED B *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 50-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 3B50EVRL.DAT
TIME/DATE OF STUDY: 12:41 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

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

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.437
- 2) 10.00; 3.483
- 3) 15.00; 2.666
- 4) 20.00; 2.227
- 5) 25.00; 1.924
- 6) 30.00; 1.731
- 7) 40.00; 1.465
- 8) 50.00; 1.303
- 9) 60.00; 1.200
- 10) 90.00; 0.997
- 11) 120.00; 0.867
- 12) 180.00; 0.745
- 13) 360.00; 0.552
- 14) 1200.00; 0.243

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

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

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

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

FLOW PROCESS FROM NODE 203.00 TO NODE 204.00 IS CODE = 21

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

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 305.00
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 402.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.206
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.966
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56	6.61
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56	9.94
COMMERCIAL	B	0.30	0.30	0.100	56	6.21
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56	6.61

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.207
SUBAREA RUNOFF(CFS) = 6.62
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 6.62

FLOW PROCESS FROM NODE 204.00 TO NODE 205.00 IS CODE = 62

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

=====

UPSTREAM ELEVATION(FEET) = 402.00 DOWNSTREAM ELEVATION(FEET) = 385.00
STREET LENGTH(FEET) = 515.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.65
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.38
HALFSTREET FLOOD WIDTH(FEET) = 11.91

AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.33
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.62
 STREET FLOW TRAVEL TIME (MIN.) = 1.98 Tc (MIN.) = 8.19
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.190
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.50	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.80	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.512
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 11.99
 EFFECTIVE AREA (ACRES) = 4.80 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 4.8 PEAK FLOW RATE (CFS) = 17.56

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.41 HALFSTREET FLOOD WIDTH (FEET) = 13.71
 FLOW VELOCITY (FEET/SEC.) = 4.69 DEPTH*VELOCITY (FT*FT/SEC.) = 1.91
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 205.00 = 820.00 FEET.

 FLOW PROCESS FROM NODE 205.00 TO NODE 206.00 IS CODE = 62

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

UPSTREAM ELEVATION (FEET) = 385.00 DOWNSTREAM ELEVATION (FEET) = 375.00
 STREET LENGTH (FEET) = 386.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

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

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

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.91
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.45
 HALFSTREET FLOOD WIDTH (FEET) = 15.90
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.47
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.00
 STREET FLOW TRAVEL TIME (MIN.) = 1.44 Tc (MIN.) = 9.63
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.628

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56

COMMERCIAL	B	0.40	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 2.80 SUBAREA RUNOFF (CFS) = 8.69
 EFFECTIVE AREA (ACRES) = 7.60 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 7.6 PEAK FLOW RATE (CFS) = 23.82

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.45
 FLOW VELOCITY (FEET/SEC.) = 4.57 DEPTH*VELOCITY (FT*FT/SEC.) = 2.08
 LONGEST FLOWPATH FROM NODE 203.00 TO NODE 206.00 = 1206.00 FEET.

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.63
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.628

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	2.50	0.30	0.100	56
COMMERCIAL	B	0.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.115
 SUBAREA AREA (ACRES) = 4.10 SUBAREA RUNOFF (CFS) = 13.26
 EFFECTIVE AREA (ACRES) = 11.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 11.7 PEAK FLOW RATE (CFS) = 37.08

 FLOW PROCESS FROM NODE 206.00 TO NODE 206.00 IS CODE = 81

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

MAINLINE Tc (MIN.) = 9.63
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.628

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					

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".4 DWELLING/ACRE"      B      2.60    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      9.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      1.50    0.30    0.900    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 13.40    SUBAREA RUNOFF(CFS) = 40.50
EFFECTIVE AREA(ACRES) = 25.10    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.65
TOTAL AREA(ACRES) = 25.1    PEAK FLOW RATE(CFS) = 77.58

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FLOW PROCESS FROM NODE 206.00 TO NODE 207.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 375.00    DOWNSTREAM(FEET) = 353.00
FLOW LENGTH(FEET) = 1217.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.64
ESTIMATED PIPE DIAMETER(INCH) = 36.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 77.58
PIPE TRAVEL TIME(MIN.) = 1.49    Tc(MIN.) = 11.12
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 207.00 = 2423.00 FEET.

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FLOW PROCESS FROM NODE 207.00 TO NODE 207.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 11.12
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.301
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        2.40    0.30    0.100    56
COMMERCIAL          B        0.20    0.30    0.100    56
COMMERCIAL          B        0.30    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        2.10    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.30    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        0.50    0.30    0.900    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 5.80    SUBAREA RUNOFF(CFS) = 16.45
EFFECTIVE AREA(ACRES) = 30.90    AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.62
TOTAL AREA(ACRES) = 30.9    PEAK FLOW RATE(CFS) = 86.63

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FLOW PROCESS FROM NODE 207.00 TO NODE 208.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 353.00    DOWNSTREAM(FEET) = 343.00
FLOW LENGTH(FEET) = 1021.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.14
ESTIMATED PIPE DIAMETER(INCH) = 42.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 86.63
PIPE TRAVEL TIME(MIN.) = 1.53    Tc(MIN.) = 12.64
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 208.00 = 3444.00 FEET.

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FLOW PROCESS FROM NODE 208.00 TO NODE 208.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.64
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.051
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        1.40    0.30    0.100    56
COMMERCIAL          B        1.10    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.90    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"  B        1.60    0.30    0.900    56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        0.20    0.30    0.400    56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.561
SUBAREA AREA(ACRES) = 6.20    SUBAREA RUNOFF(CFS) = 16.08
EFFECTIVE AREA(ACRES) = 37.10    AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.61
TOTAL AREA(ACRES) = 37.1    PEAK FLOW RATE(CFS) = 95.77

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FLOW PROCESS FROM NODE 208.00 TO NODE 209.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 343.00    DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 916.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 39.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.59
ESTIMATED PIPE DIAMETER(INCH) = 54.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.77
PIPE TRAVEL TIME(MIN.) = 2.01    Tc(MIN.) = 14.65
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.00 = 4360.00 FEET.

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FLOW PROCESS FROM NODE 209.00 TO NODE 209.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.65
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.722
SUBAREA LOSS RATE DATA(AMC II):

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DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.30	0.30	0.100	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.40	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA (ACRES) = 3.20 SUBAREA RUNOFF (CFS) = 7.41
EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 95.77
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 209.00 TO NODE 209.10 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 340.00 DOWNSTREAM (FEET) = 331.00
FLOW LENGTH (FEET) = 960.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.31
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 95.77
PIPE TRAVEL TIME (MIN.) = 1.41 Tc (MIN.) = 16.07
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 209.10 = 5320.00 FEET.

FLOW PROCESS FROM NODE 209.10 TO NODE 209.10 IS CODE = 81

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

MAINLINE Tc (MIN.) = 16.07
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.572
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	2.20	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA (ACRES) = 5.80 SUBAREA RUNOFF (CFS) = 13.15
EFFECTIVE AREA (ACRES) = 46.10 AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.55

TOTAL AREA (ACRES) = 46.1 PEAK FLOW RATE (CFS) = 99.91

FLOW PROCESS FROM NODE 209.10 TO NODE 230.00 IS CODE = 31

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

ELEVATION DATA: UPSTREAM (FEET) = 331.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 205.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.92
ESTIMATED PIPE DIAMETER (INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 99.91
PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 16.45
LONGEST FLOWPATH FROM NODE 203.00 TO NODE 230.00 = 5525.00 FEET.

FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1

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

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 16.45
RAINFALL INTENSITY (INCH/HR) = 2.54
AREA-AVERAGED Fm (INCH/HR) = 0.16
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.55
EFFECTIVE STREAM AREA (ACRES) = 46.10
TOTAL STREAM AREA (ACRES) = 46.10
PEAK FLOW RATE (CFS) AT CONFLUENCE = 99.91

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

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

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 426.00 DOWNSTREAM (FEET) = 423.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.407
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.106
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	0.50	0.30	0.200	56	8.41
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	1.20	0.30	0.200	56	8.41

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF (CFS) = 6.19
TOTAL AREA (ACRES) = 1.70 PEAK FLOW RATE (CFS) = 6.19

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FLOW PROCESS FROM NODE 211.00 TO NODE 212.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 423.00 DOWNSTREAM(FEET) = 421.00
FLOW LENGTH(FEET) = 385.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.57
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 6.19
PIPE TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 9.81
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 212.00 = 713.00 FEET.

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FLOW PROCESS FROM NODE 212.00 TO NODE 212.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 9.81
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.557
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       1.10   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       1.40   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       1.80   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 13.53
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 18.89

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FLOW PROCESS FROM NODE 212.00 TO NODE 213.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 421.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 567.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.90
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.89
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 11.01
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 213.00 = 1280.00 FEET.

```

FLOW PROCESS FROM NODE 213.00 TO NODE 213.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 11.01

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* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.319
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       1.90   0.30  0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       5.70   0.30  0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 7.60 SUBAREA RUNOFF(CFS) = 22.29
EFFECTIVE AREA(ACRES) = 13.60 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 13.6 PEAK FLOW RATE(CFS) = 39.88

```

FLOW PROCESS FROM NODE 213.00 TO NODE 214.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 409.00
FLOW LENGTH(FEET) = 747.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.55
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 39.88
PIPE TRAVEL TIME(MIN.) = 1.46 Tc(MIN.) = 12.46
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 214.00 = 2027.00 FEET.

```

FLOW PROCESS FROM NODE 214.00 TO NODE 214.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====
MAINLINE Tc(MIN.) = 12.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.081
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
  LAND USE          GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL
COMMERCIAL B       0.60   0.30  0.100  56
COMMERCIAL B       0.30   0.30  0.100  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B       0.20   0.30  0.200  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       2.90   0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       11.40  0.30  0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B       0.90   0.30  0.400  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.381
SUBAREA AREA(ACRES) = 16.30 SUBAREA RUNOFF(CFS) = 43.52
EFFECTIVE AREA(ACRES) = 29.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 29.9 PEAK FLOW RATE(CFS) = 80.49

```

FLOW PROCESS FROM NODE 214.00 TO NODE 215.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 409.00 DOWNSTREAM(FEET) = 382.00
FLOW LENGTH(FEET) = 1002.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.80
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 80.49
PIPE TRAVEL TIME(MIN.) = 1.06 Tc(MIN.) = 13.52
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 215.00 = 3029.00 FEET.

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 7.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 3.60 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 10.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.419
SUBAREA AREA(ACRES) = 33.30 SUBAREA RUNOFF(CFS) = 83.39
EFFECTIVE AREA(ACRES) = 63.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.2 PEAK FLOW RATE(CFS) = 159.23

FLOW PROCESS FROM NODE 215.00 TO NODE 215.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.908
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 0.30 SUBAREA RUNOFF(CFS) = 0.75

EFFECTIVE AREA(ACRES) = 63.50 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 63.5 PEAK FLOW RATE(CFS) = 159.98

FLOW PROCESS FROM NODE 215.00 TO NODE 218.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 382.00 DOWNSTREAM(FEET) = 373.00
FLOW LENGTH(FEET) = 1218.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 44.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.49
ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 159.98
PIPE TRAVEL TIME(MIN.) = 1.77 Tc(MIN.) = 15.29
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 218.00 = 4247.00 FEET.

FLOW PROCESS FROM NODE 218.00 TO NODE 218.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.29
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.641
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.70 0.30 0.200 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.212
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 23.66
EFFECTIVE AREA(ACRES) = 73.70 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 73.7 PEAK FLOW RATE(CFS) = 168.38

FLOW PROCESS FROM NODE 218.00 TO NODE 219.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 373.00 DOWNSTREAM(FEET) = 347.00
FLOW LENGTH(FEET) = 2106.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.27
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 168.38
PIPE TRAVEL TIME(MIN.) = 2.46 Tc(MIN.) = 17.74
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 219.00 = 6353.00 FEET.

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*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.74
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.425
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        0.20   0.30   0.100  56
COMMERCIAL          B        2.40   0.30   0.100  56
PUBLIC PARK         B        1.20   0.30   0.850  56
PUBLIC PARK         B        1.70   0.30   0.850  56
PUBLIC PARK         B        8.50   0.30   0.850  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.70   0.30   0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.686
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 29.36
EFFECTIVE AREA(ACRES) = 88.40 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 88.4 PEAK FLOW RATE(CFS) = 183.42

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.74
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.425
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        2.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        2.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        24.00  0.30   0.200  56
RESIDENTIAL
".4 DWELLING/ACRE"   B        0.10   0.30   0.900  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.20   0.30   0.500  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B        0.10   0.30   0.500  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA(ACRES) = 30.20 SUBAREA RUNOFF(CFS) = 64.24
EFFECTIVE AREA(ACRES) = 118.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 118.6 PEAK FLOW RATE(CFS) = 247.66

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 219.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 17.74
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.425
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        0.50   0.30   0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        1.40   0.30   0.400  56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B        7.40   0.30   0.400  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 9.30 SUBAREA RUNOFF(CFS) = 19.29
EFFECTIVE AREA(ACRES) = 127.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 127.9 PEAK FLOW RATE(CFS) = 266.95

*****
FLOW PROCESS FROM NODE 219.00 TO NODE 230.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 347.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1244.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.70
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 266.95
PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 18.99
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 18.99
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.316
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B        3.20   0.30   0.100  56
COMMERCIAL          B        0.70   0.30   0.100  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.90   0.30   0.200  56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B        0.30   0.30   0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.124
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 10.46
EFFECTIVE AREA(ACRES) = 133.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.34
TOTAL AREA(ACRES) = 133.0 PEAK FLOW RATE(CFS) = 266.95
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 230.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 18.99
RAINFALL INTENSITY(INCH/HR) = 2.32
AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.34
EFFECTIVE STREAM AREA(ACRES) = 133.00
TOTAL STREAM AREA(ACRES) = 133.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 266.95

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 99.91 16.45 2.538 0.30( 0.16) 0.55 46.1 203.00
2 266.95 18.99 2.316 0.30( 0.10) 0.34 133.0 210.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 354.49 16.45 2.538 0.30( 0.12) 0.40 161.3 203.00
2 357.50 18.99 2.316 0.30( 0.12) 0.40 179.1 210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 357.50 Tc(MIN.) = 18.99
EFFECTIVE AREA(ACRES) = 179.10 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 179.1
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 230.00 = 7597.00 FEET.

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*****
FLOW PROCESS FROM NODE 230.00 TO NODE 231.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 330.00 DOWNSTREAM(FEET) = 293.00
FLOW LENGTH(FEET) = 389.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 37.54
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 357.50
PIPE TRAVEL TIME(MIN.) = 0.17 Tc(MIN.) = 19.16
LONGEST FLOWPATH FROM NODE 210.00 TO NODE 231.00 = 7986.00 FEET.

*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 19.16
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.60 0.30 0.100 56
COMMERCIAL B 5.60 0.30 0.100 56
NATURAL FAIR COVER
"OPEN BRUSH" B 1.60 0.30 1.000 66
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.70 0.30 1.000 65
AGRICULTURAL FAIR COVER
"ORCHARDS" B 0.20 0.30 1.000 65
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.253
SUBAREA AREA(ACRES) = 14.70 SUBAREA RUNOFF(CFS) = 29.44
EFFECTIVE AREA(ACRES) = 193.80 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 193.8 PEAK FLOW RATE(CFS) = 381.14

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 381.28 16.63 2.523 0.30( 0.12) 0.39 176.0 203.00
2 381.14 19.16 2.301 0.30( 0.12) 0.39 193.8 210.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 381.28 Tc(MIN.) = 16.63
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.39 EFFECTIVE AREA(ACRES) = 176.05

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*****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 16.63
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.523
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 7.30 0.30 0.850 56
PUBLIC PARK B 0.80 0.30 0.850 56
PUBLIC PARK B 0.20 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.875
SUBAREA AREA(ACRES) = 16.60 SUBAREA RUNOFF(CFS) = 33.78
EFFECTIVE AREA(ACRES) = 192.65 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 210.4 PEAK FLOW RATE(CFS) = 415.05

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FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.63

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.523

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.50 0.30 0.500 56

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.10 0.30 1.000 65

NATURAL FAIR COVER

"WOODLAND,GRASS" B 0.40 0.30 1.000 65

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 2.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.576

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 6.98

EFFECTIVE AREA(ACRES) = 195.95 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43

TOTAL AREA(ACRES) = 213.7 PEAK FLOW RATE(CFS) = 422.03

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 16.63

EFFECTIVE AREA(ACRES) = 195.95 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.434

PEAK FLOW RATE(CFS) = 422.03

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	422.03	16.63	2.523	0.30(0.13)	0.43	195.9	203.00
2	417.91	19.16	2.301	0.30(0.13)	0.43	213.7	210.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 100-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C00EVRL.DAT
TIME/DATE OF STUDY: 07:29 02/15/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.027
- 2) 10.00; 3.864
- 3) 15.00; 2.981
- 4) 20.00; 2.449
- 5) 25.00; 2.118
- 6) 30.00; 1.891
- 7) 40.00; 1.635
- 8) 50.00; 1.412
- 9) 60.00; 1.310
- 10) 90.00; 1.109
- 11) 120.00; 0.972
- 12) 180.00; 0.816
- 13) 360.00; 0.607
- 14) 1200.00; 0.266

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: MANNING			
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.540
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	1.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 6.45
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 6.45

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.51
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 16.37
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.61
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.19
STREET FLOW TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 11.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.610
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
-------------------	----------	------	----	----	-----

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 4.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 14.06
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 19.18

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 HALFSTREET FLOOD WIDTH(FEET) = 18.87
FLOW VELOCITY(FEET/SEC.) = 2.84 DEPTH*VELOCITY(FT*FT/SEC.) = 1.42
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 637.00 DOWNSTREAM(FEET) = 634.00
FLOW LENGTH(FEET) = 563.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.10
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.18
PIPE TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 12.97
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 12.97
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.339
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 23.61
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 41.31

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 630.00
FLOW LENGTH(FEET) = 1072.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.49
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 41.31
PIPE TRAVEL TIME(MIN.) = 2.75 Tc(MIN.) = 15.73
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 15.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.904
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.90 0.30 0.100 56
COMMERCIAL B 4.50 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
SUBAREA AREA(ACRES) = 16.10 SUBAREA RUNOFF(CFS) = 41.36
EFFECTIVE AREA(ACRES) = 30.10 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 30.1 PEAK FLOW RATE(CFS) = 77.19

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 15.73
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.904
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
SCHOOL B 5.70 0.30 0.600 56
SCHOOL B 6.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 12.40 SUBAREA RUNOFF(CFS) = 30.40
EFFECTIVE AREA(ACRES) = 42.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 42.5 PEAK FLOW RATE(CFS) = 107.59

FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 1290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.99
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 107.59
PIPE TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 17.26
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.26
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 56
COMMERCIAL B 0.90 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
SCHOOL B 0.10 0.30 0.600 56
SCHOOL B 0.50 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 7.71
EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 109.04

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<
>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.565
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.70 0.30 0.100 56 18.91
COMMERCIAL B 4.40 0.30 0.100 56 18.91
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56 20.15
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 20.15
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 7.10 0.30 0.600 56 25.63
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 2.80 0.30 0.600 56 25.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 39.45

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) = 17.26
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.740
SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 42.27
EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 151.31

FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.51
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 151.31
PIPE TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 18.35
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.624
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.30 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 9.30
EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 153.97

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 18.35
RAINFALL INTENSITY(INCH/HR) = 2.62
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 67.60
TOTAL STREAM AREA(ACRES) = 67.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 153.97

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.474
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.957
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.10 0.30 0.100 56 7.47
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56 7.97
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56 7.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA RUNOFF(CFS) = 6.17
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 6.17

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 623.00
STREET LENGTH(FEET) = 300.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.38
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.45
HALFSTREET FLOOD WIDTH(FEET) = 16.05

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.28
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.02
STREET FLOW TRAVEL TIME(MIN.) = 2.19 Tc(MIN.) = 9.67
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.008

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.50 0.30 0.100 56
COMMERCIAL B 0.20 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 10.35
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 15.33

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.09
FLOW VELOCITY(FEET/SEC.) = 2.46 DEPTH*VELOCITY(FT*FT/SEC.) = 1.19
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 620.00
FLOW LENGTH(FEET) = 369.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.83
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 15.33
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 10.57
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.57
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.764
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.90 0.30 0.100 56
COMMERCIAL B 2.50 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.80 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125

SUBAREA AREA (ACRES) = 5.90 SUBAREA RUNOFF (CFS) = 19.79
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 34.17

FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 615.00
FLOW LENGTH (FEET) = 338.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.23
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 34.17
PIPE TRAVEL TIME (MIN.) = 0.55 Tc (MIN.) = 11.12
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.12
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.667
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.208
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 41.20
EFFECTIVE AREA (ACRES) = 22.90 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 22.9 PEAK FLOW RATE (CFS) = 74.47

FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 600.00
FLOW LENGTH (FEET) = 578.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.44
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 74.47
PIPE TRAVEL TIME (MIN.) = 0.62 Tc (MIN.) = 11.74
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.74
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.556
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.70	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	3.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.70	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 17.80 SUBAREA RUNOFF (CFS) = 55.31
EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 127.51

FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 569.00
FLOW LENGTH (FEET) = 2176.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.08
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 127.51
PIPE TRAVEL TIME (MIN.) = 2.57 Tc (MIN.) = 14.32
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 14.32
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.102
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 6.80 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 19.10 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 70.66
 EFFECTIVE AREA (ACRES) = 67.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 67.3 PEAK FLOW RATE (CFS) = 181.52

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.76
 ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 181.52
 PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 14.85
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 14.85
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.008
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	7.40	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.505					
SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 44.99					
EFFECTIVE AREA (ACRES) = 84.80 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38					
TOTAL AREA (ACRES) = 84.8 PEAK FLOW RATE (CFS) = 220.81					

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 14.85
 RAINFALL INTENSITY(INCH/HR) = 3.01
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.38
 EFFECTIVE STREAM AREA (ACRES) = 84.80
 TOTAL STREAM AREA (ACRES) = 84.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 220.81

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	153.97	18.35	2.624	0.30 (0.09)	0.31	67.6	300.00
2	220.81	14.85	3.008	0.30 (0.11)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	364.25	14.85	3.008	0.30 (0.11)	0.35	139.5	310.00
2	345.51	18.35	2.624	0.30 (0.11)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 364.25 Tc(MIN.) = 14.85
 EFFECTIVE AREA (ACRES) = 139.49 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 152.4
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00
 FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 27.48
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 364.25
 PIPE TRAVEL TIME(MIN.) = 2.30 Tc(MIN.) = 17.15
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56

COMMERCIAL B 4.80 0.30 0.100 56
 COMMERCIAL B 5.00 0.30 0.100 56
 COMMERCIAL B 3.70 0.30 0.100 56
 PUBLIC PARK B 5.00 0.30 0.850 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.288
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 47.98
 EFFECTIVE AREA(ACRES) = 159.49 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 380.13

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 MAINLINE Tc(MIN.) = 17.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 4.00 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 12.70 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.50 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.50 0.30 0.900 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 52.09
 EFFECTIVE AREA(ACRES) = 181.39 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 194.3 PEAK FLOW RATE(CFS) = 432.22

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 MAINLINE Tc(MIN.) = 17.15
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.752
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 4.50 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 1.40 0.30 0.500 56
 SCHOOL B 2.20 0.30 0.600 56
 SCHOOL B 6.80 0.30 0.600 56
 SCHOOL B 7.90 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA(ACRES) = 22.80 SUBAREA RUNOFF(CFS) = 52.94
 EFFECTIVE AREA(ACRES) = 204.19 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 217.1 PEAK FLOW RATE(CFS) = 485.16

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 41.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 36.68
 ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 485.16
 PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 17.54
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

 TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.54
 RAINFALL INTENSITY(INCH/HR) = 2.71
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 204.19
 TOTAL STREAM AREA(ACRES) = 217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 485.16

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
 ELEVATION DATA: UPSTREAM(FEET) = 636.00 DOWNSTREAM(FEET) = 633.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.540
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 2.80 0.30 0.200 56 8.44
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 11.29
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 11.29

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FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 633.00 DOWNSTREAM ELEVATION(FEET) = 628.00
STREET LENGTH(FEET) = 360.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.71
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.50
HALFSTREET FLOOD WIDTH(FEET) = 18.63
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.60
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.78
STREET FLOW TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 10.11
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.845
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 6.30 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 24.80
EFFECTIVE AREA(ACRES) = 10.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 34.34

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.55 HALFSTREET FLOOD WIDTH(FEET) = 21.60
FLOW VELOCITY(FEET/SEC.) = 3.94 DEPTH*VELOCITY(FT*FT/SEC.) = 2.16
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 628.00 DOWNSTREAM(FEET) = 624.00
FLOW LENGTH(FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.4 INCHES

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PIPE-FLOW VELOCITY(FEET/SEC.) = 7.01
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 34.34
PIPE TRAVEL TIME(MIN.) = 1.78 Tc(MIN.) = 11.89
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.89
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.531
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 2.00 0.30 0.850 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.90 0.30 0.200 56
SCHOOL B 3.10 0.30 0.600 56
SCHOOL B 0.30 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 42.64
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 74.12

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.89
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.531
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.10 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.31
EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 74.43

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 624.00 DOWNSTREAM(FEET) = 614.00
FLOW LENGTH(FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.8 INCHES

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PIPE-FLOW VELOCITY (FEET/SEC.) = 11.34
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 74.43
 PIPE TRAVEL TIME (MIN.) = 1.30 Tc (MIN.) = 13.19
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.19
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.300
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56
PUBLIC PARK	B	3.10	0.30	0.850	56
PUBLIC PARK	B	2.60	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.80	0.30	0.200	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.40	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 46.01
 EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 115.43

 FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 614.00 DOWNSTREAM (FEET) = 571.00
 FLOW LENGTH (FEET) = 1805.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.59
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 115.43
 PIPE TRAVEL TIME (MIN.) = 1.81 Tc (MIN.) = 15.00
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

 FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.980
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.10	0.30	0.200	56

RESIDENTIAL "11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	13.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	18.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 42.00 SUBAREA RUNOFF (CFS) = 107.50
 EFFECTIVE AREA (ACRES) = 82.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 82.3 PEAK FLOW RATE (CFS) = 211.32

 FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 571.00 DOWNSTREAM (FEET) = 497.00
 FLOW LENGTH (FEET) = 1090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 29.01
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 211.32
 PIPE TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 15.63
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

 FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.63
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.914
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	6.10	0.30	0.100	56
COMMERCIAL	B	12.90	0.30	0.100	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	12.80	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA (ACRES) = 34.00 SUBAREA RUNOFF (CFS) = 85.28
 EFFECTIVE AREA (ACRES) = 116.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 116.3 PEAK FLOW RATE (CFS) = 291.67

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.63

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.914

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	23.20	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56

RESIDENTIAL

"4 DWELLING/ACRE" B 23.20 0.30 0.900 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890

SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 56.70

EFFECTIVE AREA(ACRES) = 140.10 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 140.1 PEAK FLOW RATE(CFS) = 348.36

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 445.00

FLOW LENGTH(FEET) = 1732.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.94

ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 348.36

PIPE TRAVEL TIME(MIN.) = 1.21 Tc(MIN.) = 16.84

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.786

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.80	0.30	0.100	56
COMMERCIAL	B	4.80	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
PUBLIC PARK	B	6.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	43.30	0.30	0.200	56

COMMERCIAL

B 4.80 0.30 0.100 56

COMMERCIAL B 4.80 0.30 0.100 56

PUBLIC PARK B 0.10 0.30 0.850 56

PUBLIC PARK B 6.30 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 43.30 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250

SUBAREA AREA(ACRES) = 64.30 SUBAREA RUNOFF(CFS) = 156.86

EFFECTIVE AREA(ACRES) = 204.40 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 204.4 PEAK FLOW RATE(CFS) = 489.05

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.84

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.786

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	38.70	0.30	0.200	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.30	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	3.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 38.70 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 2.30 0.30 0.900 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293

SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 108.29

EFFECTIVE AREA(ACRES) = 249.00 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 249.0 PEAK FLOW RATE(CFS) = 597.34

FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 338.00

FLOW LENGTH(FEET) = 2664.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 66.0 INCH PIPE IS 50.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 30.54

ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 597.34

PIPE TRAVEL TIME(MIN.) = 1.45 Tc(MIN.) = 18.29

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.29

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.631

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
APARTMENTS	B	14.80	0.30	0.200	56
APARTMENTS	B	1.90	0.30	0.200	56
APARTMENTS	B	9.90	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

APARTMENTS

B 0.50 0.30 0.200 56

APARTMENTS B 14.80 0.30 0.200 56

APARTMENTS B 1.90 0.30 0.200 56

APARTMENTS B 9.90 0.30 0.200 56

COMMERCIAL

B 1.80 0.30 0.100 56

COMMERCIAL B 8.40 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
 SUBAREA AREA (ACRES) = 37.30 SUBAREA RUNOFF (CFS) = 86.58
 EFFECTIVE AREA (ACRES) = 286.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 286.3 PEAK FLOW RATE (CFS) = 649.26

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.29
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 7.60 0.30 0.100 56
 COMMERCIAL B 14.00 0.30 0.100 56
 PUBLIC PARK B 1.40 0.30 0.850 56
 PUBLIC PARK B 0.30 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.30 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 55.35
 EFFECTIVE AREA (ACRES) = 310.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 310.1 PEAK FLOW RATE (CFS) = 704.61

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.29
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 12.20 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 17.60 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 9.30 0.30 0.900 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
 SUBAREA AREA (ACRES) = 40.50 SUBAREA RUNOFF (CFS) = 91.71

EFFECTIVE AREA (ACRES) = 350.60 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 350.6 PEAK FLOW RATE (CFS) = 796.32

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.29
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 5.30 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 28.30 0.30 0.500 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 3.80 0.30 0.400 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 4.10 0.30 0.400 56
 SCHOOL B 0.30 0.30 0.600 56
 SCHOOL B 0.30 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
 SUBAREA AREA (ACRES) = 42.10 SUBAREA RUNOFF (CFS) = 94.20
 EFFECTIVE AREA (ACRES) = 392.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 392.7 PEAK FLOW RATE (CFS) = 890.52

 FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM (FEET) = 338.00 DOWNSTREAM (FEET) = 320.00
 FLOW LENGTH (FEET) = 1154.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 90.0 INCH PIPE IS 72.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 23.47
 ESTIMATED PIPE DIAMETER (INCH) = 90.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 890.52
 PIPE TRAVEL TIME (MIN.) = 0.82 Tc (MIN.) = 19.11
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

 FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 19.11
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.544
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 COMMERCIAL B 11.60 0.30 0.100 56
 COMMERCIAL B 6.70 0.30 0.100 56

COMMERCIAL B 12.80 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
 SUBAREA AREA(ACRES) = 31.50 SUBAREA RUNOFF(CFS) = 71.18
 EFFECTIVE AREA(ACRES) = 424.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 930.88

 FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 1981.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 114.0 INCH PIPE IS 89.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.62
 ESTIMATED PIPE DIAMETER(INCH) = 114.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 930.88
 PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 21.22
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.22
 RAINFALL INTENSITY(INCH/HR) = 2.37
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA(ACRES) = 424.20
 TOTAL STREAM AREA(ACRES) = 424.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 930.88

 FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
 ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.212
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.20 0.30 1.000 72 9.20
 NATURAL FAIR COVER
 "OPEN BRUSH" B 1.20 0.30 1.000 66 9.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.93
 TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 4.93

 FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.755

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 1.70 0.30 1.000 72
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.60 0.30 1.000 72
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.51
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.38
 AVERAGE FLOW DEPTH(FEET) = 0.67 TRAVEL TIME(MIN.) = 1.42
 Tc(MIN.) = 10.62
 SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 7.15
 EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 11.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 6.91
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

 FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.292

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.40 0.30 1.000 63

NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 8.40 0.30 1.000 72
 NATURAL FAIR COVER
 "OPEN BRUSH" B 2.70 0.30 1.000 66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 9.20 0.30 1.000 72
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.60 0.30 1.000 66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 42.20
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.96
 AVERAGE FLOW DEPTH(FEET) = 1.42 TRAVEL TIME(MIN.) = 2.62
 Tc(MIN.) = 13.24
 SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 61.13
 EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 71.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.73 FLOW VELOCITY(FEET/SEC.) = 7.93
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

 FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.950
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.60 0.30 1.000 63
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 5.50 0.30 1.000 72
 NATURAL FAIR COVER
 "OPEN BRUSH" B 1.80 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.60 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 6.80 0.30 1.000 72
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 91.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.35
 AVERAGE FLOW DEPTH(FEET) = 2.04 TRAVEL TIME(MIN.) = 2.05
 Tc(MIN.) = 15.29
 SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 41.27

EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 104.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 2.14 FLOW VELOCITY(FEET/SEC.) = 7.59
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

 FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.29
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.950
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 2.50 0.30 1.000 66
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.10 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 6.20
 EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 110.44

 FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 701.00 CHANNEL SLOPE = 0.0357
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.793
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 5.90 0.30 1.000 72
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 12.70 0.30 1.000 72
 NATURAL FAIR COVER
 "OPEN BRUSH" B 6.80 0.30 1.000 66
 NATURAL FAIR COVER
 "OPEN BRUSH" B 3.20 0.30 1.000 66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 149.83

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.90
 AVERAGE FLOW DEPTH (FEET) = 2.51 TRAVEL TIME (MIN.) = 1.48
 Tc (MIN.) = 16.77
 SUBAREA AREA (ACRES) = 35.10 SUBAREA RUNOFF (CFS) = 78.75
 EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 182.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 2.71 FLOW VELOCITY (FEET/SEC.) = 8.28
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

 FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.77
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.793
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.10	0.30	1.000	65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.914					
SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 9.75					
EFFECTIVE AREA (ACRES) = 85.70 AREA-AVERAGED Fm (INCH/HR) = 0.30					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA (ACRES) = 85.7 PEAK FLOW RATE (CFS) = 192.39					

 FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 573.00 DOWNSTREAM (FEET) = 437.00
 FLOW LENGTH (FEET) = 6286.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.16
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 192.39
 PIPE TRAVEL TIME (MIN.) = 5.77 Tc (MIN.) = 22.53
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

 FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 437.00 DOWNSTREAM (FEET) = 345.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1963.00 CHANNEL SLOPE = 0.0469
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.071

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.60	0.30	1.000	63
COMMERCIAL	B	1.50	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	1.60	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.265
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 197.77
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.37
 AVERAGE FLOW DEPTH (FEET) = 2.65 TRAVEL TIME (MIN.) = 3.49
 Tc (MIN.) = 26.03
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 10.76
 EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 192.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 2.63 FLOW VELOCITY (FEET/SEC.) = 9.29
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.03
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.071
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	1.40	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	2.80	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 13.39					
EFFECTIVE AREA (ACRES) = 100.10 AREA-AVERAGED Fm (INCH/HR) = 0.29					

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 100.1 PEAK FLOW RATE (CFS) = 192.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.03
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.071
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 66
 PUBLIC PARK B 0.10 0.30 0.850 56
 PUBLIC PARK B 3.80 0.30 0.850 56
 PUBLIC PARK B 2.50 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.40 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877
 SUBAREA AREA (ACRES) = 10.30 SUBAREA RUNOFF (CFS) = 16.76
 EFFECTIVE AREA (ACRES) = 110.40 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 110.4 PEAK FLOW RATE (CFS) = 192.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.03
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.071
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.50 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 0.20 0.30 1.000 65
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 1.90 0.30 1.000 65
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.924
 SUBAREA AREA (ACRES) = 6.80 SUBAREA RUNOFF (CFS) = 10.98
 EFFECTIVE AREA (ACRES) = 117.20 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 117.2 PEAK FLOW RATE (CFS) = 192.39
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 310.00
 FLOW LENGTH (FEET) = 1065.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 21.38
 ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 192.39
 PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 26.86
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION (MIN.) = 26.86
 RAINFALL INTENSITY (INCH/HR) = 2.03
 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA (ACRES) = 117.20
 TOTAL STREAM AREA (ACRES) = 117.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 192.39

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	485.16	17.54	2.711	0.30 (0.11)	0.37	204.2	310.00
1	448.18	21.06	2.379	0.30 (0.11)	0.37	217.1	300.00
2	930.88	21.22	2.368	0.30 (0.11)	0.35	424.2	320.00
3	192.39	26.86	2.034	0.30 (0.28)	0.94	117.2	390.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1545.21	17.54	2.711	0.30 (0.13)	0.43	631.2	310.00
2	1556.87	21.06	2.379	0.30 (0.13)	0.43	729.9	300.00
3	1557.96	21.22	2.368	0.30 (0.13)	0.43	733.9	320.00
4	1365.73	26.86	2.034	0.30 (0.13)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 1557.96 Tc (MIN.) = 21.22
 EFFECTIVE AREA (ACRES) = 733.92 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 758.5
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

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*****
FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 62.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 50.53
ESTIMATED PIPE DIAMETER(INCH) = 84.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1557.96
PIPE TRAVEL TIME(MIN.) = 0.12 Tc(MIN.) = 21.35
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.
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*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 21.35
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.360
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 17.50 0.30 0.200 56
APARTMENTS B 1.50 0.30 0.200 56
APARTMENTS B 0.70 0.30 0.200 56
NATURAL POOR COVER
"BARREN" B 0.10 0.30 1.000 86
COMMERCIAL B 44.60 0.30 0.100 56
COMMERCIAL B 0.70 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 135.95
EFFECTIVE AREA(ACRES) = 799.02 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 1609.13
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** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 1614.97 17.66 2.698 0.30( 0.12) 0.40 696.3 310.00
2 1608.80 21.18 2.371 0.30( 0.12) 0.41 795.0 300.00
3 1609.13 21.35 2.360 0.30( 0.12) 0.41 799.0 320.00
4 1409.06 26.98 2.028 0.30( 0.13) 0.42 823.6 390.00
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NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 1614.97 Tc(MIN.) = 17.66
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.40 EFFECTIVE AREA(ACRES) = 696.34
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 17.66
```

```
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.698
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.10 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 14.86
EFFECTIVE AREA(ACRES) = 702.54 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 1629.83
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.574
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.20 0.30 0.400 56 6.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 5.89
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 5.89
```

```
*****
FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00
STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```


SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 5.28
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 5.28

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.008

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.70	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.45
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.92
 AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 0.47
 Tc(MIN.) = 9.67
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 6.34
 EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 11.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 7.41
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0288
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.580

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.20 0.30 0.600 56
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.88
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.47
 AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 1.94
 Tc(MIN.) = 11.61
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 19.06
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 29.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.42 FLOW VELOCITY(FEET/SEC.) = 4.84
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

 FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 582.00 DOWNSTREAM(FEET) = 581.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.24
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 29.09
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 11.62
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.62
 RAINFALL INTENSITY(INCH/HR) = 3.58
 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 9.80
 TOTAL STREAM AREA(ACRES) = 9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.09

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	90.17	9.22	4.202	0.30(0.16)	0.54	24.8	400.00
2	29.09	11.62	3.579	0.30(0.28)	0.94	9.8	430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	117.62	9.22	4.202	0.30 (0.19)	0.64	32.6	400.00
2	105.35	11.62	3.579	0.30 (0.20)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 117.62 Tc(MIN.) = 9.22
EFFECTIVE AREA(ACRES) = 32.58 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA(ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 570.00
FLOW LENGTH(FEET) = 1056.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.41
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 117.62
PIPE TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.64
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	4.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.00	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842
SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 24.25
EFFECTIVE AREA(ACRES) = 40.28 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.67
TOTAL AREA(ACRES) = 42.3 PEAK FLOW RATE(CFS) = 128.66

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.64
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.752
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.80	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.20	0.30	0.500	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 45.73
EFFECTIVE AREA(ACRES) = 54.38 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA(ACRES) = 56.4 PEAK FLOW RATE(CFS) = 174.39

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 1526.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.74
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 174.39
PIPE TRAVEL TIME(MIN.) = 2.91 Tc(MIN.) = 13.55
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.55
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.238
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	1.80	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.80	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.80	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.10	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.698

SUBAREA AREA (ACRES) = 13.00 SUBAREA RUNOFF (CFS) = 35.43
EFFECTIVE AREA (ACRES) = 67.38 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA (ACRES) = 69.4 PEAK FLOW RATE (CFS) = 184.67

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.55
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.238
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 11.20 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 7.80 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA (ACRES) = 20.40 SUBAREA RUNOFF (CFS) = 56.94
EFFECTIVE AREA (ACRES) = 87.78 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 89.8 PEAK FLOW RATE (CFS) = 241.60

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 565.00 DOWNSTREAM (FEET) = 495.00
FLOW LENGTH (FEET) = 2168.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.21
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 241.60
PIPE TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 15.17
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.17
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.963
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 5.50 0.30 0.100 56
COMMERCIAL B 1.90 0.30 0.100 56
PUBLIC PARK B 2.50 0.30 0.850 56
PUBLIC PARK B 0.90 0.30 0.850 56
RESIDENTIAL

"11+ DWELLINGS/ACRE" B 36.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 13.60 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA (ACRES) = 60.80 SUBAREA RUNOFF (CFS) = 158.43
EFFECTIVE AREA (ACRES) = 148.58 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 150.6 PEAK FLOW RATE (CFS) = 378.30

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.17
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.963
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 4.70 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.10 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 18.00
EFFECTIVE AREA (ACRES) = 155.98 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA (ACRES) = 158.0 PEAK FLOW RATE (CFS) = 396.30

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.17
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.963
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 26.09
EFFECTIVE AREA (ACRES) = 166.18 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46

TOTAL AREA (ACRES) = 168.2 PEAK FLOW RATE (CFS) = 422.39

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.49
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 422.39
PIPE TRAVEL TIME(MIN.) = 1.83 Tc(MIN.) = 17.00
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.30 0.30 0.200 56
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 9.10 0.30 0.100 56
COMMERCIAL B 6.70 0.30 0.100 56
PUBLIC PARK B 0.50 0.30 0.850 56
PUBLIC PARK B 2.60 0.30 0.850 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.219
SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 48.16
EFFECTIVE AREA(ACRES) = 185.98 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 188.0 PEAK FLOW RATE(CFS) = 441.47

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 10.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56

RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308
SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 40.45
EFFECTIVE AREA(ACRES) = 202.78 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 204.8 PEAK FLOW RATE(CFS) = 481.92

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.30 0.30 0.600 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 15.30 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 1.50 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 5.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.579
SUBAREA AREA(ACRES) = 37.50 SUBAREA RUNOFF(CFS) = 87.56
EFFECTIVE AREA(ACRES) = 240.28 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 242.3 PEAK FLOW RATE(CFS) = 569.48

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 8.40 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.80 0.30 0.400 56
SCHOOL B 0.60 0.30 0.600 56
SCHOOL B 1.50 0.30 0.600 56

SCHOOL B 3.50 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 20.30 SUBAREA RUNOFF (CFS) = 48.08
 EFFECTIVE AREA (ACRES) = 260.58 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 262.6 PEAK FLOW RATE (CFS) = 617.56

 FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 395.00 DOWNSTREAM (FEET) = 372.00
 FLOW LENGTH (FEET) = 661.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 29.24
 ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 617.56
 PIPE TRAVEL TIME (MIN.) = 0.38 Tc (MIN.) = 17.38
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
 =====

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
 =====

 FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.435
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	7.53
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.20	0.30	0.600	56	6.37
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814						
SUBAREA RUNOFF (CFS) = 3.27						
TOTAL AREA (ACRES) = 0.70 PEAK FLOW RATE (CFS) = 3.27						

 FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 490.00
 FLOW LENGTH (FEET) = 267.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.35
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 3.27
 PIPE TRAVEL TIME (MIN.) = 0.70 Tc (MIN.) = 7.07
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

 FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 7.07
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.132

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.788					
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 7.49					
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.24					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80					
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 10.57					

 FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 490.00 DOWNSTREAM (FEET) = 480.00
 FLOW LENGTH (FEET) = 520.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.61
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 10.57
 PIPE TRAVEL TIME (MIN.) = 1.01 Tc (MIN.) = 8.08
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

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*****
FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.08
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.697
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.00   0.30   0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.40   0.30   0.900  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       0.40   0.30   0.500  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       0.30   0.30   0.500  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
SUBAREA AREA(ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 12.43
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 22.05

*****
FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 470.00
FLOW LENGTH(FEET) = 310.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.52
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.05
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 8.49
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.

*****
FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.518
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       1.50   0.30   0.100  56
COMMERCIAL          B       0.10   0.30   0.100  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.80   0.30   0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       1.00   0.30   0.900  56
RESIDENTIAL

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"5-7 DWELLINGS/ACRE" B       0.20   0.30   0.500  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       0.10   0.30   0.500  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 22.17
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 43.34

*****
FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.518
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS          B       0.10   0.30   0.200  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.40
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 43.74

*****
FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 528.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.90
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 43.74
PIPE TRAVEL TIME(MIN.) = 0.52 Tc(MIN.) = 9.01
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.

*****
FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.01
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.293
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B       0.90   0.30   0.100  56
COMMERCIAL          B       0.60   0.30   0.100  56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B       6.30   0.30   0.500  56
RESIDENTIAL

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"5-7 DWELLINGS/ACRE" B 3.70 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 43.04
 EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE(CFS) = 84.49

 FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 415.00
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.09
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 84.49
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 9.55
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.55
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.059
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 APARTMENTS B 1.60 0.30 0.200 56
 APARTMENTS B 10.90 0.30 0.200 56
 COMMERCIAL B 1.30 0.30 0.100 56
 COMMERCIAL B 1.30 0.30 0.100 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 7.00 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA (ACRES) = 23.20 SUBAREA RUNOFF(CFS) = 83.58
 EFFECTIVE AREA(ACRES) = 46.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 46.0 PEAK FLOW RATE(CFS) = 163.28

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.55
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.059
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.40 0.30 0.600 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 9.30 0.30 0.500 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.55
 RAINFALL INTENSITY(INCH/HR) = 4.06
 AREA-AVERAGED Fm(INCH/HR) = 0.12
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA(ACRES) = 61.00
 TOTAL STREAM AREA(ACRES) = 61.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 216.06

 FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 495.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.368
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.435
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56 7.53
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.20 0.30 0.600 56 6.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
 SUBAREA RUNOFF(CFS) = 4.20
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE(CFS) = 4.20

 FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc(MIN.) = 9.55
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.059
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 487.00
 FLOW LENGTH(FEET) = 308.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.65
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.20
 PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 7.04
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.04
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 5.145
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.50	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 7.94
 EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
 TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 11.90

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 487.00 DOWNSTREAM(FEET) = 478.00
 FLOW LENGTH(FEET) = 373.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.66
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 11.90
 PIPE TRAVEL TIME(MIN.) = 0.64 Tc(MIN.) = 7.68
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.68
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.867

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.70	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750
 SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 18.38
 EFFECTIVE AREA(ACRES) = 7.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78
 TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 29.61

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 454.00
 FLOW LENGTH(FEET) = 995.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.99
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 29.61
 PIPE TRAVEL TIME(MIN.) = 1.38 Tc(MIN.) = 9.07
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 2004.00 FEET.

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.07
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.268
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.80	0.30	0.200	56
APARTMENTS	B	0.40	0.30	0.200	56
PUBLIC PARK	B	0.90	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 12.12

EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 37.90

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.07

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.268

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.30	0.30	0.600	56

RESIDENTIAL

"3-4 DWELLINGS/ACRE"	B	2.10	0.30	0.600	56
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RESIDENTIAL

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600					
SUBAREA AREA(ACRES) = 5.40			SUBAREA RUNOFF(CFS) = 19.87		
EFFECTIVE AREA(ACRES) = 15.80			AREA-AVERAGED Fm(INCH/HR) = 0.21		
AREA-AVERAGED Fp(INCH/HR) = 0.30			AREA-AVERAGED Ap = 0.69		
TOTAL AREA(ACRES) = 15.8			PEAK FLOW RATE(CFS) = 57.77		

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600

SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 19.87

EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69

TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 57.77

FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 454.00 DOWNSTREAM(FEET) = 415.00

FLOW LENGTH(FEET) = 1555.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.27

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 57.77

PIPE TRAVEL TIME(MIN.) = 1.82 Tc(MIN.) = 10.88

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.88

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.708

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	3.70	0.30	0.200	56

APARTMENTS

APARTMENTS	B	6.80	0.30	0.200	56
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RESIDENTIAL

"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
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RESIDENTIAL

"11+ DWELLINGS/ACRE"	B	2.60	0.30	0.200	56
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RESIDENTIAL

"3-4 DWELLINGS/ACRE"	B	2.20	0.30	0.600	56
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RESIDENTIAL

"3-4 DWELLINGS/ACRE"	B	9.90	0.30	0.600	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387

SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 83.73

EFFECTIVE AREA(ACRES) = 41.70 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 133.54

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.88

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.708

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56

RESIDENTIAL

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 1.30			SUBAREA RUNOFF(CFS) = 4.16		
EFFECTIVE AREA(ACRES) = 43.00			AREA-AVERAGED Fm(INCH/HR) = 0.15		
AREA-AVERAGED Fp(INCH/HR) = 0.30			AREA-AVERAGED Ap = 0.50		
TOTAL AREA(ACRES) = 43.0			PEAK FLOW RATE(CFS) = 137.70		

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500

SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 4.16

EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 137.70

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 10.88

RAINFALL INTENSITY(INCH/HR) = 3.71

AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 0.50

EFFECTIVE STREAM AREA(ACRES) = 43.00

TOTAL STREAM AREA(ACRES) = 43.00

PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.70

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	216.06	9.55	4.059	0.30(0.12)	0.41	61.0	410.00
2	137.70	10.88	3.708	0.30(0.15)	0.50	43.0	420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	348.81	9.55	4.059	0.30(0.13)	0.45	98.7	410.00

2 334.48 10.88 3.708 0.30(0.13) 0.45 104.0 420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 348.81 Tc(MIN.) = 9.55
EFFECTIVE AREA(ACRES) = 98.73 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 104.0
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.02
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 348.81
PIPE TRAVEL TIME(MIN.) = 0.90 Tc(MIN.) = 10.45
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.784
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Commercial, Public Park, Residential, and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.45
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.784
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 54.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.49
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 385.13
PIPE TRAVEL TIME(MIN.) = 1.42 Tc(MIN.) = 11.87
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.534
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Commercial, Public Park, and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.87
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.534

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.70	0.30	0.850	56
PUBLIC PARK	B	8.90	0.30	0.850	56
PUBLIC PARK	B	1.20	0.30	0.850	56
PUBLIC PARK	B	3.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 42.79
EFFECTIVE AREA(ACRES) = 152.43 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 157.7 PEAK FLOW RATE(CFS) = 463.51

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	463.51	11.87	3.534	0.30(0.16)	0.52	152.4	410.00
2	445.50	13.23	3.294	0.30(0.16)	0.52	157.7	420.00

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	617.56	17.38	2.728	0.30(0.13)	0.45	260.6	400.00
2	556.56	19.99	2.450	0.30(0.14)	0.45	262.6	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1016.37	11.87	3.534	0.30(0.14)	0.48	330.4	410.00
2	1018.16	13.23	3.294	0.30(0.14)	0.48	356.0	420.00
3	982.71	17.38	2.728	0.30(0.14)	0.48	418.3	400.00
4	882.19	19.99	2.450	0.30(0.14)	0.48	420.3	430.00

TOTAL AREA(ACRES) = 420.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1018.16 Tc(MIN.) = 13.227
EFFECTIVE AREA(ACRES) = 356.04 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 420.3
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00
FLOW LENGTH(FEET) = 1358.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.33
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1018.16
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 13.82
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 13.82
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.190
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.40	0.30	0.200	56
APARTMENTS	B	15.00	0.30	0.200	56
APARTMENTS	B	5.80	0.30	0.200	56
APARTMENTS	B	2.50	0.30	0.200	56
COMMERCIAL	B	9.10	0.30	0.100	56
COMMERCIAL	B	1.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
SUBAREA AREA(ACRES) = 41.30 SUBAREA RUNOFF(CFS) = 116.62
EFFECTIVE AREA(ACRES) = 397.34 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 461.6 PEAK FLOW RATE(CFS) = 1092.65

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1102.49	12.46	3.430	0.30(0.13)	0.45	371.7	410.00
2	1092.65	13.82	3.190	0.30(0.13)	0.45	397.3	420.00
3	1046.74	17.97	2.665	0.30(0.13)	0.45	459.6	400.00
4	944.74	20.60	2.409	0.30(0.14)	0.45	461.6	430.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 1102.49 Tc(MIN.) = 12.46
AREA-AVERAGED Fm(INCH/HR) = 0.13 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.45 EFFECTIVE AREA(ACRES) = 371.68

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 12.46
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.430
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.75
EFFECTIVE AREA(ACRES) = 372.58 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 462.5 PEAK FLOW RATE (CFS) = 1105.24

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1105.24	12.46	3.430	0.30 (0.13)	0.45	372.6	410.00
2	1095.21	13.82	3.190	0.30 (0.13)	0.45	398.2	420.00
3	1048.87	17.97	2.665	0.30 (0.13)	0.45	460.5	400.00
4	946.67	20.60	2.409	0.30 (0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1629.83	17.66	2.698	0.30 (0.12)	0.40	702.5	310.00
2	1621.84	21.18	2.371	0.30 (0.12)	0.40	801.2	300.00
3	1622.11	21.35	2.360	0.30 (0.12)	0.40	805.2	320.00
4	1420.18	26.98	2.028	0.30 (0.13)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2581.36	12.46	3.430	0.30 (0.13)	0.42	868.1	410.00
2	2613.64	13.82	3.190	0.30 (0.13)	0.42	947.8	420.00
3	2682.12	17.66	2.698	0.30 (0.13)	0.42	1158.4	310.00
4	2678.01	17.97	2.665	0.30 (0.13)	0.42	1171.6	400.00
5	2569.83	20.60	2.409	0.30 (0.13)	0.42	1247.4	430.00
6	2552.49	21.18	2.371	0.30 (0.13)	0.42	1263.7	300.00
7	2548.24	21.35	2.360	0.30 (0.13)	0.42	1267.7	320.00
8	2208.17	26.98	2.028	0.30 (0.13)	0.43	1292.3	390.00

TOTAL AREA (ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2682.12 Tc (MIN.) = 17.663
 EFFECTIVE AREA (ACRES) = 1158.43 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 1292.3
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1292.3 TC (MIN.) = 17.66
 EFFECTIVE AREA (ACRES) = 1158.43 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.419
 PEAK FLOW RATE (CFS) = 2682.12

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2581.36	12.46	3.430	0.30 (0.13)	0.42	868.1	410.00
2	2613.64	13.82	3.190	0.30 (0.13)	0.42	947.8	420.00

3	2682.12	17.66	2.698	0.30 (0.13)	0.42	1158.4	310.00
4	2678.01	17.97	2.665	0.30 (0.13)	0.42	1171.6	400.00
5	2569.83	20.60	2.409	0.30 (0.13)	0.42	1247.4	430.00
6	2552.49	21.18	2.371	0.30 (0.13)	0.42	1263.7	300.00
7	2548.24	21.35	2.360	0.30 (0.13)	0.42	1267.7	320.00
8	2208.17	26.98	2.028	0.30 (0.13)	0.43	1292.3	390.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 2-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C02EVRL.DAT
TIME/DATE OF STUDY: 12:36 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.857
- 2) 10.00; 1.238
- 3) 15.00; 0.945
- 4) 20.00; 0.774
- 5) 25.00; 0.667
- 6) 30.00; 0.591
- 7) 40.00; 0.510
- 8) 50.00; 0.453
- 9) 60.00; 0.396
- 10) 90.00; 0.336
- 11) 120.00; 0.276
- 12) 180.00; 0.216
- 13) 360.00; 0.156
- 14) 1200.00; 0.083

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	1.60	0.60	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 1.89
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 1.89

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.84
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.97
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.65
STREET FLOW TRAVEL TIME(MIN.) = 3.97 Tc(MIN.) = 12.41
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.097
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
-------------------	----------	------	----	----	-----

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 0.10 0.60 0.100 -
 USER-DEFINED - 4.30 0.60 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
 SUBAREA AREA (ACRES) = 4.40 SUBAREA RUNOFF (CFS) = 3.87
 EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 5.28

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.36 HALFSTREET FLOOD WIDTH (FEET) = 10.90
 FLOW VELOCITY (FEET/SEC.) = 2.10 DEPTH*VELOCITY (FT*FT/SEC.) = 0.75
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 637.00 DOWNSTREAM (FEET) = 634.00
 FLOW LENGTH (FEET) = 563.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.49
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 5.28
 PIPE TRAVEL TIME (MIN.) = 2.09 Tc (MIN.) = 14.50
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.50
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.974
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.60	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 6.15
 EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 10.77

 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 630.00
 FLOW LENGTH (FEET) = 1072.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.6 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 4.66
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 10.77
 PIPE TRAVEL TIME (MIN.) = 3.84 Tc (MIN.) = 18.34
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.34
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.831
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	0.100	-
USER-DEFINED	-	4.50	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	5.70	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.200	-
USER-DEFINED	-	0.50	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 10.61
 EFFECTIVE AREA (ACRES) = 30.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 30.1 PEAK FLOW RATE (CFS) = 19.57

 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 18.34
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.831
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.70	0.60	0.600	-
USER-DEFINED	-	6.70	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 12.40 SUBAREA RUNOFF (CFS) = 5.25
 EFFECTIVE AREA (ACRES) = 42.50 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 42.5 PEAK FLOW RATE (CFS) = 24.83

 FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 610.00
 FLOW LENGTH (FEET) = 1290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.66

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 24.83
 PIPE TRAVEL TIME(MIN.) = 2.23 Tc(MIN.) = 20.57
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

 FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.57
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.50	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 1.82
 EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 24.83
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
 ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K * [(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.811
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
COMMERCIAL	-	1.70	0.60	0.100	56	18.91
COMMERCIAL	-	4.40	0.60	0.100	56	18.91
RESIDENTIAL	-	0.60	0.60	0.200	56	20.15
RESIDENTIAL	-	1.30	0.60	0.200	56	20.15
RESIDENTIAL	-	7.10	0.60	0.600	56	25.63
RESIDENTIAL	-	2.80	0.60	0.600	56	25.63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 9.33

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) = 20.57
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
 SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 8.53
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 32.55

 FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.73
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 32.55
 PIPE TRAVEL TIME(MIN.) = 1.63 Tc(MIN.) = 22.19
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 22.19
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.727
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 2.32
 EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 32.87

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 22.19
 RAINFALL INTENSITY(INCH/HR) = 0.73
 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.60
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA(ACRES) = 67.60
 TOTAL STREAM AREA(ACRES) = 67.60

PEAK FLOW RATE(CFS) AT CONFLUENCE = 32.87

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.474
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.551
SUBAREA Tc AND LOSS RATE DATA(AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include COMMERCIAL, RESIDENTIAL, and "11+ DWELLINGS/ACRE".

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 623.00
STREET LENGTH(FEET) = 300.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.33
HALFSTREET FLOOD WIDTH(FEET) = 9.22
AVERAGE FLOW VELOCITY(FEET/SEC.) = 1.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.57
STREET FLOW TRAVEL TIME(MIN.) = 2.90 Tc(MIN.) = 10.37

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.216

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Row includes USER-DEFINED.

USER-DEFINED - 0.20 0.60 0.100 -
USER-DEFINED - 0.70 0.60 0.200 -
USER-DEFINED - 0.50 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 2.95
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 4.34

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35 HALFSTREET FLOOD WIDTH(FEET) = 10.51
FLOW VELOCITY(FEET/SEC.) = 1.84 DEPTH*VELOCITY(FT*FT/SEC.) = 0.64
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 620.00
FLOW LENGTH(FEET) = 369.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.04
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 4.34
PIPE TRAVEL TIME(MIN.) = 1.22 Tc(MIN.) = 11.59
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.59
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.145
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
USER-DEFINED - 1.90 0.60 0.100 -
USER-DEFINED - 2.50 0.60 0.100 -
USER-DEFINED - 0.80 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA(ACRES) = 5.90 SUBAREA RUNOFF(CFS) = 5.68
EFFECTIVE AREA(ACRES) = 10.20 AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.14
TOTAL AREA(ACRES) = 10.2 PEAK FLOW RATE(CFS) = 9.74

FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 620.00 DOWNSTREAM(FEET) = 615.00
 FLOW LENGTH(FEET) = 338.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.63
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 9.74
 PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 12.33
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

 FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.33
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.102
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.850	-
USER-DEFINED	-	6.10	0.60	0.200	-
USER-DEFINED	-	6.10	0.60	0.200	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.208
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 11.17
 EFFECTIVE AREA(ACRES) = 22.90 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.18
 TOTAL AREA(ACRES) = 22.9 PEAK FLOW RATE(CFS) = 20.51

 FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 600.00
 FLOW LENGTH(FEET) = 578.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.29
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 20.51
 PIPE TRAVEL TIME(MIN.) = 0.85 Tc(MIN.) = 13.18
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

 FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 13.18
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.052
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	0.100	-

USER-DEFINED - 3.00 0.60 0.200 -
 USER-DEFINED - 2.10 0.60 0.200 -
 USER-DEFINED - 3.70 0.60 0.500 -
 USER-DEFINED - 6.00 0.60 0.500 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347
 SUBAREA AREA(ACRES) = 17.80 SUBAREA RUNOFF(CFS) = 13.52
 EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 33.00

 FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 569.00
 FLOW LENGTH(FEET) = 2176.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.03
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 33.00
 PIPE TRAVEL TIME(MIN.) = 3.62 Tc(MIN.) = 16.80
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

 FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 16.80
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.884
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.900	-
USER-DEFINED	-	6.80	0.60	0.500	-
USER-DEFINED	-	19.10	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 13.97
 EFFECTIVE AREA(ACRES) = 67.30 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 67.3 PEAK FLOW RATE(CFS) = 40.81

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.36
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 40.81
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 17.57
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.57

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.857

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.900	-
USER-DEFINED	-	8.90	0.60	0.500	-
USER-DEFINED	-	7.40	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.505

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 8.73

EFFECTIVE AREA(ACRES) = 84.80 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 84.8 PEAK FLOW RATE(CFS) = 47.94

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 17.57

RAINFALL INTENSITY(INCH/HR) = 0.86

AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.38

EFFECTIVE STREAM AREA(ACRES) = 84.80

TOTAL STREAM AREA(ACRES) = 84.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 47.94

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	32.87	22.19	0.727	0.60(0.19)	0.31	67.6	300.00
2	47.94	17.57	0.857	0.60(0.23)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	80.23	17.57	0.857	0.60(0.21)	0.35	138.3	310.00
2	70.89	22.19	0.727	0.60(0.21)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 80.23 Tc(MIN.) = 17.57

EFFECTIVE AREA(ACRES) = 138.32 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35

TOTAL AREA(ACRES) = 152.4

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00

FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 33.0 INCH PIPE IS 21.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 19.22

ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 80.23

PIPE TRAVEL TIME(MIN.) = 3.29 Tc(MIN.) = 20.86

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.86

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.756

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-
USER-DEFINED	-	1.40	0.60	0.100	-
USER-DEFINED	-	4.80	0.60	0.100	-
USER-DEFINED	-	5.00	0.60	0.100	-
USER-DEFINED	-	3.70	0.60	0.100	-
USER-DEFINED	-	5.00	0.60	0.850	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.288

SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 10.49

EFFECTIVE AREA(ACRES) = 158.32 AREA-AVERAGED Fm(INCH/HR) = 0.21

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35

TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 80.23

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.86

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.756

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.60	0.200	-
USER-DEFINED	-	12.70	0.60	0.200	-

USER-DEFINED - 1.10 0.60 0.900 -
 USER-DEFINED - 1.50 0.60 0.900 -
 USER-DEFINED - 2.50 0.60 0.900 -
 USER-DEFINED - 0.10 0.60 0.500 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 10.58
 EFFECTIVE AREA(ACRES) = 180.22 AREA-AVERAGED Fm(INCH/HR) = 0.21
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 194.3 PEAK FLOW RATE(CFS) = 88.66

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.86
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.756
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.60	0.500	-
USER-DEFINED	-	1.40	0.60	0.500	-
USER-DEFINED	-	2.20	0.60	0.600	-
USER-DEFINED	-	6.80	0.60	0.600	-
USER-DEFINED	-	7.90	0.60	0.600	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA(ACRES) = 22.80 SUBAREA RUNOFF(CFS) = 8.44
 EFFECTIVE AREA(ACRES) = 203.02 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 217.1 PEAK FLOW RATE(CFS) = 97.09

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.69
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 97.09
 PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 21.44
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.44
 RAINFALL INTENSITY(INCH/HR) = 0.74
 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.60
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 203.02
 TOTAL STREAM AREA(ACRES) = 217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 97.09

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
 ELEVATION DATA: UPSTREAM(FEET) = 636.00 DOWNSTREAM(FEET) = 633.00

$Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.431
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL	-	2.80	0.60	0.200	56	8.44

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 3.30
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 3.30

 FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 633.00 DOWNSTREAM ELEVATION(FEET) = 628.00
 STREET LENGTH(FEET) = 360.00 CURB HEIGHT(INCHES) = 8.0
 STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
 INSIDE STREET CROSSFALL(DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.79
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH(FEET) = 0.36
 HALFSTREET FLOOD WIDTH(FEET) = 10.90
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.71
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
 STREET FLOW TRAVEL TIME(MIN.) = 2.22 Tc(MIN.) = 10.66
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.200

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.10 0.60 0.100 -
USER-DEFINED - 6.30 0.60 0.200 -
USER-DEFINED - 0.20 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 6.95
EFFECTIVE AREA(ACRES) = 10.10 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 9.67

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39 HALFSTREET FLOOD WIDTH(FEET) = 12.77
FLOW VELOCITY(FEET/SEC.) = 2.93 DEPTH*VELOCITY(FT*FT/SEC.) = 1.14
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

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FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 628.00 DOWNSTREAM(FEET) = 624.00
FLOW LENGTH(FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.15
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.67
PIPE TRAVEL TIME(MIN.) = 2.43 Tc(MIN.) = 13.08
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

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FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 13.08
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.60 0.850 -
USER-DEFINED - 2.10 0.60 0.850 -
USER-DEFINED - 5.60 0.60 0.200 -
USER-DEFINED - 0.90 0.60 0.200 -
USER-DEFINED - 3.10 0.60 0.600 -
USER-DEFINED - 0.30 0.60 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 9.64
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 18.01

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*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.08
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.057
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.08
EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 18.10

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*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 624.00 DOWNSTREAM(FEET) = 614.00
FLOW LENGTH(FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.05
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.10
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 14.92
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

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*****
FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 14.92
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.950
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 1.10 0.60 0.100 -
USER-DEFINED - 3.10 0.60 0.850 -
USER-DEFINED - 2.60 0.60 0.850 -
USER-DEFINED - 4.80 0.60 0.200 -
USER-DEFINED - 3.40 0.60 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
SUBAREA AREA(ACRES) = 16.10 SUBAREA RUNOFF(CFS) = 10.14
EFFECTIVE AREA(ACRES) = 40.30 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 40.3 PEAK FLOW RATE(CFS) = 25.89

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FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 614.00 DOWNSTREAM(FEET) = 571.00
FLOW LENGTH(FEET) = 1805.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.66
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.89
PIPE TRAVEL TIME(MIN.) = 2.58 Tc(MIN.) = 17.50
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.50
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.860
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.10 0.60 0.200 -
USER-DEFINED - 5.00 0.60 0.200 -
USER-DEFINED - 0.20 0.60 0.900 -
USER-DEFINED - 1.20 0.60 0.900 -
USER-DEFINED - 13.90 0.60 0.500 -
USER-DEFINED - 18.60 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA(ACRES) = 42.00 SUBAREA RUNOFF(CFS) = 22.16
EFFECTIVE AREA(ACRES) = 82.30 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 82.3 PEAK FLOW RATE(CFS) = 44.79

FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 571.00 DOWNSTREAM(FEET) = 497.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.78
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.79
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 18.42
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.828
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.60 0.100 -

USER-DEFINED - 6.10 0.60 0.100 -
USER-DEFINED - 12.90 0.60 0.100 -
USER-DEFINED - 0.30 0.60 0.200 -
USER-DEFINED - 0.90 0.60 0.900 -
USER-DEFINED - 12.80 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
SUBAREA AREA(ACRES) = 34.00 SUBAREA RUNOFF(CFS) = 17.57
EFFECTIVE AREA(ACRES) = 116.30 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 116.3 PEAK FLOW RATE(CFS) = 60.03

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.828
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 23.20 0.60 0.900 -
USER-DEFINED - 0.30 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890
SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 6.30
EFFECTIVE AREA(ACRES) = 140.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 140.1 PEAK FLOW RATE(CFS) = 66.34

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 1732.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.66
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 66.34
PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 20.26
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.26
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.768
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.60 0.100 -

USER-DEFINED - 4.80 0.60 0.100 -
 USER-DEFINED - 0.10 0.60 0.850 -
 USER-DEFINED - 6.30 0.60 0.850 -
 USER-DEFINED - 5.00 0.60 0.200 -
 USER-DEFINED - 43.30 0.60 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250
 SUBAREA AREA (ACRES) = 64.30 SUBAREA RUNOFF (CFS) = 35.80
 EFFECTIVE AREA (ACRES) = 204.40 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 204.4 PEAK FLOW RATE (CFS) = 94.60

 FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 20.26
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.768
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	38.70	0.60	0.200	-
USER-DEFINED	-	2.30	0.60	0.900	-
USER-DEFINED	-	3.60	0.60	0.900	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 44.60 SUBAREA RUNOFF (CFS) = 23.80
 EFFECTIVE AREA (ACRES) = 249.00 AREA-AVERAGED Fm (INCH/HR) = 0.24
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.40
 TOTAL AREA (ACRES) = 249.0 PEAK FLOW RATE (CFS) = 118.40

 FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 338.00
 FLOW LENGTH (FEET) = 2664.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.38
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 118.40
 PIPE TRAVEL TIME (MIN.) = 2.18 Tc (MIN.) = 22.44
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.44
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.722
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.200	-

USER-DEFINED - 14.80 0.60 0.200 -
 USER-DEFINED - 1.90 0.60 0.200 -
 USER-DEFINED - 9.90 0.60 0.200 -
 USER-DEFINED - 1.80 0.60 0.100 -
 USER-DEFINED - 8.40 0.60 0.100 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
 SUBAREA AREA (ACRES) = 37.30 SUBAREA RUNOFF (CFS) = 20.75
 EFFECTIVE AREA (ACRES) = 286.30 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 286.3 PEAK FLOW RATE (CFS) = 128.71

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.44
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.722
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.60	0.60	0.100	-
USER-DEFINED	-	14.00	0.60	0.100	-
USER-DEFINED	-	1.40	0.60	0.850	-
USER-DEFINED	-	0.30	0.60	0.850	-
USER-DEFINED	-	0.20	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.200	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 13.46
 EFFECTIVE AREA (ACRES) = 310.10 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 310.1 PEAK FLOW RATE (CFS) = 142.17

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.44
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.722
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.20	0.60	0.200	-
USER-DEFINED	-	17.60	0.60	0.200	-
USER-DEFINED	-	0.30	0.60	0.900	-
USER-DEFINED	-	0.90	0.60	0.900	-
USER-DEFINED	-	9.30	0.60	0.900	-
USER-DEFINED	-	0.20	0.60	0.500	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
 SUBAREA AREA (ACRES) = 40.50 SUBAREA RUNOFF (CFS) = 17.94
 EFFECTIVE AREA (ACRES) = 350.60 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 350.6 PEAK FLOW RATE (CFS) = 160.11


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*****
FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 22.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.722
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         5.30     0.60     0.500   -
USER-DEFINED        -        28.30     0.60     0.500   -
USER-DEFINED        -         3.80     0.60     0.400   -
USER-DEFINED        -         4.10     0.60     0.400   -
USER-DEFINED        -         0.30     0.60     0.600   -
USER-DEFINED        -         0.30     0.60     0.600   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
SUBAREA AREA(ACRES) = 42.10   SUBAREA RUNOFF(CFS) = 16.38
EFFECTIVE AREA(ACRES) = 392.70   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 392.7   PEAK FLOW RATE(CFS) = 176.49

*****
FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 338.00   DOWNSTREAM(FEET) = 320.00
FLOW LENGTH(FEET) = 1154.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.92
ESTIMATED PIPE DIAMETER(INCH) = 51.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 176.49
PIPE TRAVEL TIME(MIN.) = 1.21   Tc(MIN.) = 23.65
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

*****
FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 23.65
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.696
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
USER-DEFINED        -        11.60     0.60     0.100   -
USER-DEFINED        -         6.70     0.60     0.100   -
USER-DEFINED        -        12.80     0.60     0.100   -
USER-DEFINED        -         0.20     0.60     0.900   -
USER-DEFINED        -         0.20     0.60     0.900   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
SUBAREA AREA(ACRES) = 31.50   SUBAREA RUNOFF(CFS) = 17.86
EFFECTIVE AREA(ACRES) = 424.20   AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60   AREA-AVERAGED Ap = 0.35

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TOTAL AREA(ACRES) = 424.2   PEAK FLOW RATE(CFS) = 185.21
*****
FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 320.00   DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 1981.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.49
ESTIMATED PIPE DIAMETER(INCH) = 63.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 185.21
PIPE TRAVEL TIME(MIN.) = 3.15   Tc(MIN.) = 26.80
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

*****
FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 26.80
RAINFALL INTENSITY(INCH/HR) = 0.64
AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.35
EFFECTIVE STREAM AREA(ACRES) = 424.20
TOTAL STREAM AREA(ACRES) = 424.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 185.21

*****
FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00   DOWNSTREAM(FEET) = 775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" -         0.20     0.60     1.000   56   9.20
NATURAL FAIR COVER
"OPEN BRUSH"         -         1.20     0.60     1.000   56   9.20
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.93
TOTAL AREA(ACRES) = 1.40   PEAK FLOW RATE(CFS) = 0.93

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FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.157
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.51
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.15
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 2.19
Tc(MIN.) = 11.38
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 1.15
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 1.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.36
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.917
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 1.000 -
USER-DEFINED - 8.40 0.60 1.000 -
USER-DEFINED - 2.70 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 9.20 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.24
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.12
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 4.42
Tc(MIN.) = 15.81
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 6.49
EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 7.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 4.53
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.792
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.60 0.60 1.000 -
USER-DEFINED - 5.50 0.60 1.000 -
USER-DEFINED - 1.80 0.60 1.000 -
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 1.00 0.60 1.000 -
USER-DEFINED - 6.80 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.11
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 3.66
Tc(MIN.) = 19.47
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 2.99
EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 7.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.80 FLOW VELOCITY(FEET/SEC.) = 3.96
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 19.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.792
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.50 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 0.45
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 46.3 PEAK FLOW RATE (CFS) = 8.01

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 598.00 DOWNSTREAM (FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 701.00 CHANNEL SLOPE = 0.0357
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.723

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.30	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	5.90	0.60	1.000	-
USER-DEFINED	-	12.70	0.60	1.000	-
USER-DEFINED	-	6.80	0.60	1.000	-
USER-DEFINED	-	3.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.98

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.01

AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 2.91

Tc (MIN.) = 22.38

SUBAREA AREA (ACRES) = 35.10 SUBAREA RUNOFF (CFS) = 3.89

EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 9.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 3.93

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 22.38

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.723

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	0.900	-
USER-DEFINED	-	2.70	0.60	0.900	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.914

SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 0.68

EFFECTIVE AREA (ACRES) = 85.70 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 85.7 PEAK FLOW RATE (CFS) = 9.70

FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 573.00 DOWNSTREAM (FEET) = 437.00
FLOW LENGTH (FEET) = 6286.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.86
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 9.70
PIPE TRAVEL TIME (MIN.) = 11.82 Tc (MIN.) = 34.20
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 437.00 DOWNSTREAM (FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1963.00 CHANNEL SLOPE = 0.0469
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.502

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	1.60	0.60	0.100	-
USER-DEFINED	-	1.10	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.265

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.69

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.52

AVERAGE FLOW DEPTH (FEET) = 0.89 TRAVEL TIME (MIN.) = 7.24

Tc (MIN.) = 41.44

SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 1.99

EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.57

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95

* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;

* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.

TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 9.70

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 4.40

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 41.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.60 1.000 -
USER-DEFINED - 2.80 0.60 1.000 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 0.40 0.60 1.000 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 3.40 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 0.00
EFFECTIVE AREA(ACRES) = 100.10 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 100.1 PEAK FLOW RATE(CFS) = 9.70
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 41.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 0.10 0.60 0.850 -
USER-DEFINED - 3.80 0.60 0.850 -
USER-DEFINED - 2.50 0.60 0.850 -
USER-DEFINED - 2.40 0.60 0.900 -
USER-DEFINED - 0.70 0.60 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 10.30 SUBAREA RUNOFF(CFS) = 0.57
EFFECTIVE AREA(ACRES) = 110.40 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.95
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 110.4 PEAK FLOW RATE(CFS) = 9.70
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81
=====

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

=====
MAINLINE Tc(MIN.) = 41.44
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.502
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.60 0.900 -
USER-DEFINED - 1.10 0.60 0.900 -
USER-DEFINED - 0.10 0.60 0.400 -
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 1.90 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.924
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
SUBAREA AREA(ACRES) = 6.80 SUBAREA RUNOFF(CFS) = 0.23
EFFECTIVE AREA(ACRES) = 117.20 AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94
* RAINFALL INTENSITY IS LESS THAN AREA-AVERAGED Fp;
* IMPERVIOUS AREA USED FOR RUNOFF ESTIMATES.
TOTAL AREA(ACRES) = 117.2 PEAK FLOW RATE(CFS) = 9.70
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31
=====

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 1065.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.41
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.70
PIPE TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 43.15
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1
=====

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 43.15
RAINFALL INTENSITY(INCH/HR) = 0.49
AREA-AVERAGED Fm(INCH/HR) = 0.57
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 117.20
TOTAL STREAM AREA(ACRES) = 117.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.70

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	97.09	21.44	0.743	0.60 (0.22)	0.37	203.0 310.00
1	85.14	26.21	0.649	0.60 (0.22)	0.37	217.1 300.00
2	185.21	26.80	0.640	0.60 (0.21)	0.35	424.2 320.00
3	9.70	43.15	0.492	0.60 (0.57)	0.94	117.2 390.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	290.73	21.44	0.743	0.60 (0.25)	0.42	600.6	310.00
2	279.76	26.21	0.649	0.60 (0.25)	0.42	703.3	300.00
3	278.27	26.80	0.640	0.60 (0.25)	0.42	714.1	320.00
4	209.36	43.15	0.492	0.60 (0.27)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 290.73 Tc(MIN.) = 21.44
EFFECTIVE AREA(ACRES) = 600.59 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 758.5
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.27
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 290.73
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 21.62
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 21.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 17.50 0.60 0.200 -
USER-DEFINED - 1.50 0.60 0.200 -
USER-DEFINED - 0.70 0.60 0.200 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 44.60 0.60 0.100 -
USER-DEFINED - 0.70 0.60 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 38.69

EFFECTIVE AREA(ACRES) = 665.69 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 303.27

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc(MIN.) = 21.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.739
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.60 0.100 -
USER-DEFINED - 4.10 0.60 0.100 -
USER-DEFINED - 0.10 0.60 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 3.74
EFFECTIVE AREA(ACRES) = 671.89 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.39
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 307.01

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<<

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<<

FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.727
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE" - 1.20 0.60 0.400 56 6.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 1.61
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.61

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00
STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALfstREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.65

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 11.60
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.02
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.75

STREET FLOW TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 8.31

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.448

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.30 0.60 0.600 -
USER-DEFINED - 4.40 0.60 0.400 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.486

SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 8.01

EFFECTIVE AREA(ACRES) = 8.90 AREA-AVERAGED Fm(INCH/HR) = 0.28

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47

TOTAL AREA(ACRES) = 8.9 PEAK FLOW RATE(CFS) = 9.32

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH(FEET) = 0.42 HALFSTREET FLOOD WIDTH(FEET) = 14.49
FLOW VELOCITY(FEET/SEC.) = 2.25 DEPTH*VELOCITY(FT*FT/SEC.) = 0.95
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 588.00 FEET.

FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 588.00 DOWNSTREAM(FEET) = 581.00

FLOW LENGTH(FEET) = 805.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 6.24

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.32

PIPE TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 10.46

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.46

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.211

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.00 0.60 0.900 -
USER-DEFINED - 8.80 0.60 0.600 -
USER-DEFINED - 0.10 0.60 0.400 -
USER-DEFINED - 4.90 0.60 0.400 -

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.577

SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 12.38

EFFECTIVE AREA(ACRES) = 24.80 AREA-AVERAGED Fm(INCH/HR) = 0.32

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.54

TOTAL AREA(ACRES) = 24.8 PEAK FLOW RATE(CFS) = 19.80

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 10.46

RAINFALL INTENSITY(INCH/HR) = 1.21

AREA-AVERAGED Fm(INCH/HR) = 0.32

AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.54

EFFECTIVE STREAM AREA(ACRES) = 24.80

TOTAL STREAM AREA(ACRES) = 24.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 19.80

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00

ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 630.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.196

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" - 0.10 0.60 1.000 56 9.20
NATURAL FAIR COVER
"OPEN BRUSH" - 1.30 0.60 1.000 56 9.20

NATURAL FAIR COVER
 "OPEN BRUSH" - 0.10 0.60 1.000 56 9.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 1.00
 TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 1.00

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.248

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.55
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.51
 AVERAGE FLOW DEPTH(FEET) = 0.34 TRAVEL TIME(MIN.) = 0.72
 Tc(MIN.) = 9.92
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 1.11
 EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 1.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.37 FLOW VELOCITY(FEET/SEC.) = 4.80
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0288
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.065

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	0.900	-
USER-DEFINED	-	1.20	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.50
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 2.86
 AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 3.03
 Tc(MIN.) = 12.95
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 3.01
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.56
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 4.43

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 3.02
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

 FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 582.00 DOWNSTREAM(FEET) = 581.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.59
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 4.43
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 12.96
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 12.96
 RAINFALL INTENSITY(INCH/HR) = 1.06
 AREA-AVERAGED Fm(INCH/HR) = 0.56
 AREA-AVERAGED Fp(INCH/HR) = 0.60
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 9.80
 TOTAL STREAM AREA(ACRES) = 9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 4.43

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	19.80	10.46	1.211	0.60(0.32)	0.54	24.8	400.00
2	4.43	12.96	1.065	0.60(0.56)	0.94	9.8	430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
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NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	24.23	10.46	1.211	0.60 (0.38)	0.64	32.7 400.00
2	20.96	12.96	1.065	0.60 (0.39)	0.65	34.6 430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 24.23 Tc(MIN.) = 10.46
 EFFECTIVE AREA(ACRES) = 32.71 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.64
 TOTAL AREA(ACRES) = 34.6
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 570.00
 FLOW LENGTH(FEET) = 1056.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.39
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 24.23
 PIPE TRAVEL TIME(MIN.) = 2.10 Tc(MIN.) = 12.55
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

 FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

MAINLINE Tc(MIN.) = 12.55
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.088
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	4.90	0.60	0.900	-
USER-DEFINED	-	1.50	0.60	0.900	-
USER-DEFINED	-	1.00	0.60	0.600	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.842
 SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 4.04
 EFFECTIVE AREA(ACRES) = 40.41 AREA-AVERAGED Fm(INCH/HR) = 0.41
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.68
 TOTAL AREA(ACRES) = 42.3 PEAK FLOW RATE(CFS) = 24.84

 FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

MAINLINE Tc(MIN.) = 12.55
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.088
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	4.90	0.60	0.900	-
USER-DEFINED	-	1.50	0.60	0.900	-
USER-DEFINED	-	1.00	0.60	0.600	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	8.80	0.60	0.500	-
USER-DEFINED	-	4.20	0.60	0.500	-
USER-DEFINED	-	1.10	0.60	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.492
 SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 10.06
 EFFECTIVE AREA(ACRES) = 54.51 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.63
 TOTAL AREA(ACRES) = 56.4 PEAK FLOW RATE(CFS) = 34.90

 FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00
 FLOW LENGTH(FEET) = 1526.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.84
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 34.90
 PIPE TRAVEL TIME(MIN.) = 4.36 Tc(MIN.) = 16.91
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

 FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

MAINLINE Tc(MIN.) = 16.91
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.900	-
USER-DEFINED	-	2.80	0.60	0.900	-
USER-DEFINED	-	6.10	0.60	0.500	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.698
 SUBAREA AREA(ACRES) = 13.00 SUBAREA RUNOFF(CFS) = 5.39
 EFFECTIVE AREA(ACRES) = 67.51 AREA-AVERAGED Fm(INCH/HR) = 0.38
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.64
 TOTAL AREA(ACRES) = 69.4 PEAK FLOW RATE(CFS) = 34.90
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<<<

MAINLINE Tc(MIN.) = 16.91
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	1.80	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	1.80	0.60	0.900	-
USER-DEFINED	-	2.80	0.60	0.900	-
USER-DEFINED	-	6.10	0.60	0.500	-

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.20	0.60	0.500	-
USER-DEFINED	-	7.80	0.60	0.400	-
USER-DEFINED	-	1.40	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA (ACRES) = 20.40 SUBAREA RUNOFF (CFS) = 11.14
EFFECTIVE AREA (ACRES) = 87.91 AREA-AVERAGED Fm (INCH/HR) = 0.36
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 89.8 PEAK FLOW RATE (CFS) = 41.20

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 565.00 DOWNSTREAM (FEET) = 495.00
FLOW LENGTH (FEET) = 2168.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.68
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 41.20
PIPE TRAVEL TIME (MIN.) = 2.46 Tc (MIN.) = 19.37
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc (MIN.) = 19.37
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.795

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.60	0.100	-
USER-DEFINED	-	1.90	0.60	0.100	-
USER-DEFINED	-	2.50	0.60	0.850	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	36.40	0.60	0.200	-
USER-DEFINED	-	13.60	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA (ACRES) = 60.80 SUBAREA RUNOFF (CFS) = 36.17
EFFECTIVE AREA (ACRES) = 148.71 AREA-AVERAGED Fm (INCH/HR) = 0.27
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 150.6 PEAK FLOW RATE (CFS) = 70.71

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc (MIN.) = 19.37
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.795
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.60	0.900	-
USER-DEFINED	-	2.10	0.60	0.900	-
USER-DEFINED	-	0.10	0.60	0.600	-
USER-DEFINED	-	0.30	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 1.83
EFFECTIVE AREA (ACRES) = 156.11 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.47
TOTAL AREA (ACRES) = 158.0 PEAK FLOW RATE (CFS) = 72.54

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc (MIN.) = 19.37
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.795
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.60	0.400	-
USER-DEFINED	-	0.90	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 5.10
EFFECTIVE AREA (ACRES) = 166.31 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.46
TOTAL AREA (ACRES) = 168.2 PEAK FLOW RATE (CFS) = 77.64

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 395.00
FLOW LENGTH (FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.54
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 77.64
PIPE TRAVEL TIME (MIN.) = 2.76 Tc (MIN.) = 22.13
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc (MIN.) = 22.13
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	9.10	0.60	0.100	-
USER-DEFINED	-	6.70	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.850	-
USER-DEFINED	-	2.60	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.219
 SUBAREA AREA (ACRES) = 19.80 SUBAREA RUNOFF (CFS) = 10.64
 EFFECTIVE AREA (ACRES) = 186.11 AREA-AVERAGED Fm (INCH/HR) = 0.26
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.44
 TOTAL AREA (ACRES) = 188.0 PEAK FLOW RATE (CFS) = 78.23

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.13

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	2.40	0.60	0.200	-
USER-DEFINED	-	10.60	0.60	0.200	-
USER-DEFINED	-	0.60	0.60	0.200	-
USER-DEFINED	-	1.90	0.60	0.900	-
USER-DEFINED	-	0.70	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308
 SUBAREA AREA (ACRES) = 16.80 SUBAREA RUNOFF (CFS) = 8.22
 EFFECTIVE AREA (ACRES) = 202.91 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 204.8 PEAK FLOW RATE (CFS) = 86.45

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.13

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.30	0.60	0.600	-
USER-DEFINED	-	15.30	0.60	0.600	-
USER-DEFINED	-	0.40	0.60	0.500	-
USER-DEFINED	-	1.50	0.60	0.500	-
USER-DEFINED	-	5.10	0.60	0.500	-
USER-DEFINED	-	0.90	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.579
 SUBAREA AREA (ACRES) = 37.50 SUBAREA RUNOFF (CFS) = 12.86
 EFFECTIVE AREA (ACRES) = 240.41 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 242.3 PEAK FLOW RATE (CFS) = 99.31

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 22.13

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.728

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.50	0.60	0.400	-
USER-DEFINED	-	8.40	0.60	0.400	-
USER-DEFINED	-	2.80	0.60	0.400	-
USER-DEFINED	-	0.60	0.60	0.600	-
USER-DEFINED	-	1.50	0.60	0.600	-
USER-DEFINED	-	3.50	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 20.30 SUBAREA RUNOFF (CFS) = 8.32
 EFFECTIVE AREA (ACRES) = 260.71 AREA-AVERAGED Fm (INCH/HR) = 0.27
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 262.6 PEAK FLOW RATE (CFS) = 107.63

FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 395.00 DOWNSTREAM (FEET) = 372.00

FLOW LENGTH (FEET) = 661.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 18.93

ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 107.63

PIPE TRAVEL TIME (MIN.) = 0.58 Tc (MIN.) = 22.72

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.688

SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" - 0.50 0.60 0.900 56 7.53
RESIDENTIAL
"3-4 DWELLINGS/ACRE" - 0.20 0.60 0.600 56 6.37
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814
SUBAREA RUNOFF (CFS) = 0.76
TOTAL AREA (ACRES) = 0.70 PEAK FLOW RATE (CFS) = 0.76

FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 490.00
FLOW LENGTH (FEET) = 267.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.15
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 0.76
PIPE TRAVEL TIME (MIN.) = 1.07 Tc (MIN.) = 7.44
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 7.44
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.555
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.90 0.60 0.900 -
USER-DEFINED - 0.30 0.60 0.900 -
USER-DEFINED - 0.10 0.60 0.600 -
USER-DEFINED - 0.10 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.788
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 1.66
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.48
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 2.33

FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 490.00 DOWNSTREAM (FEET) = 480.00
FLOW LENGTH (FEET) = 520.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.81
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.33
PIPE TRAVEL TIME (MIN.) = 1.49 Tc (MIN.) = 8.93
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 8.93
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.370
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.00 0.60 0.900 -
USER-DEFINED - 0.40 0.60 0.900 -
USER-DEFINED - 0.40 0.60 0.500 -
USER-DEFINED - 0.30 0.60 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 2.47
EFFECTIVE AREA (ACRES) = 5.50 AREA-AVERAGED Fm (INCH/HR) = 0.48
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.80
TOTAL AREA (ACRES) = 5.5 PEAK FLOW RATE (CFS) = 4.40

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 480.00 DOWNSTREAM (FEET) = 470.00
FLOW LENGTH (FEET) = 310.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.38
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 4.40
PIPE TRAVEL TIME (MIN.) = 0.62 Tc (MIN.) = 9.55
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.55
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.294

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	2.80	0.60	0.900	-
USER-DEFINED	-	1.00	0.60	0.900	-
USER-DEFINED	-	0.20	0.60	0.500	-
USER-DEFINED	-	0.10	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 4.62
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.44
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 8.64

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.55
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.294
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.11
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 8.75

FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 528.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.61
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.75
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 10.31
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.31
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.220
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.60	0.100	-
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	6.30	0.60	0.500	-
USER-DEFINED	-	3.70	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
SUBAREA AREA(ACRES) = 11.50 SUBAREA RUNOFF(CFS) = 9.85
EFFECTIVE AREA(ACRES) = 22.80 AREA-AVERAGED Fm(INCH/HR) = 0.35
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 22.8 PEAK FLOW RATE(CFS) = 17.84

FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.56
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.84
PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 11.11
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.11
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.173
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.60	0.200	-
USER-DEFINED	-	10.90	0.60	0.200	-
USER-DEFINED	-	1.30	0.60	0.100	-
USER-DEFINED	-	1.30	0.60	0.100	-
USER-DEFINED	-	1.10	0.60	0.200	-
USER-DEFINED	-	7.00	0.60	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
SUBAREA AREA(ACRES) = 23.20 SUBAREA RUNOFF(CFS) = 22.13
EFFECTIVE AREA(ACRES) = 46.00 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 46.0 PEAK FLOW RATE(CFS) = 39.01

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.11
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.173

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.60	0.600	-
USER-DEFINED	-	4.90	0.60	0.500	-
USER-DEFINED	-	9.30	0.60	0.500	-
USER-DEFINED	-	0.30	0.60	0.400	-
USER-DEFINED	-	0.10	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA (ACRES) = 15.00 SUBAREA RUNOFF (CFS) = 11.79
EFFECTIVE AREA (ACRES) = 61.00 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
TOTAL AREA (ACRES) = 61.0 PEAK FLOW RATE (CFS) = 50.80

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION (MIN.) = 11.11
RAINFALL INTENSITY (INCH/HR) = 1.17
AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.41
EFFECTIVE STREAM AREA (ACRES) = 61.00
TOTAL STREAM AREA (ACRES) = 61.00
PEAK FLOW RATE (CFS) AT CONFLUENCE = 50.80

FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.688
SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	-	0.70	0.60	0.900	56	7.53
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.20	0.60	0.600	56	6.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
SUBAREA RUNOFF (CFS) = 0.96
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 0.96

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 487.00
FLOW LENGTH (FEET) = 308.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 4.98
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 0.96
PIPE TRAVEL TIME (MIN.) = 1.03 Tc (MIN.) = 7.40
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 7.40
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.560
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.900	-
USER-DEFINED	-	0.50	0.60	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.73
EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.49
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.82
TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 2.59

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 487.00 DOWNSTREAM (FEET) = 478.00
FLOW LENGTH (FEET) = 373.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.51
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 2.59
PIPE TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 8.35
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 8.35
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.442
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

USER-DEFINED - 0.80 0.60 0.900 -
 USER-DEFINED - 1.20 0.60 0.900 -
 USER-DEFINED - 0.20 0.60 0.900 -
 USER-DEFINED - 0.40 0.60 0.600 -
 USER-DEFINED - 1.70 0.60 0.600 -
 USER-DEFINED - 0.10 0.60 0.600 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750
 SUBAREA AREA (ACRES) = 4.40 SUBAREA RUNOFF (CFS) = 3.93
 EFFECTIVE AREA (ACRES) = 7.10 AREA-AVERAGED Fm (INCH/HR) = 0.47
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78
 TOTAL AREA (ACRES) = 7.1 PEAK FLOW RATE (CFS) = 6.23

 FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 478.00 DOWNSTREAM (FEET) = 454.00
 FLOW LENGTH (FEET) = 995.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.28
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 6.23
 PIPE TRAVEL TIME (MIN.) = 2.00 Tc (MIN.) = 10.36
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 2004.00 FEET.

 FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 10.36
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.217
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	0.200	-
USER-DEFINED	-	0.40	0.60	0.200	-
USER-DEFINED	-	0.90	0.60	0.850	-
USER-DEFINED	-	0.40	0.60	0.850	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	0.70	0.60	0.900	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 2.50
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.44
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.73
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 7.30

 FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 10.36

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.217
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.60	0.600	-
USER-DEFINED	-	2.10	0.60	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 4.17
 EFFECTIVE AREA (ACRES) = 15.80 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.69
 TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 11.46

 FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 454.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 1555.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.74
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 11.46
 PIPE TRAVEL TIME (MIN.) = 2.66 Tc (MIN.) = 13.02
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 13.02
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.061
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.60	0.200	-
USER-DEFINED	-	6.80	0.60	0.200	-
USER-DEFINED	-	0.70	0.60	0.200	-
USER-DEFINED	-	2.60	0.60	0.200	-
USER-DEFINED	-	2.20	0.60	0.600	-
USER-DEFINED	-	9.90	0.60	0.600	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 19.33
 EFFECTIVE AREA (ACRES) = 41.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 41.7 PEAK FLOW RATE (CFS) = 28.57

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 13.02
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.061

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.60	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 0.89
EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 29.46

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.02
RAINFALL INTENSITY(INCH/HR) = 1.06
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 43.00
TOTAL STREAM AREA(ACRES) = 43.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.46

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	50.80	11.11	1.173	0.60(0.25)	0.41	61.0	410.00
2	29.46	13.02	1.061	0.60(0.30)	0.50	43.0	420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	79.64	11.11	1.173	0.60(0.27)	0.45	97.7	410.00
2	74.11	13.02	1.061	0.60(0.27)	0.45	104.0	420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 79.64 Tc(MIN.) = 11.11
EFFECTIVE AREA(ACRES) = 97.69 AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 104.0
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.81
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 79.64
PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 12.42
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 12.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.096
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	2.90	0.60	0.100	-
USER-DEFINED	-	3.60	0.60	0.850	-
USER-DEFINED	-	4.50	0.60	0.200	-
USER-DEFINED	-	4.50	0.60	0.200	-
USER-DEFINED	-	0.10	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 14.15
EFFECTIVE AREA(ACRES) = 114.99 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 121.3 PEAK FLOW RATE(CFS) = 87.04

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 12.42
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.096
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.60	0.400	-
USER-DEFINED	-	0.20	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 0.77
EFFECTIVE AREA(ACRES) = 115.99 AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 87.82

FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 12.97
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 87.82
 PIPE TRAVEL TIME (MIN.) = 2.02 Tc (MIN.) = 14.44
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 14.44
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-
USER-DEFINED	-	5.70	0.60	0.850	-
USER-DEFINED	-	4.50	0.60	0.850	-
USER-DEFINED	-	9.40	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
 SUBAREA AREA (ACRES) = 20.90 SUBAREA RUNOFF (CFS) = 9.33
 EFFECTIVE AREA (ACRES) = 136.89 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 143.2 PEAK FLOW RATE (CFS) = 87.82
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 14.44
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.978
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.70	0.60	0.850	-
USER-DEFINED	-	8.90	0.60	0.850	-
USER-DEFINED	-	1.20	0.60	0.850	-
USER-DEFINED	-	3.70	0.60	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA (ACRES) = 14.50 SUBAREA RUNOFF (CFS) = 6.11
 EFFECTIVE AREA (ACRES) = 151.39 AREA-AVERAGED Fm (INCH/HR) = 0.31
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52
 TOTAL AREA (ACRES) = 157.7 PEAK FLOW RATE (CFS) = 90.90

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

 ** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	90.90	14.44	0.978	0.60 (0.31)	0.52	151.4	410.00
2	83.34	16.38	0.898	0.60 (0.31)	0.52	157.7	420.00

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	107.63	22.72	0.716	0.60 (0.27)	0.45	260.7	400.00
2	92.34	25.91	0.653	0.60 (0.27)	0.45	262.6	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	198.53	14.44	0.978	0.60 (0.29)	0.48	317.1	410.00
2	190.97	16.38	0.898	0.60 (0.29)	0.48	345.8	420.00
3	165.17	22.72	0.716	0.60 (0.29)	0.48	418.4	400.00
4	140.98	25.91	0.653	0.60 (0.29)	0.48	420.3	430.00
TOTAL AREA (ACRES) =			420.3				

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 198.53 Tc (MIN.) = 14.435
 EFFECTIVE AREA (ACRES) = 317.06 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48
 TOTAL AREA (ACRES) = 420.3
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00
 FLOW LENGTH (FEET) = 1358.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.86
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 198.53
 PIPE TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 15.31
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

 FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 15.31
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.934
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.40	0.60	0.200	-
USER-DEFINED	-	15.00	0.60	0.200	-
USER-DEFINED	-	5.80	0.60	0.200	-
USER-DEFINED	-	2.50	0.60	0.200	-

USER-DEFINED - 9.10 0.60 0.100 -
 USER-DEFINED - 1.50 0.60 0.100 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
 SUBAREA AREA(ACRES) = 41.30 SUBAREA RUNOFF(CFS) = 30.84
 EFFECTIVE AREA(ACRES) = 358.36 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 461.6 PEAK FLOW RATE(CFS) = 214.91

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.31

* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.934

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	0.40	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 0.71

EFFECTIVE AREA(ACRES) = 359.26 AREA-AVERAGED Fm(INCH/HR) = 0.27

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45

TOTAL AREA(ACRES) = 462.5 PEAK FLOW RATE(CFS) = 215.62

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	215.62	15.31	0.934	0.60(0.27)	0.45	359.3	410.00
2	209.27	17.26	0.868	0.60(0.27)	0.45	388.0	420.00
3	177.36	23.63	0.696	0.60(0.27)	0.45	460.6	400.00
4	153.55	26.88	0.638	0.60(0.27)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	307.01	21.62	0.739	0.60(0.23)	0.39	671.9	310.00
2	286.78	26.40	0.646	0.60(0.23)	0.39	774.6	300.00
3	284.23	26.98	0.637	0.60(0.23)	0.39	785.4	320.00
4	212.31	43.35	0.491	0.60(0.25)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	516.54	15.31	0.934	0.60(0.25)	0.41	835.0	410.00
2	516.28	17.26	0.868	0.60(0.25)	0.41	924.4	420.00
3	494.44	21.62	0.739	0.60(0.25)	0.41	1109.6	310.00

4	475.85	23.63	0.696	0.60(0.25)	0.41	1175.7	400.00
5	443.81	26.40	0.646	0.60(0.25)	0.41	1236.8	300.00
6	438.25	26.88	0.638	0.60(0.25)	0.41	1245.9	430.00
7	437.09	26.98	0.637	0.60(0.25)	0.41	1247.9	320.00
8	324.81	43.35	0.491	0.60(0.26)	0.43	1292.3	390.00
TOTAL AREA(ACRES) =						1292.3	

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 516.54 Tc(MIN.) = 15.311

EFFECTIVE AREA(ACRES) = 835.00 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41

TOTAL AREA(ACRES) = 1292.3

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1292.3 TC(MIN.) = 15.31

EFFECTIVE AREA(ACRES) = 835.00 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.412

PEAK FLOW RATE(CFS) = 516.54

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	516.54	15.31	0.934	0.60(0.25)	0.41	835.0	410.00
2	516.28	17.26	0.868	0.60(0.25)	0.41	924.4	420.00
3	494.44	21.62	0.739	0.60(0.25)	0.41	1109.6	310.00
4	475.85	23.63	0.696	0.60(0.25)	0.41	1175.7	400.00
5	443.81	26.40	0.646	0.60(0.25)	0.41	1236.8	300.00
6	438.25	26.88	0.638	0.60(0.25)	0.41	1245.9	430.00
7	437.09	26.98	0.637	0.60(0.25)	0.41	1247.9	320.00
8	324.81	43.35	0.491	0.60(0.26)	0.43	1292.3	390.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 5-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C05EVRL.DAT
TIME/DATE OF STUDY: 12:33 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.707
- 2) 10.00; 1.797
- 3) 15.00; 1.318
- 4) 20.00; 1.128
- 5) 25.00; 0.984
- 6) 30.00; 0.882
- 7) 40.00; 0.755
- 8) 50.00; 0.672
- 9) 60.00; 0.611
- 10) 90.00; 0.509
- 11) 120.00; 0.450
- 12) 180.00; 0.378
- 13) 360.00; 0.280
- 14) 1200.00; 0.123

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: MANNING			
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.081
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	-	1.60	0.50	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 2.85
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 2.85

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.85
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.37
HALFSTREET FLOOD WIDTH(FEET) = 11.37
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.17
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.79
STREET FLOW TRAVEL TIME(MIN.) = 3.61 Tc(MIN.) = 12.05
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.601
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 0.10 0.50 0.100 -
 USER-DEFINED - 4.30 0.50 0.200 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
 SUBAREA AREA (ACRES) = 4.40 SUBAREA RUNOFF (CFS) = 5.95
 EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 8.11

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.16
 FLOW VELOCITY (FEET/SEC.) = 2.33 DEPTH*VELOCITY (FT*FT/SEC.) = 0.93
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

 FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 637.00 DOWNSTREAM (FEET) = 634.00
 FLOW LENGTH (FEET) = 563.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.99
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 8.11
 PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 13.93
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

 FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.93
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.421
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.60	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 9.51
 EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.20
 TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 16.64

 FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 630.00
 FLOW LENGTH (FEET) = 1072.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.6 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 5.12
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 16.64
 PIPE TRAVEL TIME (MIN.) = 3.49 Tc (MIN.) = 17.41
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.41
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	0.100	-
USER-DEFINED	-	4.50	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	5.70	0.50	0.200	-
USER-DEFINED	-	2.40	0.50	0.200	-
USER-DEFINED	-	0.50	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 16.58
 EFFECTIVE AREA (ACRES) = 30.10 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18
 TOTAL AREA (ACRES) = 30.1 PEAK FLOW RATE (CFS) = 30.77

 FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 17.41
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.70	0.50	0.600	-
USER-DEFINED	-	6.70	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 12.40 SUBAREA RUNOFF (CFS) = 10.34
 EFFECTIVE AREA (ACRES) = 42.50 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.30
 TOTAL AREA (ACRES) = 42.5 PEAK FLOW RATE (CFS) = 41.11

 FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 630.00 DOWNSTREAM (FEET) = 610.00
 FLOW LENGTH (FEET) = 1290.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 11.08

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 41.11
 PIPE TRAVEL TIME(MIN.) = 1.94 Tc(MIN.) = 19.36
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

 FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.36
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.152
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 1.00 0.50 0.100 -
 USER-DEFINED - 0.90 0.50 0.100 -
 USER-DEFINED - 0.60 0.50 0.200 -
 USER-DEFINED - 0.10 0.50 0.200 -
 USER-DEFINED - 0.10 0.50 0.600 -
 USER-DEFINED - 0.50 0.50 0.600 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
 SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 3.01
 EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.30
 TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 41.29

 FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<<
 >>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
 ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.169
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 COMMERCIAL - 1.70 0.50 0.100 56 18.91
 COMMERCIAL - 4.40 0.50 0.100 56 18.91
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" - 0.60 0.50 0.200 56 20.15
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" - 1.30 0.50 0.200 56 20.15
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" - 7.10 0.50 0.600 56 25.63
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" - 2.80 0.50 0.600 56 25.63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 15.72

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:

MAINLINE Tc(MIN.) = 19.36
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.152
 SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 15.45
 EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.32
 TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 56.74

 FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.40
 ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 56.74
 PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 20.75
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.75
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.106
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 3.30 0.50 0.100 -
 USER-DEFINED - 0.40 0.50 0.100 -
 USER-DEFINED - 0.10 0.50 0.850 -
 USER-DEFINED - 0.20 0.50 0.500 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
 SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 3.73
 EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
 TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 57.84

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 20.75
 RAINFALL INTENSITY(INCH/HR) = 1.11
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.31
 EFFECTIVE STREAM AREA(ACRES) = 67.60
 TOTAL STREAM AREA(ACRES) = 67.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 57.84

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FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 629.00 DOWNSTREAM (FEET) = 625.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.474
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.257
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL - 0.10 0.50 0.100 56 7.47
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 1.10 0.50 0.200 56 7.97
RESIDENTIAL
"11+ DWELLINGS/ACRE" - 0.20 0.50 0.200 56 7.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA RUNOFF (CFS) = 2.72
TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 2.72

*****
FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION (FEET) = 625.00 DOWNSTREAM ELEVATION (FEET) = 623.00
STREET LENGTH (FEET) = 300.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.97
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.36
HALFSTREET FLOOD WIDTH (FEET) = 11.21
AVERAGE FLOW VELOCITY (FEET/SEC.) = 1.89
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.68
STREET FLOW TRAVEL TIME (MIN.) = 2.65 Tc (MIN.) = 10.12
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.785
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.20 0.50 0.100 -

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USER-DEFINED - 0.70 0.50 0.200 -
USER-DEFINED - 0.50 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 4.47
EFFECTIVE AREA (ACRES) = 4.30 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.16
TOTAL AREA (ACRES) = 4.3 PEAK FLOW RATE (CFS) = 6.60

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END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.39 HALFSTREET FLOOD WIDTH (FEET) = 12.70
FLOW VELOCITY (FEET/SEC.) = 2.02 DEPTH*VELOCITY (FT*FT/SEC.) = 0.79
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

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*****
FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 623.00 DOWNSTREAM (FEET) = 620.00
FLOW LENGTH (FEET) = 369.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.56
ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 6.60
PIPE TRAVEL TIME (MIN.) = 1.11 Tc (MIN.) = 11.23
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

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*****
FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc (MIN.) = 11.23
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.679
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.90 0.50 0.100 -
USER-DEFINED - 2.50 0.50 0.100 -
USER-DEFINED - 0.80 0.50 0.200 -
USER-DEFINED - 0.70 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125
SUBAREA AREA (ACRES) = 5.90 SUBAREA RUNOFF (CFS) = 8.58
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.07
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 14.78

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*****
FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 615.00
FLOW LENGTH (FEET) = 338.00 MANNING'S N = 0.013

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DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.46
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 14.78
 PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 11.90
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

 FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 11.90
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.615
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.850	-
USER-DEFINED	-	6.10	0.50	0.200	-
USER-DEFINED	-	6.10	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.208
 SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 17.27
 EFFECTIVE AREA(ACRES) = 22.90 AREA-AVERAGED Fm(INCH/HR) = 0.09
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.18
 TOTAL AREA(ACRES) = 22.9 PEAK FLOW RATE(CFS) = 31.46

 FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 615.00 DOWNSTREAM(FEET) = 600.00
 FLOW LENGTH(FEET) = 578.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.47
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 31.46
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 12.67
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

 FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.67
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.541
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.70	0.50	0.100	-
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	3.00	0.50	0.200	-
USER-DEFINED	-	2.10	0.50	0.200	-

USER-DEFINED - 3.70 0.50 0.500 -
 USER-DEFINED - 6.00 0.50 0.500 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
 SUBAREA AREA(ACRES) = 17.80 SUBAREA RUNOFF(CFS) = 21.91
 EFFECTIVE AREA(ACRES) = 40.70 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.25
 TOTAL AREA(ACRES) = 40.7 PEAK FLOW RATE(CFS) = 51.85

 FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 569.00
 FLOW LENGTH(FEET) = 2176.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.35
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 51.85
 PIPE TRAVEL TIME(MIN.) = 3.20 Tc(MIN.) = 15.86
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

 FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 15.86
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.285
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.200	-
USER-DEFINED	-	0.30	0.50	0.900	-
USER-DEFINED	-	6.80	0.50	0.500	-
USER-DEFINED	-	19.10	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 24.78
 EFFECTIVE AREA(ACRES) = 67.30 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 67.3 PEAK FLOW RATE(CFS) = 67.25

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.71
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 67.25
 PIPE TRAVEL TIME(MIN.) = 0.68 Tc(MIN.) = 16.54

LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.54

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.259

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	0.900	-
USER-DEFINED	-	8.90	0.50	0.500	-
USER-DEFINED	-	7.40	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.505

SUBAREA AREA(ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 15.86

EFFECTIVE AREA(ACRES) = 84.80 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38

TOTAL AREA(ACRES) = 84.8 PEAK FLOW RATE(CFS) = 81.55

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 16.54

RAINFALL INTENSITY(INCH/HR) = 1.26

AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.38

EFFECTIVE STREAM AREA(ACRES) = 84.80

TOTAL STREAM AREA(ACRES) = 84.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 81.55

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	57.84	20.75	1.106	0.50(0.16)	0.31	67.6	300.00
2	81.55	16.54	1.259	0.50(0.19)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.09	16.54	1.259	0.50(0.18)	0.35	138.7	310.00
2	127.72	20.75	1.106	0.50(0.18)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 135.09 Tc(MIN.) = 16.54

EFFECTIVE AREA(ACRES) = 138.69 AREA-AVERAGED Fm(INCH/HR) = 0.18

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35

TOTAL AREA(ACRES) = 152.4

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00

FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.77

ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 135.09

PIPE TRAVEL TIME(MIN.) = 2.91 Tc(MIN.) = 19.45

LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.45

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.149

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-
USER-DEFINED	-	1.40	0.50	0.100	-
USER-DEFINED	-	4.80	0.50	0.100	-
USER-DEFINED	-	5.00	0.50	0.100	-
USER-DEFINED	-	3.70	0.50	0.100	-
USER-DEFINED	-	5.00	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.288

SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 18.09

EFFECTIVE AREA(ACRES) = 158.69 AREA-AVERAGED Fm(INCH/HR) = 0.17

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35

TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 139.38

FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.45

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.149

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.00	0.50	0.200	-
USER-DEFINED	-	12.70	0.50	0.200	-
USER-DEFINED	-	1.10	0.50	0.900	-
USER-DEFINED	-	1.50	0.50	0.900	-
USER-DEFINED	-	2.50	0.50	0.900	-

USER-DEFINED - 0.10 0.50 0.500 -
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA (ACRES) = 21.90 SUBAREA RUNOFF (CFS) = 19.05
 EFFECTIVE AREA (ACRES) = 180.59 AREA-AVERAGED Fm (INCH/HR) = 0.17
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 194.3 PEAK FLOW RATE (CFS) = 158.44

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 19.45
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.149
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.50	0.50	0.500	-
USER-DEFINED	-	1.40	0.50	0.500	-
USER-DEFINED	-	2.20	0.50	0.600	-
USER-DEFINED	-	6.80	0.50	0.600	-
USER-DEFINED	-	7.90	0.50	0.600	-

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA (ACRES) = 22.80 SUBAREA RUNOFF (CFS) = 17.68
 EFFECTIVE AREA (ACRES) = 203.39 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 217.1 PEAK FLOW RATE (CFS) = 176.12

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 374.00 DOWNSTREAM (FEET) = 310.00
 FLOW LENGTH (FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 26.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 28.95
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 176.12
 PIPE TRAVEL TIME (MIN.) = 0.49 Tc (MIN.) = 19.94
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 19.94
 RAINFALL INTENSITY (INCH/HR) = 1.13
 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA (ACRES) = 203.39

TOTAL STREAM AREA (ACRES) = 217.10
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 176.12

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 636.00 DOWNSTREAM (FEET) = 633.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.438
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.081
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	-	2.80	0.50	0.200	56	8.44

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF (CFS) = 4.99
 TOTAL AREA (ACRES) = 2.80 PEAK FLOW RATE (CFS) = 4.99

 FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION (FEET) = 633.00 DOWNSTREAM ELEVATION (FEET) = 628.00
 STREET LENGTH (FEET) = 360.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.38

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.40
 HALFSTREET FLOOD WIDTH (FEET) = 13.16
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.98
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.18
 STREET FLOW TRAVEL TIME (MIN.) = 2.01 Tc (MIN.) = 10.45
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.754

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	6.30	0.50	0.200	-
USER-DEFINED	-	0.20	0.50	0.200	-

USER-DEFINED - 0.70 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA (ACRES) = 7.30 SUBAREA RUNOFF (CFS) = 10.74
EFFECTIVE AREA (ACRES) = 10.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.23
TOTAL AREA (ACRES) = 10.1 PEAK FLOW RATE (CFS) = 14.91

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.44 HALFSTREET FLOOD WIDTH (FEET) = 15.35
FLOW VELOCITY (FEET/SEC.) = 3.24 DEPTH*VELOCITY (FT*FT/SEC.) = 1.42
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 628.00 DOWNSTREAM (FEET) = 624.00
FLOW LENGTH (FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.7 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.68
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 14.91
PIPE TRAVEL TIME (MIN.) = 2.20 Tc (MIN.) = 12.65
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.65

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.543

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.50	0.850	-
USER-DEFINED	-	2.10	0.50	0.850	-
USER-DEFINED	-	5.60	0.50	0.200	-
USER-DEFINED	-	0.90	0.50	0.200	-
USER-DEFINED	-	3.10	0.50	0.600	-
USER-DEFINED	-	0.30	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA (ACRES) = 14.00 SUBAREA RUNOFF (CFS) = 16.37
EFFECTIVE AREA (ACRES) = 24.10 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
TOTAL AREA (ACRES) = 24.1 PEAK FLOW RATE (CFS) = 29.36

FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 12.65

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.543

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.13
EFFECTIVE AREA (ACRES) = 24.20 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
TOTAL AREA (ACRES) = 24.2 PEAK FLOW RATE (CFS) = 29.49

FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 624.00 DOWNSTREAM (FEET) = 614.00
FLOW LENGTH (FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.92
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 29.49
PIPE TRAVEL TIME (MIN.) = 1.66 Tc (MIN.) = 14.31
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 14.31

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.384

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	0.100	-
USER-DEFINED	-	3.10	0.50	0.850	-
USER-DEFINED	-	2.60	0.50	0.850	-
USER-DEFINED	-	4.80	0.50	0.200	-
USER-DEFINED	-	3.40	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 17.04
EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.39
TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 43.07

FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 614.00 DOWNSTREAM (FEET) = 571.00
FLOW LENGTH (FEET) = 1805.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.0 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 12.98
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 43.07
PIPE TRAVEL TIME (MIN.) = 2.32 Tc (MIN.) = 16.63
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.63
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.256
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.10 0.50 0.200 -
USER-DEFINED - 5.00 0.50 0.200 -
USER-DEFINED - 0.20 0.50 0.900 -
USER-DEFINED - 1.20 0.50 0.900 -
USER-DEFINED - 13.90 0.50 0.500 -
USER-DEFINED - 18.60 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA (ACRES) = 42.00 SUBAREA RUNOFF (CFS) = 38.87
EFFECTIVE AREA (ACRES) = 82.30 AREA-AVERAGED Fm (INCH/HR) = 0.21
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 82.3 PEAK FLOW RATE (CFS) = 77.30

FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 571.00 DOWNSTREAM (FEET) = 497.00
FLOW LENGTH (FEET) = 1090.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.74
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 77.30
PIPE TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 17.43
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.43
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.100 -
USER-DEFINED - 6.10 0.50 0.100 -
USER-DEFINED - 12.90 0.50 0.100 -
USER-DEFINED - 0.30 0.50 0.200 -

USER-DEFINED - 0.90 0.50 0.900 -
USER-DEFINED - 12.80 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
SUBAREA AREA (ACRES) = 34.00 SUBAREA RUNOFF (CFS) = 31.03
EFFECTIVE AREA (ACRES) = 116.30 AREA-AVERAGED Fm (INCH/HR) = 0.21
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 116.3 PEAK FLOW RATE (CFS) = 106.09

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.43
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.226
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 23.20 0.50 0.900 -
USER-DEFINED - 0.30 0.50 0.500 -
USER-DEFINED - 0.30 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890
SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 16.72
EFFECTIVE AREA (ACRES) = 140.10 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA (ACRES) = 140.1 PEAK FLOW RATE (CFS) = 122.81

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 497.00 DOWNSTREAM (FEET) = 445.00
FLOW LENGTH (FEET) = 1732.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.1 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 18.53
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 122.81
PIPE TRAVEL TIME (MIN.) = 1.56 Tc (MIN.) = 18.98
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.167
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.80 0.50 0.100 -
USER-DEFINED - 4.80 0.50 0.100 -
USER-DEFINED - 0.10 0.50 0.850 -
USER-DEFINED - 6.30 0.50 0.850 -

USER-DEFINED - 5.00 0.50 0.200 -
USER-DEFINED - 43.30 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250
SUBAREA AREA(ACRES) = 64.30 SUBAREA RUNOFF(CFS) = 60.28
EFFECTIVE AREA(ACRES) = 204.40 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 204.4 PEAK FLOW RATE(CFS) = 175.62

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.167
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 38.70 0.50 0.200 -
USER-DEFINED - 2.30 0.50 0.900 -
USER-DEFINED - 3.60 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 40.95
EFFECTIVE AREA(ACRES) = 249.00 AREA-AVERAGED Fm(INCH/HR) = 0.20
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 249.0 PEAK FLOW RATE(CFS) = 216.58

FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 338.00
FLOW LENGTH(FEET) = 2664.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.67
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 216.58
PIPE TRAVEL TIME(MIN.) = 1.88 Tc(MIN.) = 20.86
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.103
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.200 -
USER-DEFINED - 14.80 0.50 0.200 -
USER-DEFINED - 1.90 0.50 0.200 -
USER-DEFINED - 9.90 0.50 0.200 -

USER-DEFINED - 1.80 0.50 0.100 -
USER-DEFINED - 8.40 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
SUBAREA AREA(ACRES) = 37.30 SUBAREA RUNOFF(CFS) = 34.14
EFFECTIVE AREA(ACRES) = 286.30 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
TOTAL AREA(ACRES) = 286.3 PEAK FLOW RATE(CFS) = 236.52

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.103
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.60 0.50 0.100 -
USER-DEFINED - 14.00 0.50 0.100 -
USER-DEFINED - 1.40 0.50 0.850 -
USER-DEFINED - 0.30 0.50 0.850 -
USER-DEFINED - 0.20 0.50 0.200 -
USER-DEFINED - 0.30 0.50 0.200 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 21.96
EFFECTIVE AREA(ACRES) = 310.10 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 310.1 PEAK FLOW RATE(CFS) = 258.48

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 20.86
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.103
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 12.20 0.50 0.200 -
USER-DEFINED - 17.60 0.50 0.200 -
USER-DEFINED - 0.30 0.50 0.900 -
USER-DEFINED - 0.90 0.50 0.900 -
USER-DEFINED - 9.30 0.50 0.900 -
USER-DEFINED - 0.20 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
SUBAREA AREA(ACRES) = 40.50 SUBAREA RUNOFF(CFS) = 33.23
EFFECTIVE AREA(ACRES) = 350.60 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 350.6 PEAK FLOW RATE(CFS) = 291.71

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.86
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.103
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.30	0.50	0.500	-
USER-DEFINED	-	28.30	0.50	0.500	-
USER-DEFINED	-	3.80	0.50	0.400	-
USER-DEFINED	-	4.10	0.50	0.400	-
USER-DEFINED	-	0.30	0.50	0.600	-
USER-DEFINED	-	0.30	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
 SUBAREA AREA(ACRES) = 42.10 SUBAREA RUNOFF(CFS) = 32.65
 EFFECTIVE AREA(ACRES) = 392.70 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 392.7 PEAK FLOW RATE(CFS) = 324.36

FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 338.00 DOWNSTREAM(FEET) = 320.00
 FLOW LENGTH(FEET) = 1154.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.43
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 324.36
 PIPE TRAVEL TIME(MIN.) = 1.04 Tc(MIN.) = 21.90
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 21.90
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.073
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	11.60	0.50	0.100	-
USER-DEFINED	-	6.70	0.50	0.100	-
USER-DEFINED	-	12.80	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.900	-
USER-DEFINED	-	0.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
 SUBAREA AREA(ACRES) = 31.50 SUBAREA RUNOFF(CFS) = 28.86
 EFFECTIVE AREA(ACRES) = 424.20 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 342.60

FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 1981.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 78.0 INCH PIPE IS 61.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 12.13
 ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 342.60
 PIPE TRAVEL TIME(MIN.) = 2.72 Tc(MIN.) = 24.62
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 24.62
 RAINFALL INTENSITY(INCH/HR) = 0.99
 AREA-AVERAGED Fm(INCH/HR) = 0.18
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA(ACRES) = 424.20
 TOTAL STREAM AREA(ACRES) = 424.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 342.60

FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
 ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.943
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL,NARROWLEAF"	-	0.20	0.50	1.000	56	9.20
NATURAL FAIR COVER						
"OPEN BRUSH"	-	1.20	0.50	1.000	56	9.20

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 1.82
 TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 1.82

FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.698

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.06
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.93
AVERAGE FLOW DEPTH(FEET) = 0.45 TRAVEL TIME(MIN.) = 1.84
Tc(MIN.) = 11.04
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 2.48
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 3.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.30
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.361

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.40 0.50 1.000 -
USER-DEFINED - 8.40 0.50 1.000 -
USER-DEFINED - 2.70 0.50 1.000 -
USER-DEFINED - 0.40 0.50 1.000 -
USER-DEFINED - 9.20 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.96
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.19
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 3.51
Tc(MIN.) = 14.55
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 17.59
EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 20.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.08 FLOW VELOCITY(FEET/SEC.) = 5.84
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.60 0.50 1.000 -
USER-DEFINED - 5.50 0.50 1.000 -
USER-DEFINED - 1.80 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 1.00 0.50 1.000 -
USER-DEFINED - 6.80 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.13
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.39
AVERAGE FLOW DEPTH(FEET) = 1.27 TRAVEL TIME(MIN.) = 2.80
Tc(MIN.) = 17.35
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 11.35
EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 28.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.32 FLOW VELOCITY(FEET/SEC.) = 5.51
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.35
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.229
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 2.50 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 1.71
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 30.36

```

*****
FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 701.00 CHANNEL SLOPE = 0.0357
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 6.30 0.50 1.000 -
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 5.90 0.50 1.000 -
USER-DEFINED - 12.70 0.50 1.000 -
USER-DEFINED - 6.80 0.50 1.000 -
USER-DEFINED - 3.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.65
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.68
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 2.06
Tc(MIN.) = 19.40
SUBAREA AREA(ACRES) = 35.10 SUBAREA RUNOFF(CFS) = 20.55
EFFECTIVE AREA(ACRES) = 81.40 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 81.4 PEAK FLOW RATE(CFS) = 47.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.64 FLOW VELOCITY(FEET/SEC.) = 5.93
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

*****
FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 19.40
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.151
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.00 0.50 0.900 -
USER-DEFINED - 2.70 0.50 0.900 -
USER-DEFINED - 0.50 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.914
SUBAREA AREA(ACRES) = 4.30 SUBAREA RUNOFF(CFS) = 2.68
EFFECTIVE AREA(ACRES) = 85.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 85.7 PEAK FLOW RATE(CFS) = 50.34

*****
FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

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-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 573.00 DOWNSTREAM(FEET) = 437.00
FLOW LENGTH(FEET) = 6286.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.15
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 50.34
PIPE TRAVEL TIME(MIN.) = 7.96 Tc(MIN.) = 27.36
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

*****
FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 437.00 DOWNSTREAM(FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1963.00 CHANNEL SLOPE = 0.0469
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.853
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 1.50 0.50 0.100 -
USER-DEFINED - 0.70 0.50 0.100 -
USER-DEFINED - 1.60 0.50 0.100 -
USER-DEFINED - 1.10 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.265
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 52.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.70
AVERAGE FLOW DEPTH(FEET) = 1.61 TRAVEL TIME(MIN.) = 4.88
Tc(MIN.) = 32.25
SUBAREA AREA(ACRES) = 6.00 SUBAREA RUNOFF(CFS) = 3.89
EFFECTIVE AREA(ACRES) = 91.70 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 91.7 PEAK FLOW RATE(CFS) = 50.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.59 FLOW VELOCITY(FEET/SEC.) = 6.64
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

*****
FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 32.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.853
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS

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LAND USE      GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED  -       1.40     0.50      1.000     -
USER-DEFINED  -       2.80     0.50      1.000     -
USER-DEFINED  -       0.10     0.50      1.000     -
USER-DEFINED  -       0.40     0.50      1.000     -
USER-DEFINED  -       0.30     0.50      1.000     -
USER-DEFINED  -       3.40     0.50      1.000     -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 8.40      SUBAREA RUNOFF(CFS) = 2.67
EFFECTIVE AREA(ACRES) = 100.10  AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 100.1      PEAK FLOW RATE(CFS) = 50.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```

MAINLINE Tc(MIN.) = 32.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.853
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       0.80     0.50    1.000   -
USER-DEFINED        -       0.10     0.50    0.850   -
USER-DEFINED        -       3.80     0.50    0.850   -
USER-DEFINED        -       2.50     0.50    0.850   -
USER-DEFINED        -       2.40     0.50    0.900   -
USER-DEFINED        -       0.70     0.50    0.900   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.877
SUBAREA AREA(ACRES) = 10.30      SUBAREA RUNOFF(CFS) = 3.85
EFFECTIVE AREA(ACRES) = 110.40  AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50  AREA-AVERAGED Ap = 0.95
TOTAL AREA(ACRES) = 110.4      PEAK FLOW RATE(CFS) = 50.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 32.25
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 0.853
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL  AREA    Fp      Ap      SCS
LAND USE            GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -       3.50     0.50    0.900   -
USER-DEFINED        -       1.10     0.50    0.900   -
USER-DEFINED        -       0.10     0.50    0.400   -
USER-DEFINED        -       0.20     0.50    1.000   -
USER-DEFINED        -       1.90     0.50    1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.924
SUBAREA AREA(ACRES) = 6.80      SUBAREA RUNOFF(CFS) = 2.40
EFFECTIVE AREA(ACRES) = 117.20  AREA-AVERAGED Fm(INCH/HR) = 0.47

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AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 117.2      PEAK FLOW RATE(CFS) = 50.34
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 345.00 DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 1065.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.24
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 50.34
PIPE TRAVEL TIME(MIN.) = 1.16 Tc(MIN.) = 33.41
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

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*****
FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 33.41
RAINFALL INTENSITY(INCH/HR) = 0.84
AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 117.20
TOTAL STREAM AREA(ACRES) = 117.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 50.34

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** CONFLUENCE DATA **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	176.12	19.94	1.130	0.50(0.19)	0.37	203.4	310.00
1	163.11	24.27	1.005	0.50(0.18)	0.37	217.1	300.00
2	342.60	24.62	0.995	0.50(0.18)	0.35	424.2	320.00
3	50.34	33.41	0.839	0.50(0.47)	0.94	117.2	390.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

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** PEAK FLOW RATE TABLE **

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STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	549.77	19.94	1.130	0.50(0.21)	0.43	616.7	310.00
2	555.33	24.27	1.005	0.50(0.21)	0.43	720.2	300.00
3	554.01	24.62	0.995	0.50(0.21)	0.43	727.7	320.00
4	457.63	33.41	0.839	0.50(0.22)	0.45	758.5	390.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 555.33 Tc(MIN.) = 24.27
EFFECTIVE AREA(ACRES) = 720.25 AREA-AVERAGED Fm(INCH/HR) = 0.21

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AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA (ACRES) = 758.5
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00

FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 39.03

ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 555.33

PIPE TRAVEL TIME(MIN.) = 0.16 Tc(MIN.) = 24.43

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 24.43

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.001

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	17.50	0.50	0.200	-
USER-DEFINED	-	1.50	0.50	0.200	-
USER-DEFINED	-	0.70	0.50	0.200	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	44.60	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132

SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 54.76

EFFECTIVE AREA(ACRES) = 785.35 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 564.90

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	568.41	20.10	1.125	0.50(0.20)	0.40	681.8	310.00
2	564.90	24.43	1.001	0.50(0.20)	0.40	785.3	300.00
3	562.72	24.78	0.990	0.50(0.20)	0.40	792.8	320.00
4	463.19	33.58	0.837	0.50(0.21)	0.42	823.6	390.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 568.41 Tc(MIN.) = 20.10

AREA-AVERAGED Fm(INCH/HR) = 0.20 AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.40 EFFECTIVE AREA(ACRES) = 681.85

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 20.10

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.125

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.50	0.100	-
USER-DEFINED	-	4.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115

SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 5.96

EFFECTIVE AREA(ACRES) = 688.05 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 574.37

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<

FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00

ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.516

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "8-10 DWELLINGS/ACRE"	-	1.20	0.50	0.400	56	6.05

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 2.50
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.50

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>(STREET TABLE SECTION # 1 USED)<<<<

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00

STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0

STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00

INSIDE STREET CROSSFALL (DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL (DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.14

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.42

HALFSTREET FLOOD WIDTH (FEET) = 14.34

AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.25

PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 0.94

STREET FLOW TRAVEL TIME (MIN.) = 2.03 Tc (MIN.) = 8.07

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.147

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.50	0.600	-
USER-DEFINED	-	4.40	0.50	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.486

SUBAREA AREA (ACRES) = 7.70 SUBAREA RUNOFF (CFS) = 13.20

EFFECTIVE AREA (ACRES) = 8.90 AREA-AVERAGED Fm (INCH/HR) = 0.24

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47

TOTAL AREA (ACRES) = 8.9 PEAK FLOW RATE (CFS) = 15.30

END OF SUBAREA STREET FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.77

FLOW VELOCITY (FEET/SEC.) = 2.54 DEPTH*VELOCITY (FT*FT/SEC.) = 1.22

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 588.00 FEET.

FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 588.00 DOWNSTREAM (FEET) = 581.00

FLOW LENGTH (FEET) = 805.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.02

ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 15.30

PIPE TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 9.99

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 9.99

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.800

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	2.00	0.50	0.900	-
USER-DEFINED	-	8.80	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.400	-
USER-DEFINED	-	4.90	0.50	0.400	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.577

SUBAREA AREA (ACRES) = 15.90 SUBAREA RUNOFF (CFS) = 21.62

EFFECTIVE AREA (ACRES) = 24.80 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.54

TOTAL AREA (ACRES) = 24.8 PEAK FLOW RATE (CFS) = 34.13

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION (MIN.) = 9.99

RAINFALL INTENSITY (INCH/HR) = 1.80

AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.54

EFFECTIVE STREAM AREA (ACRES) = 24.80

TOTAL STREAM AREA (ACRES) = 24.80

PEAK FLOW RATE (CFS) AT CONFLUENCE = 34.13

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 329.00

ELEVATION DATA: UPSTREAM (FEET) = 725.00 DOWNSTREAM (FEET) = 630.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.196

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.943

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, NARROW LEAF"	-	0.10	0.50	1.000	56	9.20
NATURAL FAIR COVER "OPEN BRUSH"	-	1.30	0.50	1.000	56	9.20
NATURAL FAIR COVER "OPEN BRUSH"	-	0.10	0.50	1.000	56	9.20

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.95

TOTAL AREA (ACRES) = 1.50 PEAK FLOW RATE (CFS) = 1.95

FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.833

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 1.70 0.50 1.000 -
USER-DEFINED - 0.10 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 3.09

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.37

AVERAGE FLOW DEPTH(FEET) = 0.44 TRAVEL TIME(MIN.) = 0.61

Tc(MIN.) = 9.80

SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 2.28

EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 4.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.49 FLOW VELOCITY(FEET/SEC.) = 5.77

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 582.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0288
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.573

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.70 0.50 1.000 -
USER-DEFINED - 1.20 0.50 0.900 -
USER-DEFINED - 1.20 0.50 0.600 -
USER-DEFINED - 0.30 0.50 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.32

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.43

AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 2.53

Tc(MIN.) = 12.33

SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 6.45

EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.47

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94

TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 9.74

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.94 FLOW VELOCITY(FEET/SEC.) = 3.66

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 582.00 DOWNSTREAM(FEET) = 581.00

FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.9 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.71

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.74

PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 12.34

LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 12.34

RAINFALL INTENSITY(INCH/HR) = 1.57

AREA-AVERAGED Fm(INCH/HR) = 0.47

AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 0.94

EFFECTIVE STREAM AREA(ACRES) = 9.80

TOTAL STREAM AREA(ACRES) = 9.80

PEAK FLOW RATE(CFS) AT CONFLUENCE = 9.74

** CONFLUENCE DATA **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 34.13 9.99 1.800 0.50(0.27) 0.54 24.8 400.00
2 9.74 12.34 1.572 0.50(0.47) 0.94 9.8 430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 43.63 9.99 1.800 0.50(0.32) 0.64 32.7 400.00
2 38.80 12.34 1.572 0.50(0.33) 0.65 34.6 430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 43.63 Tc(MIN.) = 9.99

EFFECTIVE AREA(ACRES) = 32.73 AREA-AVERAGED Fm(INCH/HR) = 0.32

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.64

TOTAL AREA (ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	581.00	DOWNSTREAM (FEET) =	570.00
FLOW LENGTH (FEET) =	1056.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	33.0 INCH PIPE IS	23.4 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	9.68		
ESTIMATED PIPE DIAMETER (INCH) =	33.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	43.63		
PIPE TRAVEL TIME (MIN.) =	1.82	Tc (MIN.) =	11.80
LONGEST FLOWPATH FROM NODE	400.00 TO NODE	404.00 =	2449.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	11.80				
* 5 YEAR RAINFALL INTENSITY (INCH/HR) =	1.624				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	4.90	0.50	0.900	-
USER-DEFINED	-	1.50	0.50	0.900	-
USER-DEFINED	-	1.00	0.50	0.600	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) =		0.50			
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =		0.842			
SUBAREA AREA (ACRES) =	7.70	SUBAREA RUNOFF (CFS) =	8.34		
EFFECTIVE AREA (ACRES) =	40.43	AREA-AVERAGED Fm (INCH/HR) =	0.34		
AREA-AVERAGED Fp (INCH/HR) =	0.50	AREA-AVERAGED Ap =	0.68		
TOTAL AREA (ACRES) =	42.3	PEAK FLOW RATE (CFS) =	46.80		

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	11.80				
* 5 YEAR RAINFALL INTENSITY (INCH/HR) =	1.624				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	8.80	0.50	0.500	-
USER-DEFINED	-	4.20	0.50	0.500	-
USER-DEFINED	-	1.10	0.50	0.400	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) =		0.50			
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =		0.492			
SUBAREA AREA (ACRES) =	14.10	SUBAREA RUNOFF (CFS) =	17.49		
EFFECTIVE AREA (ACRES) =	54.53	AREA-AVERAGED Fm (INCH/HR) =	0.31		

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.63
TOTAL AREA (ACRES) = 56.4 PEAK FLOW RATE (CFS) = 64.28

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) =	570.00	DOWNSTREAM (FEET) =	565.00
FLOW LENGTH (FEET) =	1526.00	MANNING'S N =	0.013
DEPTH OF FLOW IN	45.0 INCH PIPE IS	36.1 INCHES	
PIPE-FLOW VELOCITY (FEET/SEC.) =	6.78		
ESTIMATED PIPE DIAMETER (INCH) =	45.00	NUMBER OF PIPES =	1
PIPE-FLOW (CFS) =	64.28		
PIPE TRAVEL TIME (MIN.) =	3.75	Tc (MIN.) =	15.56
LONGEST FLOWPATH FROM NODE	400.00 TO NODE	405.00 =	3975.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	15.56				
* 5 YEAR RAINFALL INTENSITY (INCH/HR) =	1.297				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	1.80	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	0.850	-
USER-DEFINED	-	1.80	0.50	0.900	-
USER-DEFINED	-	2.80	0.50	0.900	-
USER-DEFINED	-	6.10	0.50	0.500	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) =		0.50			
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =		0.698			
SUBAREA AREA (ACRES) =	13.00	SUBAREA RUNOFF (CFS) =	11.09		
EFFECTIVE AREA (ACRES) =	67.53	AREA-AVERAGED Fm (INCH/HR) =	0.32		
AREA-AVERAGED Fp (INCH/HR) =	0.50	AREA-AVERAGED Ap =	0.64		
TOTAL AREA (ACRES) =	69.4	PEAK FLOW RATE (CFS) =	64.28		
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE					

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) =	15.56				
* 5 YEAR RAINFALL INTENSITY (INCH/HR) =	1.297				
SUBAREA LOSS RATE DATA (AMC II):					
DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	11.20	0.50	0.500	-
USER-DEFINED	-	7.80	0.50	0.400	-
USER-DEFINED	-	1.40	0.50	0.400	-
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) =		0.50			
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap =		0.455			
SUBAREA AREA (ACRES) =	20.40	SUBAREA RUNOFF (CFS) =	19.63		

EFFECTIVE AREA(ACRES) = 87.93 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 89.8 PEAK FLOW RATE(CFS) = 78.94

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 495.00
FLOW LENGTH(FEET) = 2168.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.11
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 78.94
PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 17.67
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.217

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.50	0.50	0.100	-
USER-DEFINED	-	1.90	0.50	0.100	-
USER-DEFINED	-	2.50	0.50	0.850	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	36.40	0.50	0.200	-
USER-DEFINED	-	13.60	0.50	0.200	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA(ACRES) = 60.80 SUBAREA RUNOFF(CFS) = 60.44
EFFECTIVE AREA(ACRES) = 148.73 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 150.6 PEAK FLOW RATE(CFS) = 133.03

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.217

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.70	0.50	0.900	-
USER-DEFINED	-	2.10	0.50	0.900	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.30	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.10	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 5.21
EFFECTIVE AREA(ACRES) = 156.13 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 158.0 PEAK FLOW RATE(CFS) = 138.24

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.217
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.30	0.50	0.400	-
USER-DEFINED	-	0.90	0.50	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 9.33
EFFECTIVE AREA(ACRES) = 166.33 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 168.2 PEAK FLOW RATE(CFS) = 147.57

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.59
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 147.57
PIPE TRAVEL TIME(MIN.) = 2.35 Tc(MIN.) = 20.02
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	0.200	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	9.10	0.50	0.100	-
USER-DEFINED	-	6.70	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.850	-
USER-DEFINED	-	2.60	0.50	0.850	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.219
SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 18.14
EFFECTIVE AREA(ACRES) = 186.13 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 188.0 PEAK FLOW RATE(CFS) = 152.37

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 0.200 -
USER-DEFINED - 2.40 0.50 0.200 -
USER-DEFINED - 10.60 0.50 0.200 -
USER-DEFINED - 0.60 0.50 0.200 -
USER-DEFINED - 1.90 0.50 0.900 -
USER-DEFINED - 0.70 0.50 0.900 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308
SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 14.72
EFFECTIVE AREA(ACRES) = 202.93 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 204.8 PEAK FLOW RATE(CFS) = 167.08

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.02
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 14.30 0.50 0.600 -
USER-DEFINED - 15.30 0.50 0.600 -
USER-DEFINED - 0.40 0.50 0.500 -
USER-DEFINED - 1.50 0.50 0.500 -
USER-DEFINED - 5.10 0.50 0.500 -
USER-DEFINED - 0.90 0.50 0.500 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.579
SUBAREA AREA(ACRES) = 37.50 SUBAREA RUNOFF(CFS) = 28.28
EFFECTIVE AREA(ACRES) = 240.43 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 242.3 PEAK FLOW RATE(CFS) = 195.36

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 20.02

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.127
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.50 0.50 0.400 -
USER-DEFINED - 8.40 0.50 0.400 -
USER-DEFINED - 2.80 0.50 0.400 -
USER-DEFINED - 0.60 0.50 0.600 -
USER-DEFINED - 1.50 0.50 0.600 -
USER-DEFINED - 3.50 0.50 0.600 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA(ACRES) = 20.30 SUBAREA RUNOFF(CFS) = 16.44
EFFECTIVE AREA(ACRES) = 260.73 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 262.6 PEAK FLOW RATE(CFS) = 211.80

FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 661.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.09
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 211.80
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 20.52
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 495.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.368
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.458
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc

LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE" - 0.50 0.50 0.900 56 7.53
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" - 0.20 0.50 0.600 56 6.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814
 SUBAREA RUNOFF (CFS) = 1.29
 TOTAL AREA (ACRES) = 0.70 PEAK FLOW RATE (CFS) = 1.29

 FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 490.00
 FLOW LENGTH (FEET) = 267.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 4.86
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 1.29
 PIPE TRAVEL TIME (MIN.) = 0.91 Tc (MIN.) = 7.28
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

 FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc (MIN.) = 7.28
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.292
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.900	-
USER-DEFINED	-	0.30	0.50	0.900	-
USER-DEFINED	-	0.10	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.788
 SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 2.90
 EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
 TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 4.09

 FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 490.00 DOWNSTREAM (FEET) = 480.00
 FLOW LENGTH (FEET) = 520.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 6.81
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 4.09
 PIPE TRAVEL TIME (MIN.) = 1.27 Tc (MIN.) = 8.56
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

 FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.56
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.060
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.50	0.900	-
USER-DEFINED	-	0.40	0.50	0.900	-
USER-DEFINED	-	0.40	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
 SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF (CFS) = 4.62
 EFFECTIVE AREA (ACRES) = 5.50 AREA-AVERAGED Fm (INCH/HR) = 0.40
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.80
 TOTAL AREA (ACRES) = 5.5 PEAK FLOW RATE (CFS) = 8.21

 FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 480.00 DOWNSTREAM (FEET) = 470.00
 FLOW LENGTH (FEET) = 310.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 9.91
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 8.21
 PIPE TRAVEL TIME (MIN.) = 0.52 Tc (MIN.) = 9.08
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 9.08
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.965
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.50	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.80	0.50	0.900	-
USER-DEFINED	-	1.00	0.50	0.900	-
USER-DEFINED	-	0.20	0.50	0.500	-

USER-DEFINED - 0.10 0.50 0.500 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
 SUBAREA AREA (ACRES) = 5.70 SUBAREA RUNOFF (CFS) = 8.40
 EFFECTIVE AREA (ACRES) = 11.20 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73
 TOTAL AREA (ACRES) = 11.2 PEAK FLOW RATE (CFS) = 16.14

 FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.08
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.965
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.200	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA AREA (ACRES) = 0.10 SUBAREA RUNOFF (CFS) = 0.17
 EFFECTIVE AREA (ACRES) = 11.30 AREA-AVERAGED Fm (INCH/HR) = 0.36
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.72
 TOTAL AREA (ACRES) = 11.3 PEAK FLOW RATE (CFS) = 16.31

 FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 445.00
 FLOW LENGTH (FEET) = 528.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.47
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 16.31
 PIPE TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 9.73
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.

 FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 9.73
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.846
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.90	0.50	0.100	-
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	6.30	0.50	0.500	-
USER-DEFINED	-	3.70	0.50	0.500	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 16.79

EFFECTIVE AREA (ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.29
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE (CFS) = 31.89

 FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.31
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 31.89
 PIPE TRAVEL TIME (MIN.) = 0.71 Tc (MIN.) = 10.44
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.44
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.755
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.60	0.50	0.200	-
USER-DEFINED	-	10.90	0.50	0.200	-
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	1.30	0.50	0.100	-
USER-DEFINED	-	1.10	0.50	0.200	-
USER-DEFINED	-	7.00	0.50	0.200	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA (ACRES) = 23.20 SUBAREA RUNOFF (CFS) = 34.67
 EFFECTIVE AREA (ACRES) = 46.00 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 46.0 PEAK FLOW RATE (CFS) = 64.69

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.44
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.755
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.40	0.50	0.600	-
USER-DEFINED	-	4.90	0.50	0.500	-
USER-DEFINED	-	9.30	0.50	0.500	-
USER-DEFINED	-	0.30	0.50	0.400	-
USER-DEFINED	-	0.10	0.50	0.400	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 15.00 SUBAREA RUNOFF (CFS) = 20.32
 EFFECTIVE AREA (ACRES) = 61.00 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.41
 TOTAL AREA (ACRES) = 61.0 PEAK FLOW RATE (CFS) = 85.01

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 10.44
 RAINFALL INTENSITY (INCH/HR) = 1.76
 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA (ACRES) = 61.00
 TOTAL STREAM AREA (ACRES) = 61.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 85.01

 FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.458
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	-	0.70	0.50	0.900	56	7.53
RESIDENTIAL "3-4 DWELLINGS/ACRE"	-	0.20	0.50	0.600	56	6.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
 SUBAREA RUNOFF (CFS) = 1.65
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.65

 FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 487.00
 FLOW LENGTH (FEET) = 308.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 5.86
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 1.65
 PIPE TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 7.24
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

 FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 7.24
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.299
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.900	-
USER-DEFINED	-	0.50	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 3.06
 EFFECTIVE AREA (ACRES) = 2.70 AREA-AVERAGED Fm (INCH/HR) = 0.41
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.82
 TOTAL AREA (ACRES) = 2.7 PEAK FLOW RATE (CFS) = 4.59

 FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 487.00 DOWNSTREAM (FEET) = 478.00
 FLOW LENGTH (FEET) = 373.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 7.63
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 4.59
 PIPE TRAVEL TIME (MIN.) = 0.81 Tc (MIN.) = 8.06
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

 FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.06
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.150
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	0.900	-
USER-DEFINED	-	1.20	0.50	0.900	-
USER-DEFINED	-	0.20	0.50	0.900	-
USER-DEFINED	-	0.40	0.50	0.600	-
USER-DEFINED	-	1.70	0.50	0.600	-
USER-DEFINED	-	0.10	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750
 SUBAREA AREA (ACRES) = 4.40 SUBAREA RUNOFF (CFS) = 7.03

EFFECTIVE AREA(ACRES) = 7.10 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 11.26

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	478.00	DOWNSTREAM(FEET) =	454.00
FLOW LENGTH(FEET) =	995.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS	11.4 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	9.55		
ESTIMATED PIPE DIAMETER(INCH) =	18.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	11.26		
PIPE TRAVEL TIME(MIN.) =	1.74	Tc(MIN.) =	9.80
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 =	2004.00 FEET.		

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 9.80
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.80	0.50	0.200	-
USER-DEFINED	-	0.40	0.50	0.200	-
USER-DEFINED	-	0.90	0.50	0.850	-
USER-DEFINED	-	0.40	0.50	0.850	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	0.70	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 4.52
EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.36
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 13.75

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 9.80
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.834
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.30	0.50	0.600	-
USER-DEFINED	-	2.10	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 7.46
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.34

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.69
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 21.21

FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) =	454.00	DOWNSTREAM(FEET) =	415.00
FLOW LENGTH(FEET) =	1555.00	MANNING'S N =	0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS	15.4 INCHES		
PIPE-FLOW VELOCITY(FEET/SEC.) =	11.19		
ESTIMATED PIPE DIAMETER(INCH) =	21.00	NUMBER OF PIPES =	1
PIPE-FLOW(CFS) =	21.21		
PIPE TRAVEL TIME(MIN.) =	2.32	Tc(MIN.) =	12.11
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 =	3559.00 FEET.		

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.11
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.595
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.70	0.50	0.200	-
USER-DEFINED	-	6.80	0.50	0.200	-
USER-DEFINED	-	0.70	0.50	0.200	-
USER-DEFINED	-	2.60	0.50	0.200	-
USER-DEFINED	-	2.20	0.50	0.600	-
USER-DEFINED	-	9.90	0.50	0.600	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 32.66
EFFECTIVE AREA(ACRES) = 41.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 50.46

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.11
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.595
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.30	0.50	0.500	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 1.57
EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.50
TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 52.04

```

*****
FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
-----
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.11
RAINFALL INTENSITY(INCH/HR) = 1.59
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.50
EFFECTIVE STREAM AREA(ACRES) = 43.00
TOTAL STREAM AREA(ACRES) = 43.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 52.04

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 85.01 10.44 1.755 0.50( 0.21) 0.41 61.0 410.00
2 52.04 12.11 1.595 0.50( 0.25) 0.50 43.0 420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 135.20 10.44 1.755 0.50( 0.22) 0.45 98.1 410.00
2 128.24 12.11 1.595 0.50( 0.22) 0.45 104.0 420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 135.20 Tc(MIN.) = 10.44
EFFECTIVE AREA(ACRES) = 98.06 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 104.0
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

*****
FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.89
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 135.20
PIPE TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 11.57
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

*****
FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.646
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 1.70 0.50 0.100 -
USER-DEFINED - 2.90 0.50 0.100 -
USER-DEFINED - 3.60 0.50 0.850 -
USER-DEFINED - 4.50 0.50 0.200 -
USER-DEFINED - 4.50 0.50 0.200 -
USER-DEFINED - 0.10 0.50 0.900 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 23.19
EFFECTIVE AREA(ACRES) = 115.36 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 121.3 PEAK FLOW RATE(CFS) = 148.78

*****
FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.646
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.80 0.50 0.400 -
USER-DEFINED - 0.20 0.50 0.400 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 1.30
EFFECTIVE AREA(ACRES) = 116.36 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 150.08

*****
FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 36.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.87
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 150.08
PIPE TRAVEL TIME(MIN.) = 1.76 Tc(MIN.) = 13.34
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

*****
FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

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=====
MAINLINE Tc(MIN.) = 13.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.50   0.100  -
USER-DEFINED        -         0.20   0.50   0.100  -
USER-DEFINED        -         0.40   0.50   0.100  -
USER-DEFINED        -         5.70   0.50   0.850  -
USER-DEFINED        -         4.50   0.50   0.850  -
USER-DEFINED        -         9.40   0.50   0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 20.90   SUBAREA RUNOFF(CFS) = 20.23
EFFECTIVE AREA(ACRES) = 137.26   AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 143.2   PEAK FLOW RATE(CFS) = 152.63

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*****
FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN.) = 13.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.477
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         0.70   0.50   0.850  -
USER-DEFINED        -         8.90   0.50   0.850  -
USER-DEFINED        -         1.20   0.50   0.850  -
USER-DEFINED        -         3.70   0.50   0.850  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 14.50   SUBAREA RUNOFF(CFS) = 13.73
EFFECTIVE AREA(ACRES) = 151.76   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 157.7   PEAK FLOW RATE(CFS) = 166.36

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*****
FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11
-----
>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<
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** MAIN STREAM CONFLUENCE DATA **
STREAM   Q   Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      166.36 13.34 1.477 0.50(0.26) 0.52 151.8 410.00
2      149.95 15.07 1.315 0.50(0.26) 0.52 157.7 420.00
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

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** MEMORY BANK # 2 CONFLUENCE DATA **
STREAM   Q   Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      211.80 20.52 1.113 0.50(0.22) 0.45 260.7 400.00
2      194.26 23.26 1.034 0.50(0.23) 0.45 262.6 430.00

```

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

```

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc   Intensity   Fp(Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      360.49 13.34 1.477 0.50(0.24) 0.48 321.2 410.00
2      340.93 15.07 1.315 0.50(0.24) 0.48 349.2 420.00
3      333.04 20.52 1.113 0.50(0.24) 0.48 418.4 400.00
4      304.28 23.26 1.034 0.50(0.24) 0.48 420.3 430.00
TOTAL AREA(ACRES) = 420.3

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COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 360.49 Tc(MIN.) = 13.337
EFFECTIVE AREA(ACRES) = 321.24 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 420.3
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

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*****
FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----

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ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00
FLOW LENGTH(FEET) = 1358.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.63
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 360.49
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 14.10
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

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*****
FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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=====
MAINLINE Tc(MIN.) = 14.10
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.404
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -         7.40   0.50   0.200  -
USER-DEFINED        -        15.00   0.50   0.200  -
USER-DEFINED        -         5.80   0.50   0.200  -
USER-DEFINED        -         2.50   0.50   0.200  -
USER-DEFINED        -         9.10   0.50   0.100  -
USER-DEFINED        -         1.50   0.50   0.100  -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
SUBAREA AREA(ACRES) = 41.30   SUBAREA RUNOFF(CFS) = 48.95
EFFECTIVE AREA(ACRES) = 362.54   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50   AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 461.6   PEAK FLOW RATE(CFS) = 385.20

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*****
FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

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=====
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 14.10
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.404
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.100 -
USER-DEFINED - 0.40 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.10
EFFECTIVE AREA(ACRES) = 363.44 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 462.5 PEAK FLOW RATE(CFS) = 386.29

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11
=====

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	386.29	14.10	1.404	0.50(0.22)	0.45	363.4	410.00
2	374.30	15.84	1.286	0.50(0.22)	0.45	391.4	420.00
3	359.48	21.29	1.091	0.50(0.22)	0.45	460.6	400.00
4	327.32	24.06	1.011	0.50(0.22)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	574.37	20.10	1.125	0.50(0.20)	0.40	688.0	310.00
2	570.16	24.43	1.001	0.50(0.20)	0.40	791.5	300.00
3	567.92	24.78	0.990	0.50(0.20)	0.40	799.0	320.00
4	467.54	33.58	0.837	0.50(0.21)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	910.51	14.10	1.404	0.50(0.21)	0.42	846.2	410.00
2	905.48	15.84	1.286	0.50(0.21)	0.42	933.6	420.00
3	937.09	20.10	1.125	0.50(0.21)	0.42	1133.5	310.00
4	932.69	21.29	1.091	0.50(0.21)	0.42	1177.1	400.00
5	897.84	24.06	1.011	0.50(0.21)	0.42	1245.2	430.00
6	893.06	24.43	1.001	0.50(0.21)	0.42	1254.0	300.00
7	886.52	24.78	0.990	0.50(0.21)	0.42	1261.5	320.00
8	722.18	33.58	0.837	0.50(0.22)	0.43	1292.3	390.00

TOTAL AREA(ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 937.09 Tc(MIN.) = 20.095
EFFECTIVE AREA(ACRES) = 1133.54 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 1292.3
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 1292.3 TC(MIN.) = 20.10
EFFECTIVE AREA(ACRES) = 1133.54 AREA-AVERAGED Fm(INCH/HR)= 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.416
PEAK FLOW RATE(CFS) = 937.09

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	910.51	14.10	1.404	0.50(0.21)	0.42	846.2	410.00
2	905.48	15.84	1.286	0.50(0.21)	0.42	933.6	420.00
3	937.09	20.10	1.125	0.50(0.21)	0.42	1133.5	310.00
4	932.69	21.29	1.091	0.50(0.21)	0.42	1177.1	400.00
5	897.84	24.06	1.011	0.50(0.21)	0.42	1245.2	430.00
6	893.06	24.43	1.001	0.50(0.21)	0.42	1254.0	300.00
7	886.52	24.78	0.990	0.50(0.21)	0.42	1261.5	320.00
8	722.18	33.58	0.837	0.50(0.22)	0.43	1292.3	390.00

=====
END OF RATIONAL METHOD ANALYSIS
=====

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 10-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C10EVRL.DAT
TIME/DATE OF STUDY: 05:53 05/09/2023

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90

USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.867
- 2) 10.00; 2.568
- 3) 15.00; 1.883
- 4) 20.00; 1.612
- 5) 25.00; 1.405
- 6) 30.00; 1.260
- 7) 40.00; 1.079
- 8) 50.00; 0.961
- 9) 60.00; 0.873
- 10) 90.00; 0.726
- 11) 120.00; 0.643
- 12) 180.00; 0.540
- 13) 360.00; 0.400
- 14) 1200.00; 0.176

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: MANNING			
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	1.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 4.20
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 4.20

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.71
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 13.63
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.35
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 3.33 Tc(MIN.) = 11.77
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.325
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 4.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 8.97
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 12.24

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44 HALFSTREET FLOOD WIDTH(FEET) = 15.66
FLOW VELOCITY(FEET/SEC.) = 2.57 DEPTH*VELOCITY(FT*FT/SEC.) = 1.13
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 637.00 DOWNSTREAM(FEET) = 634.00
FLOW LENGTH(FEET) = 563.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.51
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.24
PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 13.47
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 13.47
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.092
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 14.63
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 25.61

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 630.00
FLOW LENGTH(FEET) = 1072.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.78
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 25.61
PIPE TRAVEL TIME(MIN.) = 3.09 Tc(MIN.) = 16.57
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 16.57
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.798
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.90 0.30 0.100 56
COMMERCIAL B 4.50 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
SUBAREA AREA(ACRES) = 16.10 SUBAREA RUNOFF(CFS) = 25.34
EFFECTIVE AREA(ACRES) = 30.10 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 30.1 PEAK FLOW RATE(CFS) = 47.24

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 16.57
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.798
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
SCHOOL B 5.70 0.30 0.600 56
SCHOOL B 6.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 12.40 SUBAREA RUNOFF(CFS) = 18.06
EFFECTIVE AREA(ACRES) = 42.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 42.5 PEAK FLOW RATE(CFS) = 65.30

FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 1290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.46
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.30
PIPE TRAVEL TIME(MIN.) = 1.73 Tc(MIN.) = 18.29
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.29
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.705
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 56
COMMERCIAL B 0.90 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
SCHOOL B 0.10 0.30 0.600 56
SCHOOL B 0.50 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 4.72
EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 66.45

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<

>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.671
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.70 0.30 0.100 56 18.91
COMMERCIAL B 4.40 0.30 0.100 56 18.91
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56 20.15
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 20.15
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 7.10 0.30 0.600 56 25.63
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 2.80 0.30 0.600 56 25.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 25.05

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) = 18.29
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.705
SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 25.59
EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 92.04

FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.87
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 92.04
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 19.52
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.52
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.638
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.30 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 5.75
EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 93.98

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 19.52
RAINFALL INTENSITY(INCH/HR) = 1.64
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 67.60
TOTAL STREAM AREA(ACRES) = 67.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 93.98

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.474
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.224
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.10 0.30 0.100 56 7.47
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56 7.97
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56 7.97
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA RUNOFF(CFS) = 3.99
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.99

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 623.00
STREET LENGTH(FEET) = 300.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018
SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.34
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.40
HALFSTREET FLOOD WIDTH(FEET) = 13.32

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.06
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.83
STREET FLOW TRAVEL TIME(MIN.) = 2.42 Tc(MIN.) = 9.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.595
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.50 0.30 0.100 56
COMMERCIAL B 0.20 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 6.66
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 9.86

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43 HALFSTREET FLOOD WIDTH(FEET) = 15.12
FLOW VELOCITY(FEET/SEC.) = 2.21 DEPTH*VELOCITY(FT*FT/SEC.) = 0.95
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 620.00
FLOW LENGTH(FEET) = 369.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.14
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 9.86
PIPE TRAVEL TIME(MIN.) = 1.00 Tc(MIN.) = 10.90
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 10.90
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.90 0.30 0.100 56
COMMERCIAL B 2.50 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.80 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.125

SUBAREA AREA (ACRES) = 5.90 SUBAREA RUNOFF (CFS) = 12.78
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 22.06

FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 615.00
FLOW LENGTH (FEET) = 338.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.32
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 22.06
PIPE TRAVEL TIME (MIN.) = 0.60 Tc (MIN.) = 11.50
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.50
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.362
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.208
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 26.29
EFFECTIVE AREA (ACRES) = 22.90 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 22.9 PEAK FLOW RATE (CFS) = 47.59

FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 600.00
FLOW LENGTH (FEET) = 578.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.05
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 47.59
PIPE TRAVEL TIME (MIN.) = 0.69 Tc (MIN.) = 12.19
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 12.19
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.268
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.70	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	3.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.70	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 17.80 SUBAREA RUNOFF (CFS) = 34.67
EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 80.33

FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 569.00
FLOW LENGTH (FEET) = 2176.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.67
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 80.33
PIPE TRAVEL TIME (MIN.) = 2.86 Tc (MIN.) = 15.05
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 15.05
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.880
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 6.80 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 19.10 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 41.42
 EFFECTIVE AREA (ACRES) = 67.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 67.3 PEAK FLOW RATE (CFS) = 107.54

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.06
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 107.54
 PIPE TRAVEL TIME(MIN.) = 0.60 Tc(MIN.) = 15.65
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.65
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.848
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	7.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.505
 SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 26.72
 EFFECTIVE AREA (ACRES) = 84.80 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 84.8 PEAK FLOW RATE (CFS) = 132.29

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 15.65
 RAINFALL INTENSITY(INCH/HR) = 1.85
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.38
 EFFECTIVE STREAM AREA (ACRES) = 84.80
 TOTAL STREAM AREA (ACRES) = 84.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 132.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	93.98	19.52	1.638	0.30(0.09)	0.31	67.6	300.00
2	132.29	15.65	1.848	0.30(0.11)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	217.86	15.65	1.848	0.30(0.11)	0.35	139.0	310.00
2	210.26	19.52	1.638	0.30(0.11)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 217.86 Tc(MIN.) = 15.65
 EFFECTIVE AREA (ACRES) = 139.00 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 152.4
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00
 FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 24.27
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 217.86
 PIPE TRAVEL TIME(MIN.) = 2.61 Tc(MIN.) = 18.26
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 18.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56

COMMERCIAL B 4.80 0.30 0.100 56
 COMMERCIAL B 5.00 0.30 0.100 56
 COMMERCIAL B 3.70 0.30 0.100 56
 PUBLIC PARK B 5.00 0.30 0.850 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.288
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 29.16
 EFFECTIVE AREA(ACRES) = 159.00 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 229.34

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.70	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.50	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 31.48
 EFFECTIVE AREA(ACRES) = 180.90 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 194.3 PEAK FLOW RATE(CFS) = 260.82

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.26
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.706
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.40	0.30	0.500	56
SCHOOL	B	2.20	0.30	0.600	56
SCHOOL	B	6.80	0.30	0.600	56
SCHOOL	B	7.90	0.30	0.600	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA(ACRES) = 22.80 SUBAREA RUNOFF(CFS) = 31.48
 EFFECTIVE AREA(ACRES) = 203.70 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 217.1 PEAK FLOW RATE(CFS) = 292.30

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.42
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 292.30
 PIPE TRAVEL TIME(MIN.) = 0.44 Tc(MIN.) = 18.69
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.69
 RAINFALL INTENSITY(INCH/HR) = 1.68
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 203.70
 TOTAL STREAM AREA(ACRES) = 217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 292.30

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
 ELEVATION DATA: UPSTREAM(FEET) = 636.00 DOWNSTREAM(FEET) = 633.00

 $Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.974
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56	8.44

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 7.34
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 7.34

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*****
FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 633.00 DOWNSTREAM ELEVATION(FEET) = 628.00
STREET LENGTH(FEET) = 360.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.44
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.59
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.27
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.44
STREET FLOW TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.27
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.530
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 6.30 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 16.16
EFFECTIVE AREA(ACRES) = 10.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 22.38

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.49 HALFSTREET FLOOD WIDTH(FEET) = 18.16
FLOW VELOCITY(FEET/SEC.) = 3.56 DEPTH*VELOCITY(FT*FT/SEC.) = 1.74
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 628.00 DOWNSTREAM(FEET) = 624.00
FLOW LENGTH(FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.1 INCHES

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PIPE-FLOW VELOCITY(FEET/SEC.) = 6.41
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 22.38
PIPE TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 12.22
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.22
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.263
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 2.00 0.30 0.850 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.90 0.30 0.200 56
SCHOOL B 3.10 0.30 0.600 56
SCHOOL B 0.30 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 26.68
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 46.63

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.22
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.263
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.10 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.20
EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 46.83

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 624.00 DOWNSTREAM(FEET) = 614.00
FLOW LENGTH(FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.0 INCHES

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PIPE-FLOW VELOCITY (FEET/SEC.) = 10.12
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 46.83
 PIPE TRAVEL TIME (MIN.) = 1.46 Tc (MIN.) = 13.68
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.68
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.063
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56
PUBLIC PARK	B	3.10	0.30	0.850	56
PUBLIC PARK	B	2.60	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.80	0.30	0.200	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.40	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 28.08
 EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 70.55

 FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 614.00 DOWNSTREAM (FEET) = 571.00
 FLOW LENGTH (FEET) = 1805.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 24.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.78
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 70.55
 PIPE TRAVEL TIME (MIN.) = 2.04 Tc (MIN.) = 15.72
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

 FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.72
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.844
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.10	0.30	0.200	56

RESIDENTIAL "11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	13.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	18.60	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 42.00 SUBAREA RUNOFF (CFS) = 64.54
 EFFECTIVE AREA (ACRES) = 82.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 82.3 PEAK FLOW RATE (CFS) = 127.14

 FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 571.00 DOWNSTREAM (FEET) = 497.00
 FLOW LENGTH (FEET) = 1090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 25.08
 ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 127.14
 PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 16.45
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

 FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.805
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	6.10	0.30	0.100	56
COMMERCIAL	B	12.90	0.30	0.100	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	12.80	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA (ACRES) = 34.00 SUBAREA RUNOFF (CFS) = 51.34
 EFFECTIVE AREA (ACRES) = 116.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 116.3 PEAK FLOW RATE (CFS) = 175.57

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.45

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.805

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"4 DWELLING/ACRE" B 23.20 0.30 0.900 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890

SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 32.94

EFFECTIVE AREA(ACRES) = 140.10 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 140.1 PEAK FLOW RATE(CFS) = 208.51

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 445.00

FLOW LENGTH(FEET) = 1732.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 48.0 INCH PIPE IS 35.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.21

ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 208.51

PIPE TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 17.81

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.81

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.731

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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COMMERCIAL B 4.80 0.30 0.100 56

COMMERCIAL B 4.80 0.30 0.100 56

PUBLIC PARK B 0.10 0.30 0.850 56

PUBLIC PARK B 6.30 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 43.30 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250

SUBAREA AREA(ACRES) = 64.30 SUBAREA RUNOFF(CFS) = 95.83
 EFFECTIVE AREA(ACRES) = 204.40 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 204.4 PEAK FLOW RATE(CFS) = 295.04

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.81

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.731

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

"11+ DWELLINGS/ACRE" B 38.70 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 2.30 0.30 0.900 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293

SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 65.96

EFFECTIVE AREA(ACRES) = 249.00 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 249.0 PEAK FLOW RATE(CFS) = 360.99

FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 338.00

FLOW LENGTH(FEET) = 2664.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 26.78

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 360.99

PIPE TRAVEL TIME(MIN.) = 1.66 Tc(MIN.) = 19.46

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 19.46

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.641

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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APARTMENTS B 0.50 0.30 0.200 56

APARTMENTS B 14.80 0.30 0.200 56

APARTMENTS B 1.90 0.30 0.200 56

APARTMENTS B 9.90 0.30 0.200 56

COMMERCIAL B 1.80 0.30 0.100 56

COMMERCIAL B 8.40 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
 SUBAREA AREA (ACRES) = 37.30 SUBAREA RUNOFF (CFS) = 53.35
 EFFECTIVE AREA (ACRES) = 286.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 286.3 PEAK FLOW RATE (CFS) = 394.20

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 19.46
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.641
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.60	0.30	0.100	56
COMMERCIAL	B	14.00	0.30	0.100	56
PUBLIC PARK	B	1.40	0.30	0.850	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 34.15
 EFFECTIVE AREA (ACRES) = 310.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 310.1 PEAK FLOW RATE (CFS) = 428.36

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 19.46
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.641
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	17.60	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	9.30	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
 SUBAREA AREA (ACRES) = 40.50 SUBAREA RUNOFF (CFS) = 55.63

EFFECTIVE AREA (ACRES) = 350.60 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 350.6 PEAK FLOW RATE (CFS) = 483.98

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 19.46
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.641
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	28.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.10	0.30	0.400	56
SCHOOL	B	0.30	0.30	0.600	56
SCHOOL	B	0.30	0.30	0.600	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
 SUBAREA AREA (ACRES) = 42.10 SUBAREA RUNOFF (CFS) = 56.69
 EFFECTIVE AREA (ACRES) = 392.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 392.7 PEAK FLOW RATE (CFS) = 540.68

 FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM (FEET) = 338.00 DOWNSTREAM (FEET) = 320.00
 FLOW LENGTH (FEET) = 1154.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 75.0 INCH PIPE IS 59.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.78
 ESTIMATED PIPE DIAMETER (INCH) = 75.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 540.68
 PIPE TRAVEL TIME (MIN.) = 0.93 Tc (MIN.) = 20.39
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

 FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 20.39
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.596
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	11.60	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56

COMMERCIAL B 12.80 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.110
SUBAREA AREA(ACRES) = 31.50 SUBAREA RUNOFF(CFS) = 44.31
EFFECTIVE AREA(ACRES) = 424.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 569.01

FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 310.00
FLOW LENGTH(FEET) = 1981.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 96.0 INCH PIPE IS 72.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.88
ESTIMATED PIPE DIAMETER(INCH) = 96.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 569.01
PIPE TRAVEL TIME(MIN.) = 2.38 Tc(MIN.) = 22.77
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 22.77
RAINFALL INTENSITY(INCH/HR) = 1.50
AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.35
EFFECTIVE STREAM AREA(ACRES) = 424.20
TOTAL STREAM AREA(ACRES) = 424.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 569.01

FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.777
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 0.20 0.30 1.000 72 9.20
NATURAL FAIR COVER
"OPEN BRUSH" B 1.20 0.30 1.000 66 9.20
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.12
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 3.12

FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 1.70 0.30 1.000 72
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 0.60 0.30 1.000 72
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH(FEET) = 0.56 TRAVEL TIME(MIN.) = 1.59
Tc(MIN.) = 10.79
SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 4.47
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 7.19

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 6.18
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.052
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.40 0.30 1.000 63

NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 8.40 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 2.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 9.20 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 25.24
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.13
AVERAGE FLOW DEPTH(FEET) = 1.17 TRAVEL TIME(MIN.) = 2.97
Tc(MIN.) = 13.76
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 35.80
EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 41.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.41 FLOW VELOCITY(FEET/SEC.) = 6.94
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.60 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.50 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 1.80 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 6.80 0.30 1.000 72
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 53.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.42
AVERAGE FLOW DEPTH(FEET) = 1.67 TRAVEL TIME(MIN.) = 2.35
Tc(MIN.) = 16.11
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 23.71

EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 59.90

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.74 FLOW VELOCITY(FEET/SEC.) = 6.62
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 16.11
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.823
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 2.50 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 3.56
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 63.46

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 701.00 CHANNEL SLOPE = 0.0357
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.731
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.90 0.30 1.000 72
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 12.70 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 6.80 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 3.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 86.07

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.88
AVERAGE FLOW DEPTH (FEET) = 2.04 TRAVEL TIME (MIN.) = 1.70
Tc (MIN.) = 17.81
SUBAREA AREA (ACRES) = 35.10 SUBAREA RUNOFF (CFS) = 45.20
EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 104.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 2.20 FLOW VELOCITY (FEET/SEC.) = 7.22
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.81
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.731
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
NATURAL FAIR COVER					
" WOODLAND, GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER					
" WOODLAND, GRASS"	B	0.10	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.914
SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 5.64
EFFECTIVE AREA (ACRES) = 85.70 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 85.7 PEAK FLOW RATE (CFS) = 110.47

FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 573.00 DOWNSTREAM (FEET) = 437.00
FLOW LENGTH (FEET) = 6286.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 30.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.81
ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 110.47
PIPE TRAVEL TIME (MIN.) = 6.62 Tc (MIN.) = 24.43
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 437.00 DOWNSTREAM (FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1963.00 CHANNEL SLOPE = 0.0469
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
" CHAPARRAL, BROADLEAF"	B	0.50	0.30	1.000	63
NATURAL FAIR COVER					
" CHAPARRAL, BROADLEAF"	B	0.60	0.30	1.000	63
COMMERCIAL	B	1.50	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	1.60	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.265
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 113.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.16
AVERAGE FLOW DEPTH (FEET) = 2.16 TRAVEL TIME (MIN.) = 4.01
Tc (MIN.) = 28.44
SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 6.62
EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 110.47
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 2.13 FLOW VELOCITY (FEET/SEC.) = 8.11
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 28.44
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
" GRASS"	B	1.40	0.30	1.000	69
NATURAL FAIR COVER					
" GRASS"	B	2.80	0.30	1.000	69
NATURAL FAIR COVER					
" GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
" OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER					
" OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER					
" OPEN BRUSH"	B	3.40	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 7.60
EFFECTIVE AREA (ACRES) = 100.10 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 100.1 PEAK FLOW RATE (CFS) = 110.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.44
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 66
 PUBLIC PARK B 0.10 0.30 0.850 56
 PUBLIC PARK B 3.80 0.30 0.850 56
 PUBLIC PARK B 2.50 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.40 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877
 SUBAREA AREA (ACRES) = 10.30 SUBAREA RUNOFF (CFS) = 9.66
 EFFECTIVE AREA (ACRES) = 110.40 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 110.4 PEAK FLOW RATE (CFS) = 110.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 28.44
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.305
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.50 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 0.20 0.30 1.000 65
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 1.90 0.30 1.000 65
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.924
 SUBAREA AREA (ACRES) = 6.80 SUBAREA RUNOFF (CFS) = 6.29
 EFFECTIVE AREA (ACRES) = 117.20 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 117.2 PEAK FLOW RATE (CFS) = 110.47
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 310.00
 FLOW LENGTH (FEET) = 1065.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.48
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 110.47
 PIPE TRAVEL TIME (MIN.) = 0.96 Tc (MIN.) = 29.40
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION (MIN.) = 29.40
 RAINFALL INTENSITY (INCH/HR) = 1.28
 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA (ACRES) = 117.20
 TOTAL STREAM AREA (ACRES) = 117.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 110.47

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	292.30	18.69	1.683	0.30 (0.11)	0.37	203.7	310.00
1	276.01	22.58	1.505	0.30 (0.11)	0.37	217.1	300.00
2	569.01	22.77	1.497	0.30 (0.11)	0.35	424.2	320.00
3	110.47	29.40	1.277	0.30 (0.28)	0.94	117.2	390.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	920.59	18.69	1.683	0.30 (0.13)	0.43	626.5	310.00
2	947.73	22.58	1.505	0.30 (0.13)	0.43	727.7	300.00
3	947.93	22.77	1.497	0.30 (0.13)	0.43	732.1	320.00
4	820.40	29.40	1.277	0.30 (0.13)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 947.93 Tc (MIN.) = 22.77
 EFFECTIVE AREA (ACRES) = 732.06 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 758.5
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

```
*****
FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 52.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 44.45
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 947.93
PIPE TRAVEL TIME(MIN.) = 0.14 Tc(MIN.) = 22.91
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 22.91
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.492
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 17.50 0.30 0.200 56
APARTMENTS B 1.50 0.30 0.200 56
APARTMENTS B 0.70 0.30 0.200 56
NATURAL POOR COVER
"BARREN" B 0.10 0.30 1.000 86
COMMERCIAL B 44.60 0.30 0.100 56
COMMERCIAL B 0.70 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 85.08
EFFECTIVE AREA(ACRES) = 797.16 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 982.78
```

```
** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 967.82 18.83 1.675 0.30( 0.12) 0.40 691.6 310.00
2 983.15 22.72 1.500 0.30( 0.12) 0.41 792.8 300.00
3 982.78 22.91 1.492 0.30( 0.12) 0.41 797.2 320.00
4 849.60 29.55 1.273 0.30( 0.13) 0.42 823.6 390.00
```

```
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 983.15 Tc(MIN.) = 22.72
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.41 EFFECTIVE AREA(ACRES) = 792.83
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 22.72
```

```
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.500
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.10 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 8.18
EFFECTIVE AREA(ACRES) = 799.03 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 991.33
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.20 0.30 0.400 56 6.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 3.75
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.75
```

```
*****
FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00
STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```


SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.34
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.34

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.639

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.70	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.14
 AVERAGE FLOW DEPTH(FEET) = 0.54 TRAVEL TIME(MIN.) = 0.53
 Tc(MIN.) = 9.73
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 4.00
 EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 7.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.60 FLOW VELOCITY(FEET/SEC.) = 6.63
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0288
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.305

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.20 0.30 0.600 56
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.03
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.95
 AVERAGE FLOW DEPTH(FEET) = 1.05 TRAVEL TIME(MIN.) = 2.19
 Tc(MIN.) = 11.92
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 11.71
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 17.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.18 FLOW VELOCITY(FEET/SEC.) = 4.29
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

 FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 582.00 DOWNSTREAM(FEET) = 581.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 18.39
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 17.85
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 11.93
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.93
 RAINFALL INTENSITY(INCH/HR) = 2.30
 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 9.80
 TOTAL STREAM AREA(ACRES) = 9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.85

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	56.00	9.60	2.671	0.30(0.16)	0.54	24.8	400.00
2	17.85	11.93	2.304	0.30(0.28)	0.94	9.8	430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.98	9.60	2.671	0.30(0.19)	0.64	32.7	400.00
2	65.64	11.93	2.304	0.30(0.20)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 72.98 Tc(MIN.) = 9.60
EFFECTIVE AREA(ACRES) = 32.69 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA(ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 570.00
FLOW LENGTH(FEET) = 1056.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.92
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.98
PIPE TRAVEL TIME(MIN.) = 1.61 Tc(MIN.) = 11.21
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.21
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.402

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	4.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.00	0.30	0.600	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842					
SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 14.89					
EFFECTIVE AREA(ACRES) = 40.39 AREA-AVERAGED Fm(INCH/HR) = 0.20					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.68					
TOTAL AREA(ACRES) = 42.3 PEAK FLOW RATE(CFS) = 79.93					

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.21
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.402
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/
LAND USE

SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.80	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	4.20	0.30	0.500	56
RESIDENTIAL "8-10 DWELLINGS/ACRE"	B	1.10	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492					
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 28.60					
EFFECTIVE AREA(ACRES) = 54.49 AREA-AVERAGED Fm(INCH/HR) = 0.19					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63					
TOTAL AREA(ACRES) = 56.4 PEAK FLOW RATE(CFS) = 108.54					

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00
FLOW LENGTH(FEET) = 1526.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 41.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.85
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 108.54
PIPE TRAVEL TIME(MIN.) = 3.24 Tc(MIN.) = 14.45
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 14.45
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	1.80	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.80	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.80	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.10	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.698
 SUBAREA AREA(ACRES) = 13.00 SUBAREA RUNOFF(CFS) = 20.46
 EFFECTIVE AREA(ACRES) = 67.49 AREA-AVERAGED Fm(INCH/HR) = 0.19
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
 TOTAL AREA(ACRES) = 69.4 PEAK FLOW RATE(CFS) = 108.54
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 14.45
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.958
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	11.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	7.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455					
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 33.44					
EFFECTIVE AREA(ACRES) = 87.89 AREA-AVERAGED Fm(INCH/HR) = 0.18					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60					
TOTAL AREA(ACRES) = 89.8 PEAK FLOW RATE(CFS) = 140.68					

 FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 495.00
 FLOW LENGTH(FEET) = 2168.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.34
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 140.68
 PIPE TRAVEL TIME(MIN.) = 1.87 Tc(MIN.) = 16.32
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

 FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.32
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	9.30	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.90	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 15.53					

PUBLIC PARK B 0.90 0.30 0.850 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 36.40 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 13.60 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
 SUBAREA AREA(ACRES) = 60.80 SUBAREA RUNOFF(CFS) = 95.44
 EFFECTIVE AREA(ACRES) = 148.69 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 150.6 PEAK FLOW RATE(CFS) = 224.53

 FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.32
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868					
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 10.33					
EFFECTIVE AREA(ACRES) = 156.09 AREA-AVERAGED Fm(INCH/HR) = 0.14					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47					
TOTAL AREA(ACRES) = 158.0 PEAK FLOW RATE(CFS) = 234.86					

 FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.32
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	9.30	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.90	0.30	0.400	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400					
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 15.53					

EFFECTIVE AREA (ACRES) = 166.29 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA (ACRES) = 168.2 PEAK FLOW RATE (CFS) = 250.39

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 395.00
FLOW LENGTH (FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.94
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 250.39
PIPE TRAVEL TIME (MIN.) = 2.11 Tc (MIN.) = 18.43
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.43
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.697
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.30 0.30 0.200 56
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 9.10 0.30 0.100 56
COMMERCIAL B 6.70 0.30 0.100 56
PUBLIC PARK B 0.50 0.30 0.850 56
PUBLIC PARK B 2.60 0.30 0.850 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.219
SUBAREA AREA (ACRES) = 19.80 SUBAREA RUNOFF (CFS) = 29.07
EFFECTIVE AREA (ACRES) = 186.09 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA (ACRES) = 188.0 PEAK FLOW RATE (CFS) = 262.33

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.43
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.697
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 10.60 0.30 0.200 56

RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308
SUBAREA AREA (ACRES) = 16.80 SUBAREA RUNOFF (CFS) = 24.26
EFFECTIVE AREA (ACRES) = 202.89 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 204.8 PEAK FLOW RATE (CFS) = 286.59

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.43
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.697
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.30 0.30 0.600 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 15.30 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 1.50 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 5.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.579
SUBAREA AREA (ACRES) = 37.50 SUBAREA RUNOFF (CFS) = 51.41
EFFECTIVE AREA (ACRES) = 240.39 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 242.3 PEAK FLOW RATE (CFS) = 338.01

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.43
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.697
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 8.40 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.80 0.30 0.400 56

SCHOOL B 0.60 0.30 0.600 56
 SCHOOL B 1.50 0.30 0.600 56
 SCHOOL B 3.50 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA(ACRES) = 20.30 SUBAREA RUNOFF(CFS) = 28.51
 EFFECTIVE AREA(ACRES) = 260.69 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 262.6 PEAK FLOW RATE(CFS) = 366.52

 FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
 FLOW LENGTH(FEET) = 661.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 57.0 INCH PIPE IS 42.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 25.71
 ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 366.52
 PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 18.86
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

 FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
 ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 495.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.368
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.512
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	7.53
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.20	0.30	0.600	56	6.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814

SUBAREA RUNOFF(CFS) = 2.06
 TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 2.06

 FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 490.00
 FLOW LENGTH(FEET) = 267.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 5.56
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 2.06
 PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 7.17
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

 FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 7.17
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.304
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.788
 SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 4.69
 EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
 TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 6.62

 FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 490.00 DOWNSTREAM(FEET) = 480.00
 FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.74
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 6.62
PIPE TRAVEL TIME(MIN.) = 1.12 Tc(MIN.) = 8.29
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.29
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.013
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 2.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.40 0.30 0.900 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
SUBAREA AREA (ACRES) = 3.10 SUBAREA RUNOFF(CFS) = 7.73
EFFECTIVE AREA(ACRES) = 5.50 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 5.5 PEAK FLOW RATE(CFS) = 13.72

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 470.00
FLOW LENGTH(FEET) = 310.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.16
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.72
PIPE TRAVEL TIME(MIN.) = 0.46 Tc(MIN.) = 8.75
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.75
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.893
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.50 0.30 0.100 56
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.80 0.30 0.900 56

RESIDENTIAL
".4 DWELLING/ACRE" B 1.00 0.30 0.900 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
SUBAREA AREA(ACRES) = 5.70 SUBAREA RUNOFF(CFS) = 13.83
EFFECTIVE AREA(ACRES) = 11.20 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 11.2 PEAK FLOW RATE(CFS) = 26.96

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.75
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.893
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.10 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.25
EFFECTIVE AREA(ACRES) = 11.30 AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 11.3 PEAK FLOW RATE(CFS) = 27.21

FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 528.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.21
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.21
PIPE TRAVEL TIME(MIN.) = 0.58 Tc(MIN.) = 9.33
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.33
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.742
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.90 0.30 0.100 56
COMMERCIAL B 0.60 0.30 0.100 56

RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 6.30 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 3.70 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 26.99
 EFFECTIVE AREA (ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE (CFS) = 52.68

 FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 415.00
 FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.77
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 52.68
 PIPE TRAVEL TIME (MIN.) = 0.61 Tc (MIN.) = 9.94
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

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MAINLINE Tc (MIN.) = 9.94
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.584
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	1.60	0.30	0.200	56
APARTMENTS	B	10.90	0.30	0.200	56
COMMERCIAL	B	1.30	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	1.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	7.00	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA (ACRES) = 23.20 SUBAREA RUNOFF (CFS) = 52.77
 EFFECTIVE AREA (ACRES) = 46.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 46.0 PEAK FLOW RATE (CFS) = 102.19

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 9.94
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.584

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	9.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.30	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 15.00 SUBAREA RUNOFF (CFS) = 32.86
 EFFECTIVE AREA (ACRES) = 61.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA (ACRES) = 61.0 PEAK FLOW RATE (CFS) = 135.05

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 9.94
 RAINFALL INTENSITY (INCH/HR) = 2.58
 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA (ACRES) = 61.00
 TOTAL STREAM AREA (ACRES) = 61.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 135.05

 FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.512
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56	7.53
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.20	0.30	0.600	56	6.37

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
 SUBAREA RUNOFF (CFS) = 2.64

TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 2.64

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 487.00
FLOW LENGTH(FEET) = 308.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.71
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.64
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 7.13
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.13
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.313

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL
".4 DWELLING/ACRE" B 1.30 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.50 0.30 0.600 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.97
EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 7.45

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 487.00 DOWNSTREAM(FEET) = 478.00
FLOW LENGTH(FEET) = 373.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.67
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.45
PIPE TRAVEL TIME(MIN.) = 0.72 Tc(MIN.) = 7.85
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.85
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.127
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 1.20 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.40 0.30 0.600 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 1.70 0.30 0.600 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 11.49
EFFECTIVE AREA(ACRES) = 7.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78
TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 18.49

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 454.00
FLOW LENGTH(FEET) = 995.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.76
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.49
PIPE TRAVEL TIME(MIN.) = 1.54 Tc(MIN.) = 9.39
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 2004.00 FEET.

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.39
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.727

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

APARTMENTS B 0.80 0.30 0.200 56
APARTMENTS B 0.40 0.30 0.200 56
PUBLIC PARK B 0.90 0.30 0.850 56
PUBLIC PARK B 0.40 0.30 0.850 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
RESIDENTIAL

"4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
 SUBAREA AREA (ACRES) = 3.30 SUBAREA RUNOFF (CFS) = 7.54
 EFFECTIVE AREA (ACRES) = 10.40 AREA-AVERAGED Fm (INCH/HR) = 0.22
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
 TOTAL AREA (ACRES) = 10.4 PEAK FLOW RATE (CFS) = 23.47

 FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 9.39
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.727
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	3.30	0.30	0.600	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	2.10	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 12.38
 EFFECTIVE AREA (ACRES) = 15.80 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
 TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 35.85

 FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 454.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 1555.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 12.91
 ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 35.85
 PIPE TRAVEL TIME (MIN.) = 2.01 Tc (MIN.) = 11.40
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.40
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.377
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	3.70	0.30	0.200	56
APARTMENTS	B	6.80	0.30	0.200	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56

RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.20 0.30 0.600 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 9.90 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 52.69
 EFFECTIVE AREA (ACRES) = 41.70 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 41.7 PEAK FLOW RATE (CFS) = 83.56

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 11.40
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.377
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 2.61
 EFFECTIVE AREA (ACRES) = 43.00 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 43.0 PEAK FLOW RATE (CFS) = 86.17

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.40
 RAINFALL INTENSITY (INCH/HR) = 2.38
 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.50
 EFFECTIVE STREAM AREA (ACRES) = 43.00
 TOTAL STREAM AREA (ACRES) = 43.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 86.17

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.05	9.94	2.584	0.30 (0.12)	0.41	61.0	410.00
2	86.17	11.40	2.377	0.30 (0.15)	0.50	43.0	420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	217.19	9.94	2.584	0.30 (0.13)	0.45	98.5	410.00
2	209.84	11.40	2.377	0.30 (0.13)	0.45	104.0	420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 217.19 Tc(MIN.) = 9.94
EFFECTIVE AREA(ACRES) = 98.50 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 104.0
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 51.0 INCH PIPE IS 41.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.48
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 217.19
PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 10.97
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.97
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.435

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.70	0.30	0.100	56
COMMERCIAL	B	2.90	0.30	0.100	56
PUBLIC PARK	B	3.60	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.50	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.50	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 36.45
EFFECTIVE AREA(ACRES) = 115.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 121.3 PEAK FLOW RATE(CFS) = 240.42

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.97

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.435
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.20	0.30	0.400	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.08
EFFECTIVE AREA(ACRES) = 116.80 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 242.51

FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.71
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 242.51
PIPE TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 12.54
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.54
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.220

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56
PUBLIC PARK	B	5.70	0.30	0.850	56
PUBLIC PARK	B	4.50	0.30	0.850	56
PUBLIC PARK	B	9.40	0.30	0.850	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 37.22
EFFECTIVE AREA(ACRES) = 137.70 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 143.2 PEAK FLOW RATE(CFS) = 257.15

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 12.54
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.220
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.70	0.30	0.850	56
PUBLIC PARK	B	8.90	0.30	0.850	56
PUBLIC PARK	B	1.20	0.30	0.850	56
PUBLIC PARK	B	3.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
 SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 25.64
 EFFECTIVE AREA(ACRES) = 152.20 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 157.7 PEAK FLOW RATE(CFS) = 282.79

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	282.79	12.54	2.220	0.30(0.16)	0.52	152.2	410.00
2	264.51	14.01	2.019	0.30(0.16)	0.52	157.7	420.00

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	366.52	18.86	1.674	0.30(0.13)	0.45	260.7	400.00
2	339.93	21.35	1.556	0.30(0.14)	0.45	262.6	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	612.99	12.54	2.220	0.30(0.14)	0.48	325.5	410.00
2	597.78	14.01	2.019	0.30(0.14)	0.48	351.3	420.00
3	582.04	18.86	1.674	0.30(0.14)	0.48	418.4	400.00
4	538.73	21.35	1.556	0.30(0.14)	0.48	420.3	430.00

TOTAL AREA(ACRES) = 420.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 612.99 Tc(MIN.) = 12.540
 EFFECTIVE AREA(ACRES) = 325.53 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 420.3
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

=====

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00
 FLOW LENGTH(FEET) = 1358.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 34.05
 ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 612.99
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 13.20
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.20
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.40	0.30	0.200	56
APARTMENTS	B	15.00	0.30	0.200	56
APARTMENTS	B	5.80	0.30	0.200	56
APARTMENTS	B	2.50	0.30	0.200	56
COMMERCIAL	B	9.10	0.30	0.100	56
COMMERCIAL	B	1.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
 SUBAREA AREA(ACRES) = 41.30 SUBAREA RUNOFF(CFS) = 77.19
 EFFECTIVE AREA(ACRES) = 366.83 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 461.6 PEAK FLOW RATE(CFS) = 658.59

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 13.20
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.129
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 1.70
 EFFECTIVE AREA(ACRES) = 367.73 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 462.5 PEAK FLOW RATE(CFS) = 660.29

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<

=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	660.29	13.20	2.129	0.30 (0.13)	0.45	367.7	410.00
2	635.21	14.67	1.928	0.30 (0.13)	0.45	393.5	420.00
3	623.18	19.53	1.638	0.30 (0.13)	0.45	460.6	400.00
4	579.70	22.04	1.528	0.30 (0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	976.97	18.83	1.675	0.30 (0.12)	0.40	697.8	310.00
2	991.33	22.72	1.500	0.30 (0.12)	0.40	799.0	300.00
3	990.91	22.91	1.492	0.30 (0.12)	0.40	803.4	320.00
4	856.52	29.55	1.273	0.30 (0.13)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1545.06	13.20	2.129	0.30 (0.13)	0.42	857.0	410.00
2	1519.93	14.67	1.928	0.30 (0.13)	0.42	937.2	420.00
3	1601.87	18.83	1.675	0.30 (0.13)	0.42	1148.8	310.00
4	1602.72	19.53	1.638	0.30 (0.13)	0.42	1176.5	400.00
5	1568.53	22.04	1.528	0.30 (0.13)	0.42	1243.9	430.00
6	1559.38	22.72	1.500	0.30 (0.13)	0.42	1261.5	300.00
7	1555.67	22.91	1.492	0.30 (0.13)	0.42	1265.9	320.00
8	1330.34	29.55	1.273	0.30 (0.13)	0.43	1292.3	390.00

TOTAL AREA (ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 1602.72 Tc (MIN.) = 19.528
 EFFECTIVE AREA (ACRES) = 1176.50 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 1292.3
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1292.3 TC (MIN.) = 19.53
 EFFECTIVE AREA (ACRES) = 1176.50 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.418
 PEAK FLOW RATE (CFS) = 1602.72

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1545.06	13.20	2.129	0.30 (0.13)	0.42	857.0	410.00
2	1519.93	14.67	1.928	0.30 (0.13)	0.42	937.2	420.00
3	1601.87	18.83	1.675	0.30 (0.13)	0.42	1148.8	310.00
4	1602.72	19.53	1.638	0.30 (0.13)	0.42	1176.5	400.00
5	1568.53	22.04	1.528	0.30 (0.13)	0.42	1243.9	430.00
6	1559.38	22.72	1.500	0.30 (0.13)	0.42	1261.5	300.00
7	1555.67	22.91	1.492	0.30 (0.13)	0.42	1265.9	320.00
8	1330.34	29.55	1.273	0.30 (0.13)	0.43	1292.3	390.00

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RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 25-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C25EVRL.DAT
TIME/DATE OF STUDY: 12:30 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.933
- 2) 10.00; 3.214
- 3) 15.00; 2.451
- 4) 20.00; 2.024
- 5) 25.00; 1.763
- 6) 30.00; 1.547
- 7) 40.00; 1.347
- 8) 50.00; 1.194
- 9) 60.00; 1.070
- 10) 90.00; 0.902
- 11) 120.00; 0.792
- 12) 180.00; 0.662
- 13) 360.00; 0.490
- 14) 1200.00; 0.216

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: MANNING			
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.751
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	1.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 5.32
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 5.32

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 11.11
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 15.04
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.08
STREET FLOW TRAVEL TIME(MIN.) = 3.12 Tc(MIN.) = 11.56
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.976
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/	SCS SOIL	AREA	Fp	Ap	SCS
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 4.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA (ACRES) = 4.40 SUBAREA RUNOFF (CFS) = 11.55
EFFECTIVE AREA (ACRES) = 6.00 AREA-AVERAGED Fm (INCH/HR) = 0.06
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 6.0 PEAK FLOW RATE (CFS) = 15.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.47 HALFSTREET FLOOD WIDTH (FEET) = 17.38
FLOW VELOCITY (FEET/SEC.) = 2.72 DEPTH*VELOCITY (FT*FT/SEC.) = 1.29
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 637.00 DOWNSTREAM (FEET) = 634.00
FLOW LENGTH (FEET) = 563.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 5.89
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 15.75
PIPE TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 13.15
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 13.15
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.733
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 19.25
EFFECTIVE AREA (ACRES) = 14.00 AREA-AVERAGED Fm (INCH/HR) = 0.06
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA (ACRES) = 14.0 PEAK FLOW RATE (CFS) = 33.69

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 634.00 DOWNSTREAM (FEET) = 630.00
FLOW LENGTH (FEET) = 1072.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 6.16
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 33.69
PIPE TRAVEL TIME (MIN.) = 2.90 Tc (MIN.) = 16.05
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 16.05
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.361
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.90 0.30 0.100 56
COMMERCIAL B 4.50 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 33.50
EFFECTIVE AREA (ACRES) = 30.10 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 30.1 PEAK FLOW RATE (CFS) = 62.50

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 16.05
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.361
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
SCHOOL B 5.70 0.30 0.600 56
SCHOOL B 6.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA (ACRES) = 12.40 SUBAREA RUNOFF (CFS) = 24.34
EFFECTIVE AREA (ACRES) = 42.50 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA (ACRES) = 42.5 PEAK FLOW RATE (CFS) = 86.85

FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 1290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.29
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 86.85
PIPE TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 17.67
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.67
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 56
COMMERCIAL B 0.90 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
SCHOOL B 0.10 0.30 0.600 56
SCHOOL B 0.50 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.22
EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 87.78

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<
>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.117
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.70 0.30 0.100 56 18.91
COMMERCIAL B 4.40 0.30 0.100 56 18.91
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56 20.15
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 20.15
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 7.10 0.30 0.600 56 25.63
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 2.80 0.30 0.600 56 25.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 32.24

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) = 17.67
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223
SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 33.94
EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 121.72

FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.28
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 121.72
PIPE TRAVEL TIME(MIN.) = 1.15 Tc(MIN.) = 18.82
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.82
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.125
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.30 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 7.50
EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 123.60

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 18.82
RAINFALL INTENSITY(INCH/HR) = 2.12
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 67.60
TOTAL STREAM AREA(ACRES) = 67.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 123.60

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.474
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.082
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.10 0.30 0.100 56 7.47
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56 7.97
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56 7.97
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.193
SUBAREA RUNOFF(CFS) = 5.07
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 5.07

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 623.00
STREET LENGTH(FEET) = 300.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.34
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.43
HALFSTREET FLOOD WIDTH(FEET) = 14.73

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.19
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.93
STREET FLOW TRAVEL TIME(MIN.) = 2.28 Tc(MIN.) = 9.75
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.298
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.50 0.30 0.100 56
COMMERCIAL B 0.20 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.50
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 12.58

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.46 HALFSTREET FLOOD WIDTH(FEET) = 16.68
FLOW VELOCITY(FEET/SEC.) = 2.35 DEPTH*VELOCITY(FT*FT/SEC.) = 1.08
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 620.00
FLOW LENGTH(FEET) = 369.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.40
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 12.58
PIPE TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 10.72
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 10.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.105
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.90 0.30 0.100 56
COMMERCIAL B 2.50 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.80 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.125

SUBAREA AREA (ACRES) = 5.90 SUBAREA RUNOFF (CFS) = 16.29
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 28.12

FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 615.00
FLOW LENGTH (FEET) = 338.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.96
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 28.12
PIPE TRAVEL TIME (MIN.) = 0.57 Tc (MIN.) = 11.28
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.28
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.018
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.208
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 33.79
EFFECTIVE AREA (ACRES) = 22.90 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 22.9 PEAK FLOW RATE (CFS) = 61.12

FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 600.00
FLOW LENGTH (FEET) = 578.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 14.55
ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 61.12
PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 11.94
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.94
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.917
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.70	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	3.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.70	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 17.80 SUBAREA RUNOFF (CFS) = 45.07
EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 104.11

FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 569.00
FLOW LENGTH (FEET) = 2176.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.42
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 104.11
PIPE TRAVEL TIME (MIN.) = 2.70 Tc (MIN.) = 14.64
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 14.64
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.505
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 6.80 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 19.10 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 56.38
 EFFECTIVE AREA (ACRES) = 67.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 67.3 PEAK FLOW RATE (CFS) = 145.39

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.54
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 145.39
 PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.21
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.21
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.433
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.90	0.30	0.500	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	7.40	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.505
 SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 35.94
 EFFECTIVE AREA (ACRES) = 84.80 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 84.8 PEAK FLOW RATE (CFS) = 176.98

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 15.21
 RAINFALL INTENSITY(INCH/HR) = 2.43
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.38
 EFFECTIVE STREAM AREA (ACRES) = 84.80
 TOTAL STREAM AREA (ACRES) = 84.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 176.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	123.60	18.82	2.125	0.30(0.09)	0.31	67.6	300.00
2	176.98	15.21	2.433	0.30(0.11)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	292.02	15.21	2.433	0.30(0.11)	0.35	139.4	310.00
2	277.04	18.82	2.125	0.30(0.11)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 292.02 Tc(MIN.) = 15.21
 EFFECTIVE AREA (ACRES) = 139.43 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 152.4
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00
 FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.25
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 292.02
 PIPE TRAVEL TIME(MIN.) = 2.41 Tc(MIN.) = 17.62
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.62
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56

COMMERCIAL B 4.80 0.30 0.100 56
 COMMERCIAL B 5.00 0.30 0.100 56
 COMMERCIAL B 3.70 0.30 0.100 56
 PUBLIC PARK B 5.00 0.30 0.850 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.288
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 38.54
 EFFECTIVE AREA(ACRES) = 159.43 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 304.72

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.62
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.70	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.50	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 41.75
 EFFECTIVE AREA(ACRES) = 181.33 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 194.3 PEAK FLOW RATE(CFS) = 346.47

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.62
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.227
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.40	0.30	0.500	56
SCHOOL	B	2.20	0.30	0.600	56
SCHOOL	B	6.80	0.30	0.600	56
SCHOOL	B	7.90	0.30	0.600	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA(ACRES) = 22.80 SUBAREA RUNOFF(CFS) = 42.17
 EFFECTIVE AREA(ACRES) = 204.13 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 217.1 PEAK FLOW RATE(CFS) = 388.65

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 37.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.04
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 388.65
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 18.02
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 18.02
 RAINFALL INTENSITY(INCH/HR) = 2.19
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 204.13
 TOTAL STREAM AREA(ACRES) = 217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 388.65

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
 ELEVATION DATA: UPSTREAM(FEET) = 636.00 DOWNSTREAM(FEET) = 633.00
 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.751
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56	8.44

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 9.30
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 9.30

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*****
FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 633.00 DOWNSTREAM ELEVATION(FEET) = 628.00
STREET LENGTH(FEET) = 360.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.56
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.47
HALFSTREET FLOOD WIDTH(FEET) = 17.23
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.44
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.62
STREET FLOW TRAVEL TIME(MIN.) = 1.75 Tc(MIN.) = 10.18
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.186
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 6.30 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 20.47
EFFECTIVE AREA(ACRES) = 10.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 28.34

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.52 HALFSTREET FLOOD WIDTH(FEET) = 19.96
FLOW VELOCITY(FEET/SEC.) = 3.78 DEPTH*VELOCITY(FT*FT/SEC.) = 1.96
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 628.00 DOWNSTREAM(FEET) = 624.00
FLOW LENGTH(FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 24.5 INCHES

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PIPE-FLOW VELOCITY(FEET/SEC.) = 6.60
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 28.34
PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 12.08
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 2.00 0.30 0.850 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.90 0.30 0.200 56
SCHOOL B 3.10 0.30 0.600 56
SCHOOL B 0.30 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 34.66
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 60.38

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.897
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.10 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.26
EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 60.63

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 624.00 DOWNSTREAM(FEET) = 614.00
FLOW LENGTH(FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.8 INCHES

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PIPE-FLOW VELOCITY (FEET/SEC.) = 10.76
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 60.63
 PIPE TRAVEL TIME (MIN.) = 1.37 Tc (MIN.) = 13.45
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.45
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.687
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56
PUBLIC PARK	B	3.10	0.30	0.850	56
PUBLIC PARK	B	2.60	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.80	0.30	0.200	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.40	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 37.13
 EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 93.19

 FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 614.00 DOWNSTREAM (FEET) = 571.00
 FLOW LENGTH (FEET) = 1805.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 15.73
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 93.19
 PIPE TRAVEL TIME (MIN.) = 1.91 Tc (MIN.) = 15.36
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

 FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.36
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.420
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.10	0.30	0.200	56

RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.20 0.30 0.900 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 13.90 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 18.60 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 42.00 SUBAREA RUNOFF (CFS) = 86.31
 EFFECTIVE AREA (ACRES) = 82.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 82.3 PEAK FLOW RATE (CFS) = 169.80

 FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 571.00 DOWNSTREAM (FEET) = 497.00
 FLOW LENGTH (FEET) = 1090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.2 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 27.52
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 169.80
 PIPE TRAVEL TIME (MIN.) = 0.66 Tc (MIN.) = 16.02
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

 FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 16.02
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.364
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	6.10	0.30	0.100	56
COMMERCIAL	B	12.90	0.30	0.100	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	12.80	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA (ACRES) = 34.00 SUBAREA RUNOFF (CFS) = 68.44
 EFFECTIVE AREA (ACRES) = 116.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 116.3 PEAK FLOW RATE (CFS) = 234.07

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.02

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.364

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	23.20	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56

RESIDENTIAL

"4 DWELLING/ACRE" B 23.20 0.30 0.900 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890

SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 44.91

EFFECTIVE AREA(ACRES) = 140.10 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 140.1 PEAK FLOW RATE(CFS) = 278.98

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 445.00

FLOW LENGTH(FEET) = 1732.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 38.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 22.87

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 278.98

PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 17.29

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.29

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.80	0.30	0.100	56
COMMERCIAL	B	4.80	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
PUBLIC PARK	B	6.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	43.30	0.30	0.200	56

COMMERCIAL

COMMERCIAL B 4.80 0.30 0.100 56

COMMERCIAL B 4.80 0.30 0.100 56

PUBLIC PARK B 0.10 0.30 0.850 56

PUBLIC PARK B 6.30 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 43.30 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250

SUBAREA AREA(ACRES) = 64.30 SUBAREA RUNOFF(CFS) = 126.20

EFFECTIVE AREA(ACRES) = 204.40 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 204.4 PEAK FLOW RATE(CFS) = 391.59

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.29

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.256

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	38.70	0.30	0.200	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.30	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	3.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 38.70 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 2.30 0.30 0.900 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293

SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 87.02

EFFECTIVE AREA(ACRES) = 249.00 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 249.0 PEAK FLOW RATE(CFS) = 478.61

FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 338.00

FLOW LENGTH(FEET) = 2664.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.5 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 28.73

ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 478.61

PIPE TRAVEL TIME(MIN.) = 1.55 Tc(MIN.) = 18.83

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.83

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.124

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
APARTMENTS	B	14.80	0.30	0.200	56
APARTMENTS	B	1.90	0.30	0.200	56
APARTMENTS	B	9.90	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

APARTMENTS

APARTMENTS B 0.50 0.30 0.200 56

APARTMENTS B 14.80 0.30 0.200 56

APARTMENTS B 1.90 0.30 0.200 56

APARTMENTS B 9.90 0.30 0.200 56

COMMERCIAL B 1.80 0.30 0.100 56

COMMERCIAL B 8.40 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
 SUBAREA AREA (ACRES) = 37.30 SUBAREA RUNOFF (CFS) = 69.56
 EFFECTIVE AREA (ACRES) = 286.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 286.3 PEAK FLOW RATE (CFS) = 518.59

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 18.83
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.124
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.60	0.30	0.100	56
COMMERCIAL	B	14.00	0.30	0.100	56
PUBLIC PARK	B	1.40	0.30	0.850	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 44.49
 EFFECTIVE AREA (ACRES) = 310.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 310.1 PEAK FLOW RATE (CFS) = 563.08

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 18.83
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.124
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	17.60	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	9.30	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
 SUBAREA AREA (ACRES) = 40.50 SUBAREA RUNOFF (CFS) = 73.22

EFFECTIVE AREA (ACRES) = 350.60 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 350.6 PEAK FLOW RATE (CFS) = 636.31

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 18.83
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.124
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	28.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.10	0.30	0.400	56
SCHOOL	B	0.30	0.30	0.600	56
SCHOOL	B	0.30	0.30	0.600	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
 SUBAREA AREA (ACRES) = 42.10 SUBAREA RUNOFF (CFS) = 74.98
 EFFECTIVE AREA (ACRES) = 392.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 392.7 PEAK FLOW RATE (CFS) = 711.29

 FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====
 ELEVATION DATA: UPSTREAM (FEET) = 338.00 DOWNSTREAM (FEET) = 320.00
 FLOW LENGTH (FEET) = 1154.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 84.0 INCH PIPE IS 64.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.36
 ESTIMATED PIPE DIAMETER (INCH) = 84.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 711.29
 PIPE TRAVEL TIME (MIN.) = 0.86 Tc (MIN.) = 19.69
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

 FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====
 MAINLINE Tc (MIN.) = 19.69
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.050
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	11.60	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56

COMMERCIAL B 12.80 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.110
 SUBAREA AREA(ACRES) = 31.50 SUBAREA RUNOFF(CFS) = 57.19
 EFFECTIVE AREA(ACRES) = 424.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 742.52

 FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 1981.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 78.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 14.93
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 742.52
 PIPE TRAVEL TIME(MIN.) = 2.21 Tc(MIN.) = 21.90
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.90
 RAINFALL INTENSITY(INCH/HR) = 1.92
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA(ACRES) = 424.20
 TOTAL STREAM AREA(ACRES) = 424.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 742.52

 FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
 ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 775.00

 $Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.491
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.20 0.30 1.000 72 9.20
 NATURAL FAIR COVER
 "OPEN BRUSH" B 1.20 0.30 1.000 66 9.20
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.02
 TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 4.02

 FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.110
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 1.70 0.30 1.000 72
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.60 0.30 1.000 72
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.93
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.10
 AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 1.49
 Tc(MIN.) = 10.68
 SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 5.82
 EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 9.36

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.69 FLOW VELOCITY(FEET/SEC.) = 6.56
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

 FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.688
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.40 0.30 1.000 63

NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 8.40 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 2.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 9.20 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 33.87
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.58
AVERAGE FLOW DEPTH(FEET) = 1.31 TRAVEL TIME(MIN.) = 2.77
Tc(MIN.) = 13.45
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 48.78
EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 56.73

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.59 FLOW VELOCITY(FEET/SEC.) = 7.48
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.60 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.50 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 1.80 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 6.80 0.30 1.000 72
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 73.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.95
AVERAGE FLOW DEPTH(FEET) = 1.87 TRAVEL TIME(MIN.) = 2.17
Tc(MIN.) = 15.62
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 32.67

EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 82.52

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.96 FLOW VELOCITY(FEET/SEC.) = 7.18
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.62
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.398
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 2.50 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 4.91
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 87.43

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 701.00 CHANNEL SLOPE = 0.0357
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.90 0.30 1.000 72
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 12.70 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 6.80 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 3.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 118.47

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.46
AVERAGE FLOW DEPTH (FEET) = 2.30 TRAVEL TIME (MIN.) = 1.57
Tc (MIN.) = 17.18
SUBAREA AREA (ACRES) = 35.10 SUBAREA RUNOFF (CFS) = 62.06
EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 143.92

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 2.48 FLOW VELOCITY (FEET/SEC.) = 7.82
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 17.18

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.264

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.10	0.30	1.000	65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.914					
SUBAREA AREA (ACRES) =	4.30	SUBAREA RUNOFF (CFS) =	7.70		
EFFECTIVE AREA (ACRES) =	85.70	AREA-AVERAGED Fm (INCH/HR) =	0.30		
AREA-AVERAGED Fp (INCH/HR) =	0.30	AREA-AVERAGED Ap =	1.00		
TOTAL AREA (ACRES) =	85.7	PEAK FLOW RATE (CFS) =	151.62		

FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 573.00 DOWNSTREAM (FEET) = 437.00
FLOW LENGTH (FEET) = 6286.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.29
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 151.62
PIPE TRAVEL TIME (MIN.) = 6.06 Tc (MIN.) = 23.24
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 437.00 DOWNSTREAM (FEET) = 345.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1963.00 CHANNEL SLOPE = 0.0469
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.679

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.60	0.30	1.000	63
COMMERCIAL	B	1.50	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	1.60	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.265

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 155.94

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.85

AVERAGE FLOW DEPTH (FEET) = 2.42 TRAVEL TIME (MIN.) = 3.70

Tc (MIN.) = 26.94

SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 8.64

EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.28

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95

TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 151.62

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 2.40 FLOW VELOCITY (FEET/SEC.) = 8.77

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 26.94

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.679

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	1.40	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	2.80	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 10.43

EFFECTIVE AREA (ACRES) = 100.10 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 100.1 PEAK FLOW RATE (CFS) = 151.62
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.94
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.679
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 66
 PUBLIC PARK B 0.10 0.30 0.850 56
 PUBLIC PARK B 3.80 0.30 0.850 56
 PUBLIC PARK B 2.50 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.40 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877
 SUBAREA AREA (ACRES) = 10.30 SUBAREA RUNOFF (CFS) = 13.13
 EFFECTIVE AREA (ACRES) = 110.40 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 110.4 PEAK FLOW RATE (CFS) = 151.62
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.94
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 1.679
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.50 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 0.20 0.30 1.000 65
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 1.90 0.30 1.000 65
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.924
 SUBAREA AREA (ACRES) = 6.80 SUBAREA RUNOFF (CFS) = 8.58
 EFFECTIVE AREA (ACRES) = 117.20 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 117.2 PEAK FLOW RATE (CFS) = 151.62
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 310.00
 FLOW LENGTH (FEET) = 1065.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 30.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.28
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 151.62
 PIPE TRAVEL TIME (MIN.) = 0.88 Tc (MIN.) = 27.82
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION (MIN.) = 27.82
 RAINFALL INTENSITY (INCH/HR) = 1.64
 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA (ACRES) = 117.20
 TOTAL STREAM AREA (ACRES) = 117.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 151.62

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	388.65	18.02	2.193	0.30 (0.11)	0.37	204.1	310.00
1	360.50	21.72	1.934	0.30 (0.11)	0.37	217.1	300.00
2	742.52	21.90	1.925	0.30 (0.11)	0.35	424.2	320.00
3	151.62	27.82	1.641	0.30 (0.28)	0.94	117.2	390.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1227.80	18.02	2.193	0.30 (0.13)	0.43	629.1	310.00
2	1244.61	21.72	1.934	0.30 (0.13)	0.43	729.3	300.00
3	1245.43	21.90	1.925	0.30 (0.13)	0.43	733.6	320.00
4	1081.09	27.82	1.641	0.30 (0.13)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 1245.43 Tc (MIN.) = 21.90
 EFFECTIVE AREA (ACRES) = 733.59 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 758.5
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 60.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 47.14
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1245.43
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 22.04
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.04
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.918
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 17.50 0.30 0.200 56
APARTMENTS B 1.50 0.30 0.200 56
APARTMENTS B 0.70 0.30 0.200 56
NATURAL POOR COVER
"BARREN" B 0.10 0.30 1.000 86
COMMERCIAL B 44.60 0.30 0.100 56
COMMERCIAL B 0.70 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 110.05
EFFECTIVE AREA(ACRES) = 798.69 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 1290.77

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 22.04
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.918
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.10 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 10.51
EFFECTIVE AREA(ACRES) = 804.89 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 1301.28

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<<

FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<

FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.573
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.20 0.30 0.400 56 6.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 4.81
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 4.81

FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00
STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.15
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.50
 HALFSTREET FLOOD WIDTH(FEET) = 19.02
 AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.65
 PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.33
 STREET FLOW TRAVEL TIME(MIN.) = 1.72 Tc(MIN.) = 7.77
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.980

SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.30 0.30 0.600 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 4.40 0.30 0.400 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.486
 SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 26.57
 EFFECTIVE AREA(ACRES) = 8.90 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
 TOTAL AREA(ACRES) = 8.9 PEAK FLOW RATE(CFS) = 30.74

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.58 HALFSTREET FLOOD WIDTH(FEET) = 23.48
 FLOW VELOCITY(FEET/SEC.) = 3.00 DEPTH*VELOCITY(FT*FT/SEC.) = 1.75
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 402.00 = 588.00 FEET.

 FLOW PROCESS FROM NODE 402.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 588.00 DOWNSTREAM(FEET) = 581.00
 FLOW LENGTH(FEET) = 805.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 8.29
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 30.74
 PIPE TRAVEL TIME(MIN.) = 1.62 Tc(MIN.) = 9.39
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

 MAINLINE Tc(MIN.) = 9.39
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.424
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.10 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.00 0.30 0.900 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 8.80 0.30 0.600 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56

RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 4.90 0.30 0.400 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.577
 SUBAREA AREA(ACRES) = 15.90 SUBAREA RUNOFF(CFS) = 46.52
 EFFECTIVE AREA(ACRES) = 24.80 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.54
 TOTAL AREA(ACRES) = 24.8 PEAK FLOW RATE(CFS) = 72.80

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.39
 RAINFALL INTENSITY(INCH/HR) = 3.42
 AREA-AVERAGED Fm(INCH/HR) = 0.16
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.54
 EFFECTIVE STREAM AREA(ACRES) = 24.80
 TOTAL STREAM AREA(ACRES) = 24.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 72.80

 FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

 INITIAL SUBAREA FLOW-LENGTH(FEET) = 329.00
 ELEVATION DATA: UPSTREAM(FEET) = 725.00 DOWNSTREAM(FEET) = 630.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.196
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.491
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.10 0.30 1.000 72 9.20
 NATURAL FAIR COVER
 "OPEN BRUSH" B 1.30 0.30 1.000 66 9.20
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.10 0.30 1.000 66 9.20
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.31
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.31

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 196.00 CHANNEL SLOPE = 0.1684
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.319
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, NARROWLEAF"	B	0.10	0.30	1.000	72
NATURAL FAIR COVER "OPEN BRUSH"	B	1.70	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 6.89
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.55
 AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 0.50
 Tc (MIN.) = 9.69
 SUBAREA AREA (ACRES) = 1.90 SUBAREA RUNOFF (CFS) = 5.16
 EFFECTIVE AREA (ACRES) = 3.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 3.4 PEAK FLOW RATE (CFS) = 9.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 7.05
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>> TRAVEL TIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 597.00 DOWNSTREAM (FEET) = 582.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 520.00 CHANNEL SLOPE = 0.0288
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.948

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	3.70	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.20	0.30	0.600	56
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.30	0.30	1.000	65

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.22
 AVERAGE FLOW DEPTH (FEET) = 1.16 TRAVEL TIME (MIN.) = 2.05
 Tc (MIN.) = 11.75
 SUBAREA AREA (ACRES) = 6.40 SUBAREA RUNOFF (CFS) = 15.41
 EFFECTIVE AREA (ACRES) = 9.80 AREA-AVERAGED Fm (INCH/HR) = 0.28

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 9.8 PEAK FLOW RATE (CFS) = 23.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 4.58
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 582.00 DOWNSTREAM (FEET) = 581.00
 FLOW LENGTH (FEET) = 10.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.55
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 23.51
 PIPE TRAVEL TIME (MIN.) = 0.01 Tc (MIN.) = 11.75
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>> AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.75
 RAINFALL INTENSITY (INCH/HR) = 2.95
 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA (ACRES) = 9.80
 TOTAL STREAM AREA (ACRES) = 9.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 23.51

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	72.80	9.39	3.424	0.30 (0.16)	0.54	24.8	400.00
2	23.51	11.75	2.946	0.30 (0.28)	0.94	9.8	430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	94.95	9.39	3.424	0.30 (0.19)	0.64	32.6	400.00
2	85.66	11.75	2.946	0.30 (0.20)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 94.95 Tc (MIN.) = 9.39
 EFFECTIVE AREA (ACRES) = 32.63 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64

TOTAL AREA (ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 581.00 DOWNSTREAM (FEET) = 570.00
FLOW LENGTH (FEET) = 1056.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 11.54
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 94.95
PIPE TRAVEL TIME (MIN.) = 1.53 Tc (MIN.) = 10.91
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 10.91
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.074

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	4.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	1.00	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842
SUBAREA AREA (ACRES) = 7.70 SUBAREA RUNOFF (CFS) = 19.56
EFFECTIVE AREA (ACRES) = 40.33 AREA-AVERAGED Fm (INCH/HR) = 0.20
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.68
TOTAL AREA (ACRES) = 42.3 PEAK FLOW RATE (CFS) = 104.23

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 10.91
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.074

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	8.80	0.30	0.500	56

"5-7 DWELLINGS/ACRE" B 4.20 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.10 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
SUBAREA AREA (ACRES) = 14.10 SUBAREA RUNOFF (CFS) = 37.14
EFFECTIVE AREA (ACRES) = 54.43 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63
TOTAL AREA (ACRES) = 56.4 PEAK FLOW RATE (CFS) = 141.37

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 570.00 DOWNSTREAM (FEET) = 565.00
FLOW LENGTH (FEET) = 1526.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 49.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.21
ESTIMATED PIPE DIAMETER (INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 141.37
PIPE TRAVEL TIME (MIN.) = 3.10 Tc (MIN.) = 14.01
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 14.01
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.602

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	1.80	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.80	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.80	0.30	0.900	56
RESIDENTIAL "5-7 DWELLINGS/ACRE"	B	6.10	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.698
SUBAREA AREA (ACRES) = 13.00 SUBAREA RUNOFF (CFS) = 27.99
EFFECTIVE AREA (ACRES) = 67.43 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA (ACRES) = 69.4 PEAK FLOW RATE (CFS) = 146.21

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 14.01
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.602

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	11.20	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	7.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	1.40	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 45.26
EFFECTIVE AREA(ACRES) = 87.83 AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA(ACRES) = 89.8 PEAK FLOW RATE(CFS) = 191.47

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 565.00 DOWNSTREAM(FEET) = 495.00
FLOW LENGTH(FEET) = 2168.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 34.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.20
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 191.47
PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 15.72
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	5.50	0.30	0.100	56
COMMERCIAL	B	1.90	0.30	0.100	56
PUBLIC PARK	B	2.50	0.30	0.850	56
PUBLIC PARK	B	0.90	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	36.40	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	13.60	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA(ACRES) = 60.80 SUBAREA RUNOFF(CFS) = 127.09
EFFECTIVE AREA(ACRES) = 148.63 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 150.6 PEAK FLOW RATE(CFS) = 301.81

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.10	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.10	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 14.18
EFFECTIVE AREA(ACRES) = 156.03 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
TOTAL AREA(ACRES) = 158.0 PEAK FLOW RATE(CFS) = 315.99

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.390
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	9.30	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	0.90	0.30	0.400	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 10.20 SUBAREA RUNOFF(CFS) = 20.84
EFFECTIVE AREA(ACRES) = 166.23 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46
TOTAL AREA(ACRES) = 168.2 PEAK FLOW RATE(CFS) = 336.83

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.80

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 336.83
 PIPE TRAVEL TIME(MIN.) = 1.95 Tc(MIN.) = 17.67
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.30	0.30	0.200	56
COMMERCIAL	B	0.60	0.30	0.100	56
COMMERCIAL	B	9.10	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56
PUBLIC PARK	B	0.50	0.30	0.850	56
PUBLIC PARK	B	2.60	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.219

SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 38.44

EFFECTIVE AREA(ACRES) = 186.03 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44

TOTAL AREA(ACRES) = 188.0 PEAK FLOW RATE(CFS) = 350.33

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.40	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	10.60	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.60	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.90	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.308

SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 32.21

EFFECTIVE AREA(ACRES) = 202.83 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 204.8 PEAK FLOW RATE(CFS) = 382.54

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	14.30	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	15.30	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.40	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.90	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.579

SUBAREA AREA(ACRES) = 37.50 SUBAREA RUNOFF(CFS) = 69.17

EFFECTIVE AREA(ACRES) = 240.33 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA(ACRES) = 242.3 PEAK FLOW RATE(CFS) = 451.71

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.67

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.223

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.50	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	8.40	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	2.80	0.30	0.400	56
SCHOOL	B	0.60	0.30	0.600	56
SCHOOL	B	1.50	0.30	0.600	56
SCHOOL	B	3.50	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455

SUBAREA AREA(ACRES) = 20.30 SUBAREA RUNOFF(CFS) = 38.12

EFFECTIVE AREA(ACRES) = 260.63 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA(ACRES) = 262.6 PEAK FLOW RATE(CFS) = 489.83

FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 661.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 27.55
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 489.83
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 18.07
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<

FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 495.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.368
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.463
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" B 0.50 0.30 0.900 56 7.53
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.20 0.30 0.600 56 6.37
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.814
SUBAREA RUNOFF(CFS) = 2.66
TOTAL AREA(ACRES) = 0.70 PEAK FLOW RATE(CFS) = 2.66

FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 490.00
FLOW LENGTH(FEET) = 267.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.98

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.66
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 7.11
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.11
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.207
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.90 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.30 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.788
SUBAREA AREA(ACRES) = 1.70 SUBAREA RUNOFF(CFS) = 6.07
EFFECTIVE AREA(ACRES) = 2.40 AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 2.4 PEAK FLOW RATE(CFS) = 8.57

FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 490.00 DOWNSTREAM(FEET) = 480.00
FLOW LENGTH(FEET) = 520.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.23
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.57
PIPE TRAVEL TIME(MIN.) = 1.05 Tc(MIN.) = 8.16
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 8.16
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.845
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL

```

".4 DWELLING/ACRE"      B      2.00    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"      B      0.40    0.30    0.900    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      0.40    0.30    0.500    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      0.30    0.30    0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
SUBAREA AREA(ACRES) = 3.10    SUBAREA RUNOFF(CFS) = 10.05
EFFECTIVE AREA(ACRES) = 5.50    AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 5.5    PEAK FLOW RATE(CFS) = 17.84

```

FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 480.00    DOWNSTREAM(FEET) = 470.00
FLOW LENGTH(FEET) = 310.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55
ESTIMATED PIPE DIAMETER(INCH) = 18.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.84
PIPE TRAVEL TIME(MIN.) = 0.45    Tc(MIN.) = 8.61
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.

```

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 8.61
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.691
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      1.50    0.30    0.100    56
COMMERCIAL          B      0.10    0.30    0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"    B      2.80    0.30    0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"    B      1.00    0.30    0.900    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      0.20    0.30    0.500    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      0.10    0.30    0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
SUBAREA AREA(ACRES) = 5.70    SUBAREA RUNOFF(CFS) = 17.93
EFFECTIVE AREA(ACRES) = 11.20    AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 11.2    PEAK FLOW RATE(CFS) = 35.01

```

FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81

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-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 8.61
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.691
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS          B      0.10    0.30    0.200    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10    SUBAREA RUNOFF(CFS) = 0.33
EFFECTIVE AREA(ACRES) = 11.30    AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 11.3    PEAK FLOW RATE(CFS) = 35.33

```

FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM(FEET) = 470.00    DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 528.00    MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.34
ESTIMATED PIPE DIAMETER(INCH) = 24.00    NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 35.33
PIPE TRAVEL TIME(MIN.) = 0.54    Tc(MIN.) = 9.15
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.

```

FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81

```

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
-----
MAINLINE Tc(MIN.) = 9.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.506
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL          B      0.90    0.30    0.100    56
COMMERCIAL          B      0.60    0.30    0.100    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      6.30    0.30    0.500    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE"    B      3.70    0.30    0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
SUBAREA AREA(ACRES) = 11.50    SUBAREA RUNOFF(CFS) = 34.90
EFFECTIVE AREA(ACRES) = 22.80    AREA-AVERAGED Fm(INCH/HR) = 0.18
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.58
TOTAL AREA(ACRES) = 22.8    PEAK FLOW RATE(CFS) = 68.35

```

FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

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```
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 415.00
FLOW LENGTH(FEET) = 650.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.99
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 68.35
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.72
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.
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*****
FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81
-----
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```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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```
MAINLINE Tc(MIN.) = 9.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.310
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 1.60 0.30 0.200 56
APARTMENTS B 10.90 0.30 0.200 56
COMMERCIAL B 1.30 0.30 0.100 56
COMMERCIAL B 1.30 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 7.00 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
SUBAREA AREA(ACRES) = 23.20 SUBAREA RUNOFF(CFS) = 67.93
EFFECTIVE AREA(ACRES) = 46.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 46.0 PEAK FLOW RATE(CFS) = 132.25
```

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*****
FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81
-----
```

```
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 9.72
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.310
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.40 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 9.30 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
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```
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 42.66
EFFECTIVE AREA(ACRES) = 61.00 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 61.0 PEAK FLOW RATE(CFS) = 174.91
```

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*****
FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1
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```

```
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
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```
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.72
RAINFALL INTENSITY(INCH/HR) = 3.31
AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.41
EFFECTIVE STREAM AREA(ACRES) = 61.00
TOTAL STREAM AREA(ACRES) = 61.00
PEAK FLOW RATE(CFS) AT CONFLUENCE = 174.91
```

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*****
FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21
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```

```
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
```

```
INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 495.00
```

```
Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.368
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.463
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
".4 DWELLING/ACRE" B 0.70 0.30 0.900 56 7.53
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.20 0.30 0.600 56 6.37
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
SUBAREA RUNOFF(CFS) = 3.41
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.41
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*****
FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31
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```
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
```

```
ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 487.00
FLOW LENGTH(FEET) = 308.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.22
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.41
```

PIPE TRAVEL TIME(MIN.) = 0.71 Tc(MIN.) = 7.08
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.08

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 4.218

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL ".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
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RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	0.50	0.30	0.600	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817

SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 6.44

EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82

TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 9.65

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 487.00 DOWNSTREAM(FEET) = 478.00

FLOW LENGTH(FEET) = 373.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.3 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 9.24

ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 9.65

PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 7.75

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 7.75

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.987

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL ".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
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RESIDENTIAL ".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
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RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
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RESIDENTIAL "3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	56
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RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 1.70 0.30 0.600 56

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750

SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 14.90

EFFECTIVE AREA(ACRES) = 7.10 AREA-AVERAGED Fm(INCH/HR) = 0.23

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78

TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 23.99

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 454.00

FLOW LENGTH(FEET) = 995.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.1 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.55

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 23.99

PIPE TRAVEL TIME(MIN.) = 1.44 Tc(MIN.) = 9.19

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 2004.00 FEET.

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.19

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

APARTMENTS	B	0.80	0.30	0.200	56
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APARTMENTS	B	0.40	0.30	0.200	56
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PUBLIC PARK	B	0.90	0.30	0.850	56
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PUBLIC PARK	B	0.40	0.30	0.850	56
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RESIDENTIAL ".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
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RESIDENTIAL ".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626

SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 9.82

EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.22

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73

TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 30.65

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.19

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.493

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 3.30 0.30 0.600 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.10 0.30 0.600 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.600
 SUBAREA AREA (ACRES) = 5.40 SUBAREA RUNOFF (CFS) = 16.10
 EFFECTIVE AREA (ACRES) = 15.80 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69
 TOTAL AREA (ACRES) = 15.8 PEAK FLOW RATE (CFS) = 46.75

 FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 454.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 1555.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 19.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.81
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 46.75
 PIPE TRAVEL TIME (MIN.) = 1.88 Tc (MIN.) = 11.07
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.07
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.051
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

APARTMENTS B 3.70 0.30 0.200 56
 APARTMENTS B 6.80 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 2.60 0.30 0.200 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 2.20 0.30 0.600 56
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 9.90 0.30 0.600 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA (ACRES) = 25.90 SUBAREA RUNOFF (CFS) = 68.42
 EFFECTIVE AREA (ACRES) = 41.70 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 41.7 PEAK FLOW RATE (CFS) = 108.89

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 11.07
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.051
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ LAND USE SCS SOIL GROUP AREA (ACRES) Fp (INCH/HR) Ap (DECIMAL) SCS CN

RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 1.30 0.30 0.500 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 1.30 SUBAREA RUNOFF (CFS) = 3.39
 EFFECTIVE AREA (ACRES) = 43.00 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA (ACRES) = 43.0 PEAK FLOW RATE (CFS) = 112.29

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 11.07
 RAINFALL INTENSITY (INCH/HR) = 3.05
 AREA-AVERAGED Fm (INCH/HR) = 0.15
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.50
 EFFECTIVE STREAM AREA (ACRES) = 43.00
 TOTAL STREAM AREA (ACRES) = 43.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 112.29

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	174.91	9.72	3.310	0.30 (0.12)	0.41	61.0	410.00
2	112.29	11.07	3.051	0.30 (0.15)	0.50	43.0	420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	282.34	9.72	3.310	0.30 (0.13)	0.45	98.8	410.00
2	273.00	11.07	3.051	0.30 (0.13)	0.45	104.0	420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 282.34 Tc (MIN.) = 9.72
 EFFECTIVE AREA (ACRES) = 98.77 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 104.0
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 45.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.82
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 282.34
PIPE TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 10.68
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

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FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.110
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL             B       1.70     0.30     0.100     56
COMMERCIAL             B       2.90     0.30     0.100     56
PUBLIC PARK            B       3.60     0.30     0.850     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B       4.50     0.30     0.200     56
RESIDENTIAL
"11+ DWELLINGS/ACRE"  B       4.50     0.30     0.200     56
RESIDENTIAL
".4 DWELLING/ACRE"    B       0.10     0.30     0.900     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.313
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 46.96
EFFECTIVE AREA(ACRES) = 116.07 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 121.3 PEAK FLOW RATE(CFS) = 311.54

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FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.68
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.110
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B       0.80     0.30     0.400     56
RESIDENTIAL
"8-10 DWELLINGS/ACRE"  B       0.20     0.30     0.400     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA(ACRES) = 1.00 SUBAREA RUNOFF(CFS) = 2.69
EFFECTIVE AREA(ACRES) = 117.07 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
TOTAL AREA(ACRES) = 122.3 PEAK FLOW RATE(CFS) = 314.23

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FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 47.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.85
ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 314.23
PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 12.15
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

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FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.886
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL             B       0.70     0.30     0.100     56
COMMERCIAL             B       0.20     0.30     0.100     56
COMMERCIAL             B       0.40     0.30     0.100     56
PUBLIC PARK            B       5.70     0.30     0.850     56
PUBLIC PARK            B       4.50     0.30     0.850     56
PUBLIC PARK            B       9.40     0.30     0.850     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.803
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 49.75
EFFECTIVE AREA(ACRES) = 137.97 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 143.2 PEAK FLOW RATE(CFS) = 340.38

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FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.15
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.886
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE              GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
PUBLIC PARK            B       0.70     0.30     0.850     56
PUBLIC PARK            B       8.90     0.30     0.850     56
PUBLIC PARK            B       1.20     0.30     0.850     56
PUBLIC PARK            B       3.70     0.30     0.850     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 34.34
EFFECTIVE AREA(ACRES) = 152.47 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52

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TOTAL AREA (ACRES) = 157.7 PEAK FLOW RATE (CFS) = 374.71

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	374.71	12.15	2.886	0.30 (0.16)	0.52	152.5	410.00
2	358.30	13.50	2.680	0.30 (0.16)	0.52	157.7	420.00

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	489.83	18.07	2.189	0.30 (0.13)	0.45	260.6	400.00
2	444.90	20.52	1.997	0.30 (0.14)	0.45	262.6	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	815.84	12.15	2.886	0.30 (0.14)	0.48	327.7	410.00
2	811.75	13.50	2.680	0.30 (0.14)	0.48	352.4	420.00
3	778.47	18.07	2.189	0.30 (0.14)	0.48	418.3	400.00
4	706.27	20.52	1.997	0.30 (0.14)	0.48	420.3	430.00

TOTAL AREA (ACRES) = 420.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 815.84 Tc (MIN.) = 12.149
EFFECTIVE AREA (ACRES) = 327.72 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA (ACRES) = 420.3
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 372.00 DOWNSTREAM (FEET) = 300.00
FLOW LENGTH (FEET) = 1358.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 55.8 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 36.26
ESTIMATED PIPE DIAMETER (INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 815.84
PIPE TRAVEL TIME (MIN.) = 0.62 Tc (MIN.) = 12.77
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.77

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.40	0.30	0.200	56
APARTMENTS	B	15.00	0.30	0.200	56
APARTMENTS	B	5.80	0.30	0.200	56
APARTMENTS	B	2.50	0.30	0.200	56
COMMERCIAL	B	9.10	0.30	0.100	56
COMMERCIAL	B	1.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174

SUBAREA AREA (ACRES) = 41.30 SUBAREA RUNOFF (CFS) = 101.79

EFFECTIVE AREA (ACRES) = 369.02 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 461.6 PEAK FLOW RATE (CFS) = 882.32

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.77

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.791

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100

SUBAREA AREA (ACRES) = 0.90 SUBAREA RUNOFF (CFS) = 2.24

EFFECTIVE AREA (ACRES) = 369.92 AREA-AVERAGED Fm (INCH/HR) = 0.13

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 462.5 PEAK FLOW RATE (CFS) = 884.56

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	884.56	12.77	2.791	0.30 (0.13)	0.45	369.9	410.00
2	870.31	14.13	2.584	0.30 (0.13)	0.45	394.6	420.00
3	829.47	18.69	2.135	0.30 (0.13)	0.45	460.5	400.00
4	761.07	21.16	1.963	0.30 (0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1299.67	18.15	2.182	0.30 (0.12)	0.40	700.4	310.00
2	1301.25	21.85	1.927	0.30 (0.12)	0.40	800.6	300.00
3	1301.28	22.04	1.918	0.30 (0.12)	0.40	804.9	320.00

4 1127.11 27.95 1.635 0.30 (0.13) 0.42 829.8 390.00
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2069.21	12.77	2.791	0.30 (0.13)	0.42	862.7	410.00
2	2079.16	14.13	2.584	0.30 (0.13)	0.42	939.6	420.00
3	2133.99	18.15	2.182	0.30 (0.13)	0.42	1153.1	310.00
4	2129.38	18.69	2.135	0.30 (0.13)	0.42	1175.6	400.00
5	2062.03	21.16	1.963	0.30 (0.13)	0.42	1244.4	430.00
6	2047.36	21.85	1.927	0.30 (0.13)	0.42	1263.1	300.00
7	2043.43	22.04	1.918	0.30 (0.13)	0.42	1267.4	320.00
8	1751.75	27.95	1.635	0.30 (0.13)	0.43	1292.3	390.00

TOTAL AREA (ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2133.99 Tc (MIN.) = 18.152
EFFECTIVE AREA (ACRES) = 1153.06 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 1292.3
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1292.3 TC (MIN.) = 18.15
EFFECTIVE AREA (ACRES) = 1153.06 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.418
PEAK FLOW RATE (CFS) = 2133.99

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2069.21	12.77	2.791	0.30 (0.13)	0.42	862.7	410.00
2	2079.16	14.13	2.584	0.30 (0.13)	0.42	939.6	420.00
3	2133.99	18.15	2.182	0.30 (0.13)	0.42	1153.1	310.00
4	2129.38	18.69	2.135	0.30 (0.13)	0.42	1175.6	400.00
5	2062.03	21.16	1.963	0.30 (0.13)	0.42	1244.4	430.00
6	2047.36	21.85	1.927	0.30 (0.13)	0.42	1263.1	300.00
7	2043.43	22.04	1.918	0.30 (0.13)	0.42	1267.4	320.00
8	1751.75	27.95	1.635	0.30 (0.13)	0.43	1292.3	390.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 ROMP AMENDMENT 2022 - SUBWATERSHED C *
* PHASED NO PA5 RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 50-YR EV MAY 2023 ROKAMOTO *

FILE NAME: 3C50EVRL.DAT
TIME/DATE OF STUDY: 12:29 12/02/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.453
- 2) 10.00; 3.490
- 3) 15.00; 2.670
- 4) 20.00; 2.230
- 5) 25.00; 1.926
- 6) 30.00; 1.733
- 7) 40.00; 1.467
- 8) 50.00; 1.305
- 9) 60.00; 1.202
- 10) 90.00; 0.999
- 11) 120.00; 0.869
- 12) 180.00; 0.747
- 13) 360.00; 0.555
- 14) 1200.00; 0.244

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: MANNING			
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.200/0.200/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.200/0.200/ ---	0.33	1.00	0.3120	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 300.00 TO NODE 301.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 644.00 DOWNSTREAM(FEET) = 641.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.103
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	1.60	0.30	0.200	56	8.44

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 5.82
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 5.82

FLOW PROCESS FROM NODE 301.00 TO NODE 302.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 641.00 DOWNSTREAM ELEVATION(FEET) = 637.00
STREET LENGTH(FEET) = 470.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.15
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.66
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.55
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.13
STREET FLOW TRAVEL TIME(MIN.) = 3.07 Tc(MIN.) = 11.51
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.242
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 4.30 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.198
SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 12.60
EFFECTIVE AREA(ACRES) = 6.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 6.0 PEAK FLOW RATE(CFS) = 17.19

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.48 HALFSTREET FLOOD WIDTH(FEET) = 18.01
FLOW VELOCITY(FEET/SEC.) = 2.78 DEPTH*VELOCITY(FT*FT/SEC.) = 1.35
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 302.00 = 800.00 FEET.

FLOW PROCESS FROM NODE 302.00 TO NODE 303.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 637.00 DOWNSTREAM(FEET) = 634.00
FLOW LENGTH(FEET) = 563.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.99
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.19
PIPE TRAVEL TIME(MIN.) = 1.57 Tc(MIN.) = 13.08
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 303.00 = 1363.00 FEET.

FLOW PROCESS FROM NODE 303.00 TO NODE 303.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 13.08
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.985
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 21.06
EFFECTIVE AREA(ACRES) = 14.00 AREA-AVERAGED Fm(INCH/HR) = 0.06
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.20
TOTAL AREA(ACRES) = 14.0 PEAK FLOW RATE(CFS) = 36.86

FLOW PROCESS FROM NODE 303.00 TO NODE 304.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 634.00 DOWNSTREAM(FEET) = 630.00
FLOW LENGTH(FEET) = 1072.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.22
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 36.86
PIPE TRAVEL TIME(MIN.) = 2.87 Tc(MIN.) = 15.95
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 304.00 = 2435.00 FEET.

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 15.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.587
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.90 0.30 0.100 56
COMMERCIAL B 4.50 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.50 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.164
SUBAREA AREA(ACRES) = 16.10 SUBAREA RUNOFF(CFS) = 36.77
EFFECTIVE AREA(ACRES) = 30.10 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA(ACRES) = 30.1 PEAK FLOW RATE(CFS) = 68.60

FLOW PROCESS FROM NODE 304.00 TO NODE 304.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc(MIN.) = 15.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.587
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
SCHOOL B 5.70 0.30 0.600 56
SCHOOL B 6.70 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600
SUBAREA AREA(ACRES) = 12.40 SUBAREA RUNOFF(CFS) = 26.86
EFFECTIVE AREA(ACRES) = 42.50 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 42.5 PEAK FLOW RATE(CFS) = 95.46

FLOW PROCESS FROM NODE 304.00 TO NODE 305.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
=====

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 610.00
FLOW LENGTH(FEET) = 1290.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 13.40
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 95.46
PIPE TRAVEL TIME(MIN.) = 1.60 Tc(MIN.) = 17.55
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 305.00 = 3725.00 FEET.

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.55
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.00 0.30 0.100 56
COMMERCIAL B 0.90 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.10 0.30 0.200 56
SCHOOL B 0.10 0.30 0.600 56
SCHOOL B 0.50 0.30 0.600 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.216
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.86
EFFECTIVE AREA(ACRES) = 45.70 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.30
TOTAL AREA(ACRES) = 45.7 PEAK FLOW RATE(CFS) = 96.92

FLOW PROCESS FROM NODE 305.00 TO NODE 305.00 IS CODE = 82

>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<
>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 3668.00
ELEVATION DATA: UPSTREAM(FEET) = 663.00 DOWNSTREAM(FEET) = 610.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 18.909
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.326
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 1.70 0.30 0.100 56 18.91
COMMERCIAL B 4.40 0.30 0.100 56 18.91
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56 20.15
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.30 0.30 0.200 56 20.15
RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 7.10 0.30 0.600 56 25.63
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 2.80 0.30 0.600 56 25.63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
SUBAREA AREA(ACRES) = 17.90 INITIAL SUBAREA RUNOFF(CFS) = 35.60

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) = 17.55
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.445
SUBAREA AREA(ACRES) = 17.90 SUBAREA RUNOFF(CFS) = 37.52
EFFECTIVE AREA(ACRES) = 63.60 AREA-AVERAGED Fm(INCH/HR) = 0.10
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.32
TOTAL AREA(ACRES) = 63.6 PEAK FLOW RATE(CFS) = 134.44

FLOW PROCESS FROM NODE 305.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 610.00 DOWNSTREAM(FEET) = 535.00
FLOW LENGTH(FEET) = 1537.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.52
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 134.44
PIPE TRAVEL TIME(MIN.) = 1.14 Tc(MIN.) = 18.69
LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.69
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.345
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 3.30 0.30 0.100 56
COMMERCIAL B 0.40 0.30 0.100 56
PUBLIC PARK B 0.10 0.30 0.850 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.20 0.30 0.500 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.139
SUBAREA AREA(ACRES) = 4.00 SUBAREA RUNOFF(CFS) = 8.29
EFFECTIVE AREA(ACRES) = 67.60 AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA(ACRES) = 67.6 PEAK FLOW RATE(CFS) = 137.00

FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:

TIME OF CONCENTRATION(MIN.) = 18.69
RAINFALL INTENSITY(INCH/HR) = 2.35
AREA-AVERAGED Fm(INCH/HR) = 0.09
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.31
EFFECTIVE STREAM AREA(ACRES) = 67.60
TOTAL STREAM AREA(ACRES) = 67.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.00

FLOW PROCESS FROM NODE 310.00 TO NODE 311.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 629.00 DOWNSTREAM(FEET) = 625.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.474
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.482
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
COMMERCIAL B 0.10 0.30 0.100 56 7.47
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56 7.97
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56 7.97
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.193
SUBAREA RUNOFF(CFS) = 5.57
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 5.57

FLOW PROCESS FROM NODE 311.00 TO NODE 312.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

UPSTREAM ELEVATION(FEET) = 625.00 DOWNSTREAM ELEVATION(FEET) = 623.00
STREET LENGTH(FEET) = 300.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.25
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.35

AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.23
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.97
STREET FLOW TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 9.72
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.601

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.50 0.30 0.100 56
COMMERCIAL B 0.20 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.50 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.141
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 9.29
EFFECTIVE AREA(ACRES) = 4.30 AREA-AVERAGED Fm(INCH/HR) = 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.16
TOTAL AREA(ACRES) = 4.3 PEAK FLOW RATE(CFS) = 13.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.47 HALFSTREET FLOOD WIDTH(FEET) = 17.30
FLOW VELOCITY(FEET/SEC.) = 2.40 DEPTH*VELOCITY(FT*FT/SEC.) = 1.13
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 312.00 = 630.00 FEET.

FLOW PROCESS FROM NODE 312.00 TO NODE 313.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 623.00 DOWNSTREAM(FEET) = 620.00
FLOW LENGTH(FEET) = 369.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.69
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 13.75
PIPE TRAVEL TIME(MIN.) = 0.92 Tc(MIN.) = 10.64
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 313.00 = 999.00 FEET.

FLOW PROCESS FROM NODE 313.00 TO NODE 313.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.64
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.386
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 1.90 0.30 0.100 56
COMMERCIAL B 2.50 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.80 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.70 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.125

SUBAREA AREA (ACRES) = 5.90 SUBAREA RUNOFF (CFS) = 17.78
EFFECTIVE AREA (ACRES) = 10.20 AREA-AVERAGED Fm (INCH/HR) = 0.04
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.14
TOTAL AREA (ACRES) = 10.2 PEAK FLOW RATE (CFS) = 30.70

FLOW PROCESS FROM NODE 313.00 TO NODE 314.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 620.00 DOWNSTREAM (FEET) = 615.00
FLOW LENGTH (FEET) = 338.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.10
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 30.70
PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 11.19
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 314.00 = 1337.00 FEET.

FLOW PROCESS FROM NODE 314.00 TO NODE 314.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.19
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.294
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.20	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	0.20	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	6.10	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.208
SUBAREA AREA (ACRES) = 12.70 SUBAREA RUNOFF (CFS) = 36.94
EFFECTIVE AREA (ACRES) = 22.90 AREA-AVERAGED Fm (INCH/HR) = 0.05
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.18
TOTAL AREA (ACRES) = 22.9 PEAK FLOW RATE (CFS) = 66.80

FLOW PROCESS FROM NODE 314.00 TO NODE 315.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 615.00 DOWNSTREAM (FEET) = 600.00
FLOW LENGTH (FEET) = 578.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.9 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 15.21
ESTIMATED PIPE DIAMETER (INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 66.80
PIPE TRAVEL TIME (MIN.) = 0.63 Tc (MIN.) = 11.83
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 315.00 = 1915.00 FEET.

FLOW PROCESS FROM NODE 315.00 TO NODE 315.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 11.83
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.190
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.70	0.30	0.100	56
COMMERCIAL	B	1.30	0.30	0.100	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	3.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.10	0.30	0.200	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	3.70	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	6.00	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.347
SUBAREA AREA (ACRES) = 17.80 SUBAREA RUNOFF (CFS) = 49.44
EFFECTIVE AREA (ACRES) = 40.70 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.25
TOTAL AREA (ACRES) = 40.7 PEAK FLOW RATE (CFS) = 114.10

FLOW PROCESS FROM NODE 315.00 TO NODE 316.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 569.00
FLOW LENGTH (FEET) = 2176.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 31.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 13.87
ESTIMATED PIPE DIAMETER (INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 114.10
PIPE TRAVEL TIME (MIN.) = 2.61 Tc (MIN.) = 14.44
LONGEST FLOWPATH FROM NODE 310.00 TO NODE 316.00 = 4091.00 FEET.

FLOW PROCESS FROM NODE 316.00 TO NODE 316.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<<

=====

MAINLINE Tc (MIN.) = 14.44
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.762
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.40	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					

"5-7 DWELLINGS/ACRE" B 6.80 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 19.10 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 62.52
 EFFECTIVE AREA (ACRES) = 67.30 AREA-AVERAGED Fm (INCH/HR) = 0.10
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 67.3 PEAK FLOW RATE (CFS) = 160.92

 FLOW PROCESS FROM NODE 316.00 TO NODE 317.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 569.00 DOWNSTREAM(FEET) = 535.00
 FLOW LENGTH(FEET) = 759.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 31.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.77
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 160.92
 PIPE TRAVEL TIME(MIN.) = 0.56 Tc(MIN.) = 15.00
 LONGEST FLOWPATH FROM NODE 310.00 TO NODE 317.00 = 4850.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 15.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.670
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.40	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.70	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	8.90	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	7.40	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.505					
SUBAREA AREA (ACRES) = 17.50 SUBAREA RUNOFF(CFS) = 39.68					
EFFECTIVE AREA (ACRES) = 84.80 AREA-AVERAGED Fm (INCH/HR) = 0.11					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38					
TOTAL AREA (ACRES) = 84.8 PEAK FLOW RATE (CFS) = 195.07					

 FLOW PROCESS FROM NODE 317.00 TO NODE 317.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION(MIN.) = 15.00
 RAINFALL INTENSITY(INCH/HR) = 2.67
 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.38
 EFFECTIVE STREAM AREA (ACRES) = 84.80
 TOTAL STREAM AREA (ACRES) = 84.80
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 195.07

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	137.00	18.69	2.345	0.30 (0.09)	0.31	67.6	300.00
2	195.07	15.00	2.670	0.30 (0.11)	0.38	84.8	310.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	320.88	15.00	2.670	0.30 (0.11)	0.35	139.0	310.00
2	307.26	18.69	2.345	0.30 (0.11)	0.35	152.4	300.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 320.88 Tc(MIN.) = 15.00
 EFFECTIVE AREA (ACRES) = 139.04 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 152.4
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 317.00 = 5262.00 FEET.

 FLOW PROCESS FROM NODE 317.00 TO NODE 307.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 535.00 DOWNSTREAM(FEET) = 374.00
 FLOW LENGTH(FEET) = 3798.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.49
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 320.88
 PIPE TRAVEL TIME(MIN.) = 2.39 Tc(MIN.) = 17.39
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 307.00 = 9060.00 FEET.

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 17.39
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.10	0.30	0.200	56
COMMERCIAL	B	1.40	0.30	0.100	56

COMMERCIAL B 4.80 0.30 0.100 56
 COMMERCIAL B 5.00 0.30 0.100 56
 COMMERCIAL B 3.70 0.30 0.100 56
 PUBLIC PARK B 5.00 0.30 0.850 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.288
 SUBAREA AREA(ACRES) = 20.00 SUBAREA RUNOFF(CFS) = 42.72
 EFFECTIVE AREA(ACRES) = 159.04 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 172.4 PEAK FLOW RATE(CFS) = 337.27

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.39
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	4.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.70	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.10	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.50	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.50	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.364
 SUBAREA AREA(ACRES) = 21.90 SUBAREA RUNOFF(CFS) = 46.33
 EFFECTIVE AREA(ACRES) = 180.94 AREA-AVERAGED Fm(INCH/HR) = 0.10
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 194.3 PEAK FLOW RATE(CFS) = 383.60

 FLOW PROCESS FROM NODE 307.00 TO NODE 307.00 IS CODE = 81

 >>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.39
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.460
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	4.50	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.40	0.30	0.500	56
SCHOOL	B	2.20	0.30	0.600	56
SCHOOL	B	6.80	0.30	0.600	56
SCHOOL	B	7.90	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.574
 SUBAREA AREA(ACRES) = 22.80 SUBAREA RUNOFF(CFS) = 46.94
 EFFECTIVE AREA(ACRES) = 203.74 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA(ACRES) = 217.1 PEAK FLOW RATE(CFS) = 430.54

 FLOW PROCESS FROM NODE 307.00 TO NODE 330.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 374.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 847.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 40.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 35.38
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 430.54
 PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 17.79
 LONGEST FLOWPATH FROM NODE 300.00 TO NODE 330.00 = 9907.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

 >>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.79
 RAINFALL INTENSITY(INCH/HR) = 2.42
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.37
 EFFECTIVE STREAM AREA(ACRES) = 203.74
 TOTAL STREAM AREA(ACRES) = 217.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 430.54

 FLOW PROCESS FROM NODE 320.00 TO NODE 321.00 IS CODE = 21

 >>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
 ELEVATION DATA: UPSTREAM(FEET) = 636.00 DOWNSTREAM(FEET) = 633.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.438
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.103
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"11+ DWELLINGS/ACRE"	B	2.80	0.30	0.200	56	8.44

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
 SUBAREA RUNOFF(CFS) = 10.19
 TOTAL AREA(ACRES) = 2.80 PEAK FLOW RATE(CFS) = 10.19


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*****
FLOW PROCESS FROM NODE 321.00 TO NODE 322.00 IS CODE = 62
-----
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 633.00 DOWNSTREAM ELEVATION(FEET) = 628.00
STREET LENGTH(FEET) = 360.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 21.36
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.48
HALFSTREET FLOOD WIDTH(FEET) = 17.85
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.51
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.69
STREET FLOW TRAVEL TIME(MIN.) = 1.71 Tc(MIN.) = 10.15
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.466
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 6.30 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.20 0.30 0.200 56
SCHOOL B 0.70 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 7.30 SUBAREA RUNOFF(CFS) = 22.31
EFFECTIVE AREA(ACRES) = 10.10 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.23
TOTAL AREA(ACRES) = 10.1 PEAK FLOW RATE(CFS) = 30.89

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53 HALFSTREET FLOOD WIDTH(FEET) = 20.66
FLOW VELOCITY(FEET/SEC.) = 3.85 DEPTH*VELOCITY(FT*FT/SEC.) = 2.05
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 322.00 = 690.00 FEET.

*****
FLOW PROCESS FROM NODE 322.00 TO NODE 323.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 628.00 DOWNSTREAM(FEET) = 624.00
FLOW LENGTH(FEET) = 750.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.2 INCHES

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PIPE-FLOW VELOCITY(FEET/SEC.) = 6.92
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.89
PIPE TRAVEL TIME(MIN.) = 1.81 Tc(MIN.) = 11.95
LONGEST FLOWPATH FROM NODE 320.00 TO NODE 323.00 = 1440.00 FEET.

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.170
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
PUBLIC PARK B 2.00 0.30 0.850 56
PUBLIC PARK B 2.10 0.30 0.850 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 5.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.90 0.30 0.200 56
SCHOOL B 3.10 0.30 0.600 56
SCHOOL B 0.30 0.30 0.600 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.488
SUBAREA AREA(ACRES) = 14.00 SUBAREA RUNOFF(CFS) = 38.10
EFFECTIVE AREA(ACRES) = 24.10 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.1 PEAK FLOW RATE(CFS) = 66.29

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 323.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 11.95
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.170
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.10 0.30 0.200 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10 SUBAREA RUNOFF(CFS) = 0.28
EFFECTIVE AREA(ACRES) = 24.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 24.2 PEAK FLOW RATE(CFS) = 66.57

*****
FLOW PROCESS FROM NODE 323.00 TO NODE 324.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 624.00 DOWNSTREAM(FEET) = 614.00
FLOW LENGTH(FEET) = 887.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.2 INCHES

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PIPE-FLOW VELOCITY (FEET/SEC.) = 10.83
 ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 66.57
 PIPE TRAVEL TIME (MIN.) = 1.36 Tc (MIN.) = 13.32
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 324.00 = 2327.00 FEET.

 FLOW PROCESS FROM NODE 324.00 TO NODE 324.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.32
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.946
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.10	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56
PUBLIC PARK	B	3.10	0.30	0.850	56
PUBLIC PARK	B	2.60	0.30	0.850	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	4.80	0.30	0.200	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.40	0.30	0.200	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.416
 SUBAREA AREA (ACRES) = 16.10 SUBAREA RUNOFF (CFS) = 40.88
 EFFECTIVE AREA (ACRES) = 40.30 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.39
 TOTAL AREA (ACRES) = 40.3 PEAK FLOW RATE (CFS) = 102.57

 FLOW PROCESS FROM NODE 324.00 TO NODE 325.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 614.00 DOWNSTREAM (FEET) = 571.00
 FLOW LENGTH (FEET) = 1805.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.35
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 102.57
 PIPE TRAVEL TIME (MIN.) = 1.84 Tc (MIN.) = 15.16
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 325.00 = 4132.00 FEET.

 FLOW PROCESS FROM NODE 325.00 TO NODE 325.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.16
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.656
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	3.10	0.30	0.200	56

RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.20 0.30 0.900 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 13.90 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 18.60 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 42.00 SUBAREA RUNOFF (CFS) = 95.24
 EFFECTIVE AREA (ACRES) = 82.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 82.3 PEAK FLOW RATE (CFS) = 187.30

 FLOW PROCESS FROM NODE 325.00 TO NODE 326.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 571.00 DOWNSTREAM (FEET) = 497.00
 FLOW LENGTH (FEET) = 1090.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 29.4 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 27.91
 ESTIMATED PIPE DIAMETER (INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 187.30
 PIPE TRAVEL TIME (MIN.) = 0.65 Tc (MIN.) = 15.81
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 326.00 = 5222.00 FEET.

 FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.81
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.599
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.00	0.30	0.100	56
COMMERCIAL	B	6.10	0.30	0.100	56
COMMERCIAL	B	12.90	0.30	0.100	56
RESIDENTIAL "11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL ".4 DWELLING/ACRE"	B	12.80	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.423
 SUBAREA AREA (ACRES) = 34.00 SUBAREA RUNOFF (CFS) = 75.64
 EFFECTIVE AREA (ACRES) = 116.30 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA (ACRES) = 116.3 PEAK FLOW RATE (CFS) = 258.70

FLOW PROCESS FROM NODE 326.00 TO NODE 326.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.81

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.599

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	23.20	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56

RESIDENTIAL

"4 DWELLING/ACRE" B 23.20 0.30 0.900 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.890

SUBAREA AREA(ACRES) = 23.80 SUBAREA RUNOFF(CFS) = 49.95

EFFECTIVE AREA(ACRES) = 140.10 AREA-AVERAGED Fm(INCH/HR) = 0.15

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50

TOTAL AREA(ACRES) = 140.1 PEAK FLOW RATE(CFS) = 308.65

FLOW PROCESS FROM NODE 326.00 TO NODE 327.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 497.00 DOWNSTREAM(FEET) = 445.00

FLOW LENGTH(FEET) = 1732.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 54.0 INCH PIPE IS 42.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 23.14

ESTIMATED PIPE DIAMETER(INCH) = 54.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 308.65

PIPE TRAVEL TIME(MIN.) = 1.25 Tc(MIN.) = 17.06

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 327.00 = 6954.00 FEET.

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.06

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.489

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	4.80	0.30	0.100	56
COMMERCIAL	B	4.80	0.30	0.100	56
PUBLIC PARK	B	0.10	0.30	0.850	56
PUBLIC PARK	B	6.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	5.00	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	43.30	0.30	0.200	56

COMMERCIAL

B 4.80 0.30 0.100 56

COMMERCIAL

B 4.80 0.30 0.100 56

PUBLIC PARK

B 0.10 0.30 0.850 56

PUBLIC PARK

B 6.30 0.30 0.850 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 5.00 0.30 0.200 56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 43.30 0.30 0.200 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.250

SUBAREA AREA(ACRES) = 64.30 SUBAREA RUNOFF(CFS) = 139.71

EFFECTIVE AREA(ACRES) = 204.40 AREA-AVERAGED Fm(INCH/HR) = 0.13

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42

TOTAL AREA(ACRES) = 204.4 PEAK FLOW RATE(CFS) = 434.52

FLOW PROCESS FROM NODE 327.00 TO NODE 327.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.06

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.489

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	38.70	0.30	0.200	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	2.30	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	3.60	0.30	0.900	56

RESIDENTIAL

"11+ DWELLINGS/ACRE" B 38.70 0.30 0.200 56

RESIDENTIAL

"4 DWELLING/ACRE" B 2.30 0.30 0.900 56

RESIDENTIAL

"4 DWELLING/ACRE" B 3.60 0.30 0.900 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293

SUBAREA AREA(ACRES) = 44.60 SUBAREA RUNOFF(CFS) = 96.39

EFFECTIVE AREA(ACRES) = 249.00 AREA-AVERAGED Fm(INCH/HR) = 0.12

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40

TOTAL AREA(ACRES) = 249.0 PEAK FLOW RATE(CFS) = 530.91

FLOW PROCESS FROM NODE 327.00 TO NODE 328.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 445.00 DOWNSTREAM(FEET) = 338.00

FLOW LENGTH(FEET) = 2664.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 48.6 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 29.63

ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 530.91

PIPE TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 18.55

LONGEST FLOWPATH FROM NODE 320.00 TO NODE 328.00 = 9618.00 FEET.

FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 18.55

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.357

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.50	0.30	0.200	56
APARTMENTS	B	14.80	0.30	0.200	56
APARTMENTS	B	1.90	0.30	0.200	56
APARTMENTS	B	9.90	0.30	0.200	56
COMMERCIAL	B	1.80	0.30	0.100	56

APARTMENTS

B 0.50 0.30 0.200 56

APARTMENTS

B 14.80 0.30 0.200 56

APARTMENTS

B 1.90 0.30 0.200 56

APARTMENTS

B 9.90 0.30 0.200 56

COMMERCIAL

B 1.80 0.30 0.100 56

COMMERCIAL B 8.40 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.173
 SUBAREA AREA (ACRES) = 37.30 SUBAREA RUNOFF (CFS) = 77.39
 EFFECTIVE AREA (ACRES) = 286.30 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 286.3 PEAK FLOW RATE (CFS) = 578.75

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.55
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	7.60	0.30	0.100	56
COMMERCIAL	B	14.00	0.30	0.100	56
PUBLIC PARK	B	1.40	0.30	0.850	56
PUBLIC PARK	B	0.30	0.30	0.850	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.30	0.30	0.200	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.156
 SUBAREA AREA (ACRES) = 23.80 SUBAREA RUNOFF (CFS) = 49.49
 EFFECTIVE AREA (ACRES) = 310.10 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 310.1 PEAK FLOW RATE (CFS) = 628.24

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.55
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	12.20	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	17.60	0.30	0.200	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	9.30	0.30	0.900	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.20	0.30	0.500	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.383
 SUBAREA AREA (ACRES) = 40.50 SUBAREA RUNOFF (CFS) = 81.73

EFFECTIVE AREA (ACRES) = 350.60 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
 TOTAL AREA (ACRES) = 350.6 PEAK FLOW RATE (CFS) = 709.97

 FLOW PROCESS FROM NODE 328.00 TO NODE 328.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 18.55
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.357
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	5.30	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	28.30	0.30	0.500	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	3.80	0.30	0.400	56
RESIDENTIAL					
"8-10 DWELLINGS/ACRE"	B	4.10	0.30	0.400	56
SCHOOL	B	0.30	0.30	0.600	56
SCHOOL	B	0.30	0.30	0.600	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.483
 SUBAREA AREA (ACRES) = 42.10 SUBAREA RUNOFF (CFS) = 83.83
 EFFECTIVE AREA (ACRES) = 392.70 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.37
 TOTAL AREA (ACRES) = 392.7 PEAK FLOW RATE (CFS) = 793.80

 FLOW PROCESS FROM NODE 328.00 TO NODE 329.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM (FEET) = 338.00 DOWNSTREAM (FEET) = 320.00
 FLOW LENGTH (FEET) = 1154.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 87.0 INCH PIPE IS 68.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 22.92
 ESTIMATED PIPE DIAMETER (INCH) = 87.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 793.80
 PIPE TRAVEL TIME (MIN.) = 0.84 Tc (MIN.) = 19.39
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 329.00 = 10772.00 FEET.

 FLOW PROCESS FROM NODE 329.00 TO NODE 329.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc (MIN.) = 19.39
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.283
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	11.60	0.30	0.100	56
COMMERCIAL	B	6.70	0.30	0.100	56

COMMERCIAL B 12.80 0.30 0.100 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.110
 SUBAREA AREA(ACRES) = 31.50 SUBAREA RUNOFF(CFS) = 63.80
 EFFECTIVE AREA(ACRES) = 424.20 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA(ACRES) = 424.2 PEAK FLOW RATE(CFS) = 831.50

 FLOW PROCESS FROM NODE 329.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM(FEET) = 320.00 DOWNSTREAM(FEET) = 310.00
 FLOW LENGTH(FEET) = 1981.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 108.0 INCH PIPE IS 87.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 15.08
 ESTIMATED PIPE DIAMETER(INCH) = 108.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 831.50
 PIPE TRAVEL TIME(MIN.) = 2.19 Tc(MIN.) = 21.58
 LONGEST FLOWPATH FROM NODE 320.00 TO NODE 330.00 = 12753.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 21.58
 RAINFALL INTENSITY(INCH/HR) = 2.13
 AREA-AVERAGED Fm(INCH/HR) = 0.11
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.35
 EFFECTIVE STREAM AREA(ACRES) = 424.20
 TOTAL STREAM AREA(ACRES) = 424.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 831.50

 FLOW PROCESS FROM NODE 390.00 TO NODE 391.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 317.00
 ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 775.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.195
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.806
 SUBAREA Tc AND LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)

NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.20 0.30 1.000 72 9.20
 NATURAL FAIR COVER
 "OPEN BRUSH" B 1.20 0.30 1.000 66 9.20
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.42
 TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 4.42

 FLOW PROCESS FROM NODE 391.00 TO NODE 392.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 775.00 DOWNSTREAM(FEET) = 700.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 545.00 CHANNEL SLOPE = 0.1376
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.383
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 1.70 0.30 1.000 72
 NATURAL FAIR COVER
 "CHAPARRAL,NARROWLEAF" B 0.60 0.30 1.000 72
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.61
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.23
 AVERAGE FLOW DEPTH(FEET) = 0.64 TRAVEL TIME(MIN.) = 1.46
 Tc(MIN.) = 10.65
 SUBAREA AREA(ACRES) = 2.30 SUBAREA RUNOFF(CFS) = 6.38
 EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 10.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 6.71
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 392.00 = 862.00 FEET.

 FLOW PROCESS FROM NODE 392.00 TO NODE 393.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM(FEET) = 700.00 DOWNSTREAM(FEET) = 635.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1093.00 CHANNEL SLOPE = 0.0595
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.942
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.40 0.30 1.000 63

NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 8.40 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 2.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 9.20 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 37.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.78
AVERAGE FLOW DEPTH(FEET) = 1.36 TRAVEL TIME(MIN.) = 2.69
Tc(MIN.) = 13.34
SUBAREA AREA(ACRES) = 22.70 SUBAREA RUNOFF(CFS) = 53.99
EFFECTIVE AREA(ACRES) = 26.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 26.4 PEAK FLOW RATE(CFS) = 62.79

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.65 FLOW VELOCITY(FEET/SEC.) = 7.68
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 393.00 = 1955.00 FEET.

FLOW PROCESS FROM NODE 393.00 TO NODE 394.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 598.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 904.00 CHANNEL SLOPE = 0.0409
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.60 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.50 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 1.80 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 6.80 0.30 1.000 72
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 80.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.11
AVERAGE FLOW DEPTH(FEET) = 1.95 TRAVEL TIME(MIN.) = 2.12
Tc(MIN.) = 15.46
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 36.27

EFFECTIVE AREA(ACRES) = 43.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 43.7 PEAK FLOW RATE(CFS) = 91.63

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.04 FLOW VELOCITY(FEET/SEC.) = 7.34
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 394.00 = 2859.00 FEET.

FLOW PROCESS FROM NODE 394.00 TO NODE 394.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 15.46
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.630
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 2.50 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 2.60 SUBAREA RUNOFF(CFS) = 5.45
EFFECTIVE AREA(ACRES) = 46.30 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 46.3 PEAK FLOW RATE(CFS) = 97.08

FLOW PROCESS FROM NODE 394.00 TO NODE 395.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 598.00 DOWNSTREAM(FEET) = 573.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 701.00 CHANNEL SLOPE = 0.0357
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.495
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 5.90 0.30 1.000 72
NATURAL FAIR COVER
"CHAPARRAL,NARROWLEAF" B 12.70 0.30 1.000 72
NATURAL FAIR COVER
"OPEN BRUSH" B 6.80 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 3.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 131.75

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.63
 AVERAGE FLOW DEPTH (FEET) = 2.40 TRAVEL TIME (MIN.) = 1.53
 Tc (MIN.) = 16.99
 SUBAREA AREA (ACRES) = 35.10 SUBAREA RUNOFF (CFS) = 69.34
 EFFECTIVE AREA (ACRES) = 81.40 AREA-AVERAGED Fm (INCH/HR) = 0.30
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 81.4 PEAK FLOW RATE (CFS) = 160.80

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 2.58 FLOW VELOCITY (FEET/SEC.) = 8.03
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 395.00 = 3560.00 FEET.

 FLOW PROCESS FROM NODE 395.00 TO NODE 395.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 16.99
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.495
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	1.00	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER					
"WOODLAND, GRASS"	B	0.10	0.30	1.000	65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.914					
SUBAREA AREA (ACRES) = 4.30 SUBAREA RUNOFF (CFS) = 8.59					
EFFECTIVE AREA (ACRES) = 85.70 AREA-AVERAGED Fm (INCH/HR) = 0.30					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00					
TOTAL AREA (ACRES) = 85.7 PEAK FLOW RATE (CFS) = 169.40					

 FLOW PROCESS FROM NODE 395.00 TO NODE 370.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 573.00 DOWNSTREAM (FEET) = 437.00
 FLOW LENGTH (FEET) = 6286.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 33.8 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.89
 ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 169.40
 PIPE TRAVEL TIME (MIN.) = 5.86 Tc (MIN.) = 22.85
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 370.00 = 9846.00 FEET.

 FLOW PROCESS FROM NODE 370.00 TO NODE 371.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 437.00 DOWNSTREAM (FEET) = 345.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1963.00 CHANNEL SLOPE = 0.0469
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.870

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.50	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL, BROADLEAF"	B	0.60	0.30	1.000	63
COMMERCIAL	B	1.50	0.30	0.100	56
COMMERCIAL	B	0.70	0.30	0.100	56
COMMERCIAL	B	1.60	0.30	0.100	56
COMMERCIAL	B	1.10	0.30	0.100	56

=====

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.265
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 174.23
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.09
 AVERAGE FLOW DEPTH (FEET) = 2.53 TRAVEL TIME (MIN.) = 3.60
 Tc (MIN.) = 26.45
 SUBAREA AREA (ACRES) = 6.00 SUBAREA RUNOFF (CFS) = 9.67
 EFFECTIVE AREA (ACRES) = 91.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 91.7 PEAK FLOW RATE (CFS) = 169.40
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 2.51 FLOW VELOCITY (FEET/SEC.) = 9.00
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 371.00 = 11809.00 FEET.

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc (MIN.) = 26.45
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.870
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	1.40	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	2.80	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000					
SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 11.87					
EFFECTIVE AREA (ACRES) = 100.10 AREA-AVERAGED Fm (INCH/HR) = 0.29					

AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 100.1 PEAK FLOW RATE (CFS) = 169.40
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.45
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.870
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.80 0.30 1.000 66
 PUBLIC PARK B 0.10 0.30 0.850 56
 PUBLIC PARK B 3.80 0.30 0.850 56
 PUBLIC PARK B 2.50 0.30 0.850 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 2.40 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.877
 SUBAREA AREA (ACRES) = 10.30 SUBAREA RUNOFF (CFS) = 14.90
 EFFECTIVE AREA (ACRES) = 110.40 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.95
 TOTAL AREA (ACRES) = 110.4 PEAK FLOW RATE (CFS) = 169.40
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 371.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 26.45
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 1.870
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 3.50 0.30 0.900 56
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 1.10 0.30 0.900 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 0.20 0.30 1.000 65
 NATURAL FAIR COVER
 "WOODLAND, GRASS" B 1.90 0.30 1.000 65
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.924
 SUBAREA AREA (ACRES) = 6.80 SUBAREA RUNOFF (CFS) = 9.75
 EFFECTIVE AREA (ACRES) = 117.20 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 117.2 PEAK FLOW RATE (CFS) = 169.40
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 FLOW PROCESS FROM NODE 371.00 TO NODE 330.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 345.00 DOWNSTREAM (FEET) = 310.00
 FLOW LENGTH (FEET) = 1065.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 42.0 INCH PIPE IS 33.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 20.50
 ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 169.40
 PIPE TRAVEL TIME (MIN.) = 0.87 Tc (MIN.) = 27.31
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.

 FLOW PROCESS FROM NODE 330.00 TO NODE 330.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION (MIN.) = 27.31
 RAINFALL INTENSITY (INCH/HR) = 1.84
 AREA-AVERAGED Fm (INCH/HR) = 0.28
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA (ACRES) = 117.20
 TOTAL STREAM AREA (ACRES) = 117.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 169.40

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	430.54	17.79	2.425	0.30 (0.11)	0.37	203.7	310.00
1	401.15	21.49	2.140	0.30 (0.11)	0.37	217.1	300.00
2	831.50	21.58	2.134	0.30 (0.11)	0.35	424.2	320.00
3	169.40	27.31	1.837	0.30 (0.28)	0.94	117.2	390.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1366.17	17.79	2.425	0.30 (0.13)	0.43	629.6	310.00
2	1390.60	21.49	2.140	0.30 (0.13)	0.43	731.7	300.00
3	1390.96	21.58	2.134	0.30 (0.13)	0.43	733.9	320.00
4	1220.40	27.31	1.837	0.30 (0.13)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE (CFS) = 1390.96 Tc (MIN.) = 21.58
 EFFECTIVE AREA (ACRES) = 733.91 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.43
 TOTAL AREA (ACRES) = 758.5
 LONGEST FLOWPATH FROM NODE 390.00 TO NODE 330.00 = 12874.00 FEET.


```
*****
FLOW PROCESS FROM NODE 330.00 TO NODE 331.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 310.00 DOWNSTREAM(FEET) = 280.00
FLOW LENGTH(FEET) = 374.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 78.0 INCH PIPE IS 63.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 48.39
ESTIMATED PIPE DIAMETER(INCH) = 78.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1390.96
PIPE TRAVEL TIME(MIN.) = 0.13 Tc(MIN.) = 21.71
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
```

```
MAINLINE Tc(MIN.) = 21.71
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.126
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 17.50 0.30 0.200 56
APARTMENTS B 1.50 0.30 0.200 56
APARTMENTS B 0.70 0.30 0.200 56
NATURAL POOR COVER
"BARREN" B 0.10 0.30 1.000 86
COMMERCIAL B 44.60 0.30 0.100 56
COMMERCIAL B 0.70 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.132
SUBAREA AREA(ACRES) = 65.10 SUBAREA RUNOFF(CFS) = 122.25
EFFECTIVE AREA(ACRES) = 799.01 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 1440.96
```

```
** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 1433.61 17.91 2.414 0.30( 0.12) 0.40 694.7 310.00
2 1441.03 21.62 2.132 0.30( 0.12) 0.41 796.8 300.00
3 1440.96 21.71 2.126 0.30( 0.12) 0.41 799.0 320.00
4 1263.58 27.44 1.832 0.30( 0.13) 0.42 823.6 390.00
```

```
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 1441.03 Tc(MIN.) = 21.62
AREA-AVERAGED Fm(INCH/HR) = 0.12 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.41 EFFECTIVE AREA(ACRES) = 796.75
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 21.62
```

```
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.132
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 2.00 0.30 0.100 56
COMMERCIAL B 4.10 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.115
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 11.70
EFFECTIVE AREA(ACRES) = 802.95 AREA-AVERAGED Fm(INCH/HR) = 0.12
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.40
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 1452.73
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 10
-----
>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 13
-----
>>>>CLEAR THE MAIN-STREAM MEMORY<<<<
=====
```

```
*****
FLOW PROCESS FROM NODE 400.00 TO NODE 401.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 618.00 DOWNSTREAM(FEET) = 590.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 6.048
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 5.042
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.20 0.30 0.400 56 6.05
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA RUNOFF(CFS) = 5.32
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 5.32
```

```
*****
FLOW PROCESS FROM NODE 401.00 TO NODE 402.00 IS CODE = 62
-----
```

```
>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<
=====
UPSTREAM ELEVATION(FEET) = 590.00 DOWNSTREAM ELEVATION(FEET) = 588.00
STREET LENGTH(FEET) = 274.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00
```


SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 4.73
 TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 4.73

 FLOW PROCESS FROM NODE 431.00 TO NODE 432.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 630.00 DOWNSTREAM(FEET) = 597.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 196.00 CHANNEL SLOPE = 0.1684
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.615

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,NARROWLEAF"	B	0.10	0.30	1.000	72
NATURAL FAIR COVER					
"OPEN BRUSH"	B	1.70	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.57
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.71
 AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 0.49
 Tc(MIN.) = 9.68
 SUBAREA AREA(ACRES) = 1.90 SUBAREA RUNOFF(CFS) = 5.67
 EFFECTIVE AREA(ACRES) = 3.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 3.4 PEAK FLOW RATE(CFS) = 10.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 7.23
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 432.00 = 525.00 FEET.

 FLOW PROCESS FROM NODE 432.00 TO NODE 433.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 597.00 DOWNSTREAM(FEET) = 582.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 520.00 CHANNEL SLOPE = 0.0288
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.215

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.70	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 1.20 0.30 0.600 56
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.30 0.30 1.000 65
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.906
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.63
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.35
 AVERAGE FLOW DEPTH(FEET) = 1.19 TRAVEL TIME(MIN.) = 1.99
 Tc(MIN.) = 11.68
 SUBAREA AREA(ACRES) = 6.40 SUBAREA RUNOFF(CFS) = 16.95
 EFFECTIVE AREA(ACRES) = 9.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 9.8 PEAK FLOW RATE(CFS) = 25.87

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.36 FLOW VELOCITY(FEET/SEC.) = 4.70
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 433.00 = 1045.00 FEET.

 FLOW PROCESS FROM NODE 433.00 TO NODE 403.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 582.00 DOWNSTREAM(FEET) = 581.00
 FLOW LENGTH(FEET) = 10.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.90
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 25.87
 PIPE TRAVEL TIME(MIN.) = 0.01 Tc(MIN.) = 11.68
 LONGEST FLOWPATH FROM NODE 430.00 TO NODE 403.00 = 1055.00 FEET.

 FLOW PROCESS FROM NODE 403.00 TO NODE 403.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.68
 RAINFALL INTENSITY(INCH/HR) = 3.21
 AREA-AVERAGED Fm(INCH/HR) = 0.28
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 9.80
 TOTAL STREAM AREA(ACRES) = 9.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 25.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	80.17	9.33	3.754	0.30(0.16)	0.54	24.8	400.00
2	25.87	11.68	3.214	0.30(0.28)	0.94	9.8	430.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	104.63	9.33	3.754	0.30 (0.19)	0.64	32.6	400.00
2	93.99	11.68	3.214	0.30 (0.20)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 104.63 Tc(MIN.) = 9.33
EFFECTIVE AREA(ACRES) = 32.62 AREA-AVERAGED Fm(INCH/HR) = 0.19
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA(ACRES) = 34.6
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 403.00 = 1393.00 FEET.

FLOW PROCESS FROM NODE 403.00 TO NODE 404.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 581.00 DOWNSTREAM(FEET) = 570.00

FLOW LENGTH(FEET) = 1056.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 45.0 INCH PIPE IS 33.2 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 11.99

ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 104.63

PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 10.80

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 404.00 = 2449.00 FEET.

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.80

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	0.10	0.30	0.100	56

NATURAL FAIR COVER

"OPEN BRUSH" B 0.10 0.30 1.000 66

RESIDENTIAL

".4 DWELLING/ACRE" B 4.90 0.30 0.900 56

RESIDENTIAL

".4 DWELLING/ACRE" B 1.50 0.30 0.900 56

RESIDENTIAL

"3-4 DWELLINGS/ACRE" B 1.00 0.30 0.600 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842

SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 21.53

EFFECTIVE AREA(ACRES) = 40.32 AREA-AVERAGED Fm(INCH/HR) = 0.20

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.68

TOTAL AREA(ACRES) = 42.3 PEAK FLOW RATE(CFS) = 114.57

FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.80

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.359

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL	B	8.80	0.30	0.500	56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 4.20 0.30 0.500 56

RESIDENTIAL

"8-10 DWELLINGS/ACRE" B 1.10 0.30 0.400 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492

SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 40.76

EFFECTIVE AREA(ACRES) = 54.42 AREA-AVERAGED Fm(INCH/HR) = 0.19

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.63

TOTAL AREA(ACRES) = 56.4 PEAK FLOW RATE(CFS) = 155.32

FLOW PROCESS FROM NODE 404.00 TO NODE 405.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 570.00 DOWNSTREAM(FEET) = 565.00

FLOW LENGTH(FEET) = 1526.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 63.0 INCH PIPE IS 49.7 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 8.48

ESTIMATED PIPE DIAMETER(INCH) = 63.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 155.32

PIPE TRAVEL TIME(MIN.) = 3.00 Tc(MIN.) = 13.80

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 405.00 = 3975.00 FEET.

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.80

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.867

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
PUBLIC PARK	B	1.80	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56

RESIDENTIAL

".4 DWELLING/ACRE" B 1.80 0.30 0.900 56

RESIDENTIAL

".4 DWELLING/ACRE" B 2.80 0.30 0.900 56

RESIDENTIAL

"5-7 DWELLINGS/ACRE" B 6.10 0.30 0.500 56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.698

SUBAREA AREA (ACRES) = 13.00 SUBAREA RUNOFF (CFS) = 31.10
EFFECTIVE AREA (ACRES) = 67.42 AREA-AVERAGED Fm (INCH/HR) = 0.19
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.64
TOTAL AREA (ACRES) = 69.4 PEAK FLOW RATE (CFS) = 162.32

FLOW PROCESS FROM NODE 405.00 TO NODE 405.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 13.80
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.867
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 11.20 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 7.80 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 1.40 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
SUBAREA AREA (ACRES) = 20.40 SUBAREA RUNOFF (CFS) = 50.14
EFFECTIVE AREA (ACRES) = 87.82 AREA-AVERAGED Fm (INCH/HR) = 0.18
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.60
TOTAL AREA (ACRES) = 89.8 PEAK FLOW RATE (CFS) = 212.45

FLOW PROCESS FROM NODE 405.00 TO NODE 406.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 565.00 DOWNSTREAM (FEET) = 495.00
FLOW LENGTH (FEET) = 2168.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.94
ESTIMATED PIPE DIAMETER (INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 212.45
PIPE TRAVEL TIME (MIN.) = 1.65 Tc (MIN.) = 15.44
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 406.00 = 6143.00 FEET.

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.44
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 5.50 0.30 0.100 56
COMMERCIAL B 1.90 0.30 0.100 56
PUBLIC PARK B 2.50 0.30 0.850 56
PUBLIC PARK B 0.90 0.30 0.850 56
RESIDENTIAL

"11+ DWELLINGS/ACRE" B 36.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 13.60 0.30 0.200 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.224
SUBAREA AREA (ACRES) = 60.80 SUBAREA RUNOFF (CFS) = 140.28
EFFECTIVE AREA (ACRES) = 148.62 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA (ACRES) = 150.6 PEAK FLOW RATE (CFS) = 334.06

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.44
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 4.70 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.10 0.30 0.900 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 0.10 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.30 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.10 0.30 0.500 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.868
SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 15.79
EFFECTIVE AREA (ACRES) = 156.02 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.47
TOTAL AREA (ACRES) = 158.0 PEAK FLOW RATE (CFS) = 349.85

FLOW PROCESS FROM NODE 406.00 TO NODE 406.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 15.44
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 2.631
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 9.30 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 0.90 0.30 0.400 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.400
SUBAREA AREA (ACRES) = 10.20 SUBAREA RUNOFF (CFS) = 23.05
EFFECTIVE AREA (ACRES) = 166.22 AREA-AVERAGED Fm (INCH/HR) = 0.14
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.46

TOTAL AREA (ACRES) = 168.2 PEAK FLOW RATE (CFS) = 372.90

FLOW PROCESS FROM NODE 406.00 TO NODE 407.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 2905.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 43.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.63
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 372.90
PIPE TRAVEL TIME(MIN.) = 1.89 Tc(MIN.) = 17.33
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 407.00 = 9048.00 FEET.

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.33
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.465
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
APARTMENTS B 0.30 0.30 0.200 56
COMMERCIAL B 0.60 0.30 0.100 56
COMMERCIAL B 9.10 0.30 0.100 56
COMMERCIAL B 6.70 0.30 0.100 56
PUBLIC PARK B 0.50 0.30 0.850 56
PUBLIC PARK B 2.60 0.30 0.850 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.219
SUBAREA AREA(ACRES) = 19.80 SUBAREA RUNOFF(CFS) = 42.75
EFFECTIVE AREA(ACRES) = 186.02 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.44
TOTAL AREA(ACRES) = 188.0 PEAK FLOW RATE(CFS) = 390.78

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.33
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.465
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 2.40 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 10.60 0.30 0.200 56
RESIDENTIAL
"11+ DWELLINGS/ACRE" B 0.60 0.30 0.200 56

RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.308
SUBAREA AREA(ACRES) = 16.80 SUBAREA RUNOFF(CFS) = 35.87
EFFECTIVE AREA(ACRES) = 202.82 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 204.8 PEAK FLOW RATE(CFS) = 426.65

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.33
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.465
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 14.30 0.30 0.600 56
RESIDENTIAL
"3-4 DWELLINGS/ACRE" B 15.30 0.30 0.600 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.40 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 1.50 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 5.10 0.30 0.500 56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B 0.90 0.30 0.500 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.579
SUBAREA AREA(ACRES) = 37.50 SUBAREA RUNOFF(CFS) = 77.32
EFFECTIVE AREA(ACRES) = 240.32 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 242.3 PEAK FLOW RATE(CFS) = 503.97

FLOW PROCESS FROM NODE 407.00 TO NODE 407.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 17.33
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.465
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 3.50 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 8.40 0.30 0.400 56
RESIDENTIAL
"8-10 DWELLINGS/ACRE" B 2.80 0.30 0.400 56
SCHOOL B 0.60 0.30 0.600 56
SCHOOL B 1.50 0.30 0.600 56

SCHOOL B 3.50 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.455
 SUBAREA AREA (ACRES) = 20.30 SUBAREA RUNOFF (CFS) = 42.54
 EFFECTIVE AREA (ACRES) = 260.62 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA (ACRES) = 262.6 PEAK FLOW RATE (CFS) = 546.51

 FLOW PROCESS FROM NODE 407.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 395.00 DOWNSTREAM (FEET) = 372.00
 FLOW LENGTH (FEET) = 661.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 66.0 INCH PIPE IS 49.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 28.38
 ESTIMATED PIPE DIAMETER (INCH) = 66.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 546.51
 PIPE TRAVEL TIME (MIN.) = 0.39 Tc (MIN.) = 17.72
 LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 10

>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
 =====

 FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 13

>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
 =====

 FLOW PROCESS FROM NODE 410.00 TO NODE 411.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.916
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
"4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	7.53
RESIDENTIAL						
"3-4 DWELLINGS/ACRE"	B	0.20	0.30	0.600	56	6.37
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30						
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.814						
SUBAREA RUNOFF (CFS) = 2.94						
TOTAL AREA (ACRES) = 0.70 PEAK FLOW RATE (CFS) = 2.94						

 FLOW PROCESS FROM NODE 411.00 TO NODE 412.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 490.00
 FLOW LENGTH (FEET) = 267.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.7 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 6.15
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 2.94
 PIPE TRAVEL TIME (MIN.) = 0.72 Tc (MIN.) = 7.09
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 412.00 = 595.00 FEET.

 FLOW PROCESS FROM NODE 412.00 TO NODE 412.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 7.09
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.632

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
RESIDENTIAL					
"4 DWELLING/ACRE"	B	0.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.10	0.30	0.500	56
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	0.30	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.788					
SUBAREA AREA (ACRES) = 1.70 SUBAREA RUNOFF (CFS) = 6.73					
EFFECTIVE AREA (ACRES) = 2.40 AREA-AVERAGED Fm (INCH/HR) = 0.24					
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80					
TOTAL AREA (ACRES) = 2.4 PEAK FLOW RATE (CFS) = 9.49					

 FLOW PROCESS FROM NODE 412.00 TO NODE 413.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 490.00 DOWNSTREAM (FEET) = 480.00
 FLOW LENGTH (FEET) = 520.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 8.43
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 9.49
 PIPE TRAVEL TIME (MIN.) = 1.03 Tc (MIN.) = 8.12
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 413.00 = 1115.00 FEET.

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*****
FLOW PROCESS FROM NODE 413.00 TO NODE 413.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.12
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.228
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B         2.00     0.30     0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"   B         0.40     0.30     0.900    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.40     0.30     0.500    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.30     0.30     0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.810
SUBAREA AREA(ACRES) = 3.10      SUBAREA RUNOFF(CFS) = 11.12
EFFECTIVE AREA(ACRES) = 5.50    AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.80
TOTAL AREA(ACRES) = 5.5        PEAK FLOW RATE(CFS) = 19.74
*****
FLOW PROCESS FROM NODE 413.00 TO NODE 414.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 480.00 DOWNSTREAM(FEET) = 470.00
FLOW LENGTH(FEET) = 310.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 12.26
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 19.74
PIPE TRAVEL TIME(MIN.) = 0.42 Tc(MIN.) = 8.54
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 414.00 = 1425.00 FEET.
*****
FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.54
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         1.50     0.30     0.100    56
COMMERCIAL          B         0.10     0.30     0.100    56
RESIDENTIAL
".4 DWELLING/ACRE"   B         2.80     0.30     0.900    56
RESIDENTIAL
".4 DWELLING/ACRE"   B         1.00     0.30     0.900    56
RESIDENTIAL

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"5-7 DWELLINGS/ACRE" B         0.20     0.30     0.500    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         0.10     0.30     0.500    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.654
SUBAREA AREA(ACRES) = 5.70      SUBAREA RUNOFF(CFS) = 19.83
EFFECTIVE AREA(ACRES) = 11.20   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
TOTAL AREA(ACRES) = 11.2        PEAK FLOW RATE(CFS) = 38.75
*****
FLOW PROCESS FROM NODE 414.00 TO NODE 414.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 8.54
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.063
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
APARTMENTS          B         0.10     0.30     0.200    56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA AREA(ACRES) = 0.10      SUBAREA RUNOFF(CFS) = 0.36
EFFECTIVE AREA(ACRES) = 11.30   AREA-AVERAGED Fm(INCH/HR) = 0.22
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.72
TOTAL AREA(ACRES) = 11.3        PEAK FLOW RATE(CFS) = 39.11
*****
FLOW PROCESS FROM NODE 414.00 TO NODE 415.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 470.00 DOWNSTREAM(FEET) = 445.00
FLOW LENGTH(FEET) = 528.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.65
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 39.11
PIPE TRAVEL TIME(MIN.) = 0.53 Tc(MIN.) = 9.07
LONGEST FLOWPATH FROM NODE 410.00 TO NODE 415.00 = 1953.00 FEET.
*****
FLOW PROCESS FROM NODE 415.00 TO NODE 415.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.07
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.855
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
COMMERCIAL          B         0.90     0.30     0.100    56
COMMERCIAL          B         0.60     0.30     0.100    56
RESIDENTIAL
"5-7 DWELLINGS/ACRE" B         6.30     0.30     0.500    56
RESIDENTIAL

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"5-7 DWELLINGS/ACRE" B 3.70 0.30 0.500 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.448
 SUBAREA AREA (ACRES) = 11.50 SUBAREA RUNOFF (CFS) = 38.51
 EFFECTIVE AREA (ACRES) = 22.80 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.58
 TOTAL AREA (ACRES) = 22.8 PEAK FLOW RATE (CFS) = 75.51

 FLOW PROCESS FROM NODE 415.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====
 ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 415.00
 FLOW LENGTH (FEET) = 650.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.3 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 19.28
 ESTIMATED PIPE DIAMETER (INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 75.51
 PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 9.63
 LONGEST FLOWPATH FROM NODE 410.00 TO NODE 416.00 = 2603.00 FEET.

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 9.63
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.635
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 APARTMENTS B 1.60 0.30 0.200 56
 APARTMENTS B 10.90 0.30 0.200 56
 COMMERCIAL B 1.30 0.30 0.100 56
 COMMERCIAL B 1.30 0.30 0.100 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 1.10 0.30 0.200 56
 RESIDENTIAL
 "11+ DWELLINGS/ACRE" B 7.00 0.30 0.200 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.189
 SUBAREA AREA (ACRES) = 23.20 SUBAREA RUNOFF (CFS) = 74.71
 EFFECTIVE AREA (ACRES) = 46.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.38
 TOTAL AREA (ACRES) = 46.0 PEAK FLOW RATE (CFS) = 145.69

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====
 MAINLINE Tc (MIN.) = 9.63
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.635
 SUBAREA LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.40 0.30 0.600 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 4.90 0.30 0.500 56
 RESIDENTIAL
 "5-7 DWELLINGS/ACRE" B 9.30 0.30 0.500 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.30 0.30 0.400 56
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE" B 0.10 0.30 0.400 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
 SUBAREA AREA (ACRES) = 15.00 SUBAREA RUNOFF (CFS) = 47.04
 EFFECTIVE AREA (ACRES) = 61.00 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.41
 TOTAL AREA (ACRES) = 61.0 PEAK FLOW RATE (CFS) = 192.73

 FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 =====
 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 9.63
 RAINFALL INTENSITY (INCH/HR) = 3.63
 AREA-AVERAGED Fm (INCH/HR) = 0.12
 AREA-AVERAGED Fp (INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.41
 EFFECTIVE STREAM AREA (ACRES) = 61.00
 TOTAL STREAM AREA (ACRES) = 61.00
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 192.73

 FLOW PROCESS FROM NODE 420.00 TO NODE 421.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====
 INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 535.00 DOWNSTREAM (FEET) = 495.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 6.368
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.916
 SUBAREA Tc AND LOSS RATE DATA (AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56 7.53
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 0.20 0.30 0.600 56 6.37
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.833
 SUBAREA RUNOFF (CFS) = 3.78
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 3.78

FLOW PROCESS FROM NODE 421.00 TO NODE 422.00 IS CODE = 31

 >>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 487.00
 FLOW LENGTH(FEET) = 308.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 7.43
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 3.78
 PIPE TRAVEL TIME(MIN.) = 0.69 Tc(MIN.) = 7.06
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 422.00 = 636.00 FEET.

FLOW PROCESS FROM NODE 422.00 TO NODE 422.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.06
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.645
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.30	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.50	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.817
 SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 7.13
 EFFECTIVE AREA(ACRES) = 2.70 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
 TOTAL AREA(ACRES) = 2.7 PEAK FLOW RATE(CFS) = 10.69

FLOW PROCESS FROM NODE 422.00 TO NODE 423.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 487.00 DOWNSTREAM(FEET) = 478.00
 FLOW LENGTH(FEET) = 373.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 9.45
 ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 10.69
 PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 7.72
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 423.00 = 1009.00 FEET.

FLOW PROCESS FROM NODE 423.00 TO NODE 423.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 7.72
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.386

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	1.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.40	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	1.70	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	0.10	0.30	0.600	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.750
 SUBAREA AREA(ACRES) = 4.40 SUBAREA RUNOFF(CFS) = 16.48
 EFFECTIVE AREA(ACRES) = 7.10 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.78
 TOTAL AREA(ACRES) = 7.1 PEAK FLOW RATE(CFS) = 26.54

FLOW PROCESS FROM NODE 423.00 TO NODE 424.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 478.00 DOWNSTREAM(FEET) = 454.00
 FLOW LENGTH(FEET) = 995.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.78
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 26.54
 PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 9.12
 LONGEST FLOWPATH FROM NODE 420.00 TO NODE 424.00 = 2004.00 FEET.

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.12
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.834
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	0.80	0.30	0.200	56
APARTMENTS	B	0.40	0.30	0.200	56
PUBLIC PARK	B	0.90	0.30	0.850	56
PUBLIC PARK	B	0.40	0.30	0.850	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.626
 SUBAREA AREA(ACRES) = 3.30 SUBAREA RUNOFF(CFS) = 10.83

EFFECTIVE AREA(ACRES) = 10.40 AREA-AVERAGED Fm(INCH/HR) = 0.22
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.73
 TOTAL AREA(ACRES) = 10.4 PEAK FLOW RATE(CFS) = 33.83

FLOW PROCESS FROM NODE 424.00 TO NODE 424.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.12

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.834

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	3.30	0.30	0.600	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.10	0.30	0.600	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.600					
SUBAREA AREA(ACRES) = 5.40 SUBAREA RUNOFF(CFS) = 17.76					
EFFECTIVE AREA(ACRES) = 15.80 AREA-AVERAGED Fm(INCH/HR) = 0.21					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.69					
TOTAL AREA(ACRES) = 15.8 PEAK FLOW RATE(CFS) = 51.59					

FLOW PROCESS FROM NODE 424.00 TO NODE 416.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 454.00 DOWNSTREAM(FEET) = 415.00

FLOW LENGTH(FEET) = 1555.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.0 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 14.06

ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 51.59

PIPE TRAVEL TIME(MIN.) = 1.84 Tc(MIN.) = 10.97

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.97

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.331

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	3.70	0.30	0.200	56
APARTMENTS	B	6.80	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	0.70	0.30	0.200	56
RESIDENTIAL					
"11+ DWELLINGS/ACRE"	B	2.60	0.30	0.200	56
RESIDENTIAL					
"3-4 DWELLINGS/ACRE"	B	2.20	0.30	0.600	56

RESIDENTIAL
 "3-4 DWELLINGS/ACRE" B 9.90 0.30 0.600 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.387
 SUBAREA AREA(ACRES) = 25.90 SUBAREA RUNOFF(CFS) = 74.94
 EFFECTIVE AREA(ACRES) = 41.70 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50
 TOTAL AREA(ACRES) = 41.7 PEAK FLOW RATE(CFS) = 119.39

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.97

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.331

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
"5-7 DWELLINGS/ACRE"	B	1.30	0.30	0.500	56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500					
SUBAREA AREA(ACRES) = 1.30 SUBAREA RUNOFF(CFS) = 3.72					
EFFECTIVE AREA(ACRES) = 43.00 AREA-AVERAGED Fm(INCH/HR) = 0.15					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.50					
TOTAL AREA(ACRES) = 43.0 PEAK FLOW RATE(CFS) = 123.11					

FLOW PROCESS FROM NODE 416.00 TO NODE 416.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.97
 RAINFALL INTENSITY(INCH/HR) = 3.33
 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.50
 EFFECTIVE STREAM AREA(ACRES) = 43.00
 TOTAL STREAM AREA(ACRES) = 43.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 123.11

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	192.73	9.63	3.635	0.30(0.12)	0.41	61.0	410.00
2	123.11	10.97	3.331	0.30(0.15)	0.50	43.0	420.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	311.15	9.63	3.635	0.30(0.13)	0.45	98.8	410.00

2 299.19 10.97 3.331 0.30(0.13) 0.45 104.0 420.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 311.15 Tc(MIN.) = 9.63
EFFECTIVE AREA(ACRES) = 98.76 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 104.0
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 416.00 = 3559.00 FEET.

FLOW PROCESS FROM NODE 416.00 TO NODE 417.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 415.00 DOWNSTREAM(FEET) = 395.00
FLOW LENGTH(FEET) = 1084.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 45.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.41
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 311.15
PIPE TRAVEL TIME(MIN.) = 0.93 Tc(MIN.) = 10.56
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 417.00 = 4643.00 FEET.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.398
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Commercial, Public Park, Residential, and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 417.00 TO NODE 417.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.56
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.398
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Residential and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 417.00 TO NODE 430.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 372.00
FLOW LENGTH(FEET) = 1572.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 48.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.34
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 344.49
PIPE TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 11.99
LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.99
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.163
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include Commercial, Public Park, and Subarea Average Pervious Loss Rate.

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.99
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.163

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
PUBLIC PARK	B	0.70	0.30	0.850	56
PUBLIC PARK	B	8.90	0.30	0.850	56
PUBLIC PARK	B	1.20	0.30	0.850	56
PUBLIC PARK	B	3.70	0.30	0.850	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.850
SUBAREA AREA(ACRES) = 14.50 SUBAREA RUNOFF(CFS) = 37.95
EFFECTIVE AREA(ACRES) = 152.46 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 157.7 PEAK FLOW RATE(CFS) = 412.74

FLOW PROCESS FROM NODE 430.00 TO NODE 430.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	412.74	11.99	3.163	0.30(0.16)	0.52	152.5	410.00
2	394.97	13.37	2.938	0.30(0.16)	0.52	157.7	420.00

LONGEST FLOWPATH FROM NODE 420.00 TO NODE 430.00 = 6215.00 FEET.

** MEMORY BANK # 2 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	546.51	17.72	2.431	0.30(0.13)	0.45	260.6	400.00
2	495.69	20.36	2.208	0.30(0.14)	0.45	262.6	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	900.60	11.99	3.163	0.30(0.14)	0.48	328.8	410.00
2	898.28	13.37	2.938	0.30(0.14)	0.48	354.3	420.00
3	869.44	17.72	2.431	0.30(0.14)	0.48	418.3	400.00
4	787.03	20.36	2.208	0.30(0.14)	0.48	420.3	430.00

TOTAL AREA(ACRES) = 420.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 900.60 Tc(MIN.) = 11.991
EFFECTIVE AREA(ACRES) = 328.82 AREA-AVERAGED Fm(INCH/HR) = 0.14
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.48
TOTAL AREA(ACRES) = 420.3
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 430.00 = 9709.00 FEET.

FLOW PROCESS FROM NODE 430.00 TO NODE 431.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 372.00 DOWNSTREAM(FEET) = 300.00
FLOW LENGTH(FEET) = 1358.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 72.0 INCH PIPE IS 57.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 37.29
ESTIMATED PIPE DIAMETER(INCH) = 72.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 900.60
PIPE TRAVEL TIME(MIN.) = 0.61 Tc(MIN.) = 12.60
LONGEST FLOWPATH FROM NODE 400.00 TO NODE 431.00 = 11067.00 FEET.

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 12.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.064
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	7.40	0.30	0.200	56
APARTMENTS	B	15.00	0.30	0.200	56
APARTMENTS	B	5.80	0.30	0.200	56
APARTMENTS	B	2.50	0.30	0.200	56
COMMERCIAL	B	9.10	0.30	0.100	56
COMMERCIAL	B	1.50	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.174
SUBAREA AREA(ACRES) = 41.30 SUBAREA RUNOFF(CFS) = 111.94
EFFECTIVE AREA(ACRES) = 370.12 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 461.6 PEAK FLOW RATE(CFS) = 975.93

FLOW PROCESS FROM NODE 431.00 TO NODE 431.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 12.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.064
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	0.40	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 0.90 SUBAREA RUNOFF(CFS) = 2.46
EFFECTIVE AREA(ACRES) = 371.02 AREA-AVERAGED Fm(INCH/HR) = 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
TOTAL AREA(ACRES) = 462.5 PEAK FLOW RATE(CFS) = 978.38

FLOW PROCESS FROM NODE 431.00 TO NODE 331.00 IS CODE = 11

>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<
=====

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
------------------	------------	--------------	------------------------	---------------------	----	---------------	-------------------

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	978.38	12.60	3.064	0.30 (0.13)	0.45	371.0	410.00
2	964.99	13.97	2.839	0.30 (0.13)	0.45	396.5	420.00
3	929.58	18.33	2.377	0.30 (0.13)	0.45	460.5	400.00
4	847.12	20.99	2.170	0.30 (0.13)	0.45	462.5	430.00

LONGEST FLOWPATH FROM NODE 400.00 TO NODE 331.00 = 11067.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1446.88	17.91	2.414	0.30 (0.12)	0.40	700.9	310.00
2	1452.73	21.62	2.132	0.30 (0.12)	0.40	803.0	300.00
3	1452.63	21.71	2.126	0.30 (0.12)	0.40	805.2	320.00
4	1273.61	27.44	1.832	0.30 (0.13)	0.42	829.8	390.00

LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

** PEAK FLOW RATE TABLE **

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2284.42	12.60	3.064	0.30 (0.13)	0.42	864.0	410.00
2	2302.60	13.97	2.839	0.30 (0.13)	0.42	943.2	420.00
3	2379.84	17.91	2.414	0.30 (0.13)	0.42	1155.4	310.00
4	2377.12	18.33	2.377	0.30 (0.13)	0.42	1172.9	400.00
5	2298.86	20.99	2.170	0.30 (0.13)	0.42	1248.1	430.00
6	2283.93	21.62	2.132	0.30 (0.13)	0.42	1265.5	300.00
7	2281.43	21.71	2.126	0.30 (0.13)	0.42	1267.7	320.00
8	1979.90	27.44	1.832	0.30 (0.13)	0.43	1292.3	390.00

TOTAL AREA (ACRES) = 1292.3

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 2379.84 Tc (MIN.) = 17.914
EFFECTIVE AREA (ACRES) = 1155.36 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
TOTAL AREA (ACRES) = 1292.3
LONGEST FLOWPATH FROM NODE 390.00 TO NODE 331.00 = 13248.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 1292.3 TC (MIN.) = 17.91
EFFECTIVE AREA (ACRES) = 1155.36 AREA-AVERAGED Fm (INCH/HR) = 0.13
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.419
PEAK FLOW RATE (CFS) = 2379.84

** PEAK FLOW RATE TABLE **

Stream Number	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2284.42	12.60	3.064	0.30 (0.13)	0.42	864.0	410.00
2	2302.60	13.97	2.839	0.30 (0.13)	0.42	943.2	420.00
3	2379.84	17.91	2.414	0.30 (0.13)	0.42	1155.4	310.00
4	2377.12	18.33	2.377	0.30 (0.13)	0.42	1172.9	400.00
5	2298.86	20.99	2.170	0.30 (0.13)	0.42	1248.1	430.00
6	2283.93	21.62	2.132	0.30 (0.13)	0.42	1265.5	300.00
7	2281.43	21.71	2.126	0.30 (0.13)	0.42	1267.7	320.00
8	1979.90	27.44	1.832	0.30 (0.13)	0.43	1292.3	390.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 100-YR EV SEPT 2022 ROKAMOTO *

FILE NAME: 3000EVRL.DAT
TIME/DATE OF STUDY: 12:06 09/20/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.101
- 2) 10.00; 3.900
- 3) 15.00; 3.005
- 4) 20.00; 2.465
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.419
- 9) 60.00; 1.320
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.826
- 13) 360.00; 0.617
- 14) 1200.00; 0.271

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.921
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66	9.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.61
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.61

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.738
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.90	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.10
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.14
AVERAGE FLOW DEPTH(FEET) = 0.62 TRAVEL TIME(MIN.) = 0.96
Tc(MIN.) = 10.91
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.97
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 11.45

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 7.02

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.380

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	14.80	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 32.28
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.28
AVERAGE FLOW DEPTH(FEET) = 1.22 TRAVEL TIME(MIN.) = 2.00
Tc(MIN.) = 12.90
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 41.59
EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 51.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.45 FLOW VELOCITY(FEET/SEC.) = 8.19
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.134

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	0.10	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	11.70	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	1.90	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 69.35

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.89
AVERAGE FLOW DEPTH(FEET) = 1.61 TRAVEL TIME(MIN.) = 1.37
Tc(MIN.) = 14.28
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 35.00
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 82.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.72 FLOW VELOCITY(FEET/SEC.) = 9.30
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 23.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.28
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.70
PIPE TRAVEL TIME(MIN.) = 2.11 Tc(MIN.) = 16.39
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.39
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 2.855
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "WOODLAND, GRASS"	A	0.10	0.40	1.000	44
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66
RESIDENTIAL ".4 DWELLING/ACRE"	B	2.30	0.30	0.900	56
NATURAL FAIR COVER "WOODLAND, GRASS"	B	0.60	0.30	1.000	65
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	B	1.00	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	8.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 28.79
EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 103.34

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.855
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 6.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 14.42
EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 51.1 PEAK FLOW RATE(CFS) = 117.77
=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 51.1 TC(MIN.) = 16.39
EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR)= 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.979
PEAK FLOW RATE(CFS) = 117.77
=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

MICHAEL BAKER INTERNATIONAL
5 HUTTON CENTRE DRIVE, SUITE 500
SANTA ANA, CA 92707

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 2-YR EV APRIL 2022 CPHAN *

FILE NAME: 3002EVRL.DAT
TIME/DATE OF STUDY: 19:35 04/29/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.400
- 10) 90.00; 0.346
- 11) 120.00; 0.290
- 12) 180.00; 0.236
- 13) 360.00; 0.180
- 14) 1200.00; 0.084

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.255
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.80	0.60	1.000	56	9.95

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.47
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 0.47

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.164
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.21
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.00
AVERAGE FLOW DEPTH(FEET) = 0.32 TRAVEL TIME(MIN.) = 1.47
Tc(MIN.) = 11.42
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 1.47
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 1.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 4.42
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.970
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include USER-DEFINED entries.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.45
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.45
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 3.26
Tc(MIN.) = 14.68
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 5.01
EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 6.24

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 4.87
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.880
SUBAREA LOSS RATE DATA(AMC II):

Table with 6 columns: DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include USER-DEFINED entries.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 8.03
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.16
AVERAGE FLOW DEPTH(FEET) = 0.72 TRAVEL TIME(MIN.) = 2.37
Tc(MIN.) = 17.05
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 3.55
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 8.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.73 FLOW VELOCITY(FEET/SEC.) = 5.21
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 7.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.72
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 8.27
PIPE TRAVEL TIME(MIN.) = 3.65 Tc(MIN.) = 20.70
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.70
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
USER-DEFINED, USER-DEFINED, USER-DEFINED, USER-DEFINED, USER-DEFINED, USER-DEFINED
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 1.82
EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 8.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 20.70
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.762
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN
USER-DEFINED, SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.900$
SUBAREA AREA (ACRES) = 6.20 SUBAREA RUNOFF (CFS) = 1.24
EFFECTIVE AREA (ACRES) = 51.10 AREA-AVERAGED F_m (INCH/HR) = 0.59
AREA-AVERAGED F_p (INCH/HR) = 0.60 AREA-AVERAGED $A_p = 0.98$
TOTAL AREA (ACRES) = 51.1 PEAK FLOW RATE (CFS) = 8.27
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

=====

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 51.1 TC (MIN.) = 20.70
EFFECTIVE AREA (ACRES) = 51.10 AREA-AVERAGED F_m (INCH/HR) = 0.59
AREA-AVERAGED F_p (INCH/HR) = 0.60 AREA-AVERAGED $A_p = 0.984$
PEAK FLOW RATE (CFS) = 8.27

=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 5-YR EV SEPT 2022 ROKAMOTO *

FILE NAME: 3005EVRL.DAT
TIME/DATE OF STUDY: 12:16 09/20/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.738
- 2) 10.00; 1.815
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.989
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1200.00; 0.125

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0312	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.824
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.80	0.50	1.000	56	9.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.95
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 0.95

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.701
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.90	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.84
AVERAGE FLOW DEPTH(FEET) = 0.42 TRAVEL TIME(MIN.) = 1.21
Tc(MIN.) = 11.16
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 3.13
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 4.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.50 FLOW VELOCITY(FEET/SEC.) = 5.36
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.441

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.80	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.42

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.48

AVERAGE FLOW DEPTH(FEET) = 0.80 TRAVEL TIME(MIN.) = 2.65

Tc(MIN.) = 13.82

SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 12.71

EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 15.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 6.13

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00

CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819

CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.299

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	11.70	0.50	1.000	-
USER-DEFINED	-	1.90	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986

TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 20.81

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.58

AVERAGE FLOW DEPTH(FEET) = 1.03 TRAVEL TIME(MIN.) = 1.86

Tc(MIN.) = 15.68

SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 9.94

EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.99

TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 23.40

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.07 FLOW VELOCITY(FEET/SEC.) = 6.78

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00

FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.8 INCHES

PIPE-FLOW VELOCITY(FEET/SEC.) = 15.17

ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW(CFS) = 23.40

PIPE TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 18.50

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.50

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.192

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	8.20	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 7.78

EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.50

AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 28.05

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 18.50

* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.192

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	6.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 4.14

EFFECTIVE AREA (ACRES) = 51.10 AREA-AVERAGED Fm (INCH/HR) = 0.49
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.98
TOTAL AREA (ACRES) = 51.1 PEAK FLOW RATE (CFS) = 32.19

=====
END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 51.1 TC (MIN.) = 18.50
EFFECTIVE AREA (ACRES) = 51.10 AREA-AVERAGED Fm (INCH/HR) = 0.49
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.984
PEAK FLOW RATE (CFS) = 32.19

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 10-YR EV SEPT 2022 ROKAMOTO *

FILE NAME: 3010EVRL.DAT
TIME/DATE OF STUDY: 12:15 09/20/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.912
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.547
- 13) 360.00; 0.406
- 14) 1200.00; 0.179

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.605
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66	9.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.66
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 1.66

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.449

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.90	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.47
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.47
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 11.02
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 5.61
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 7.16

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.62 FLOW VELOCITY(FEET/SEC.) = 6.19

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.131

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 14.80 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 19.58
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.40
AVERAGE FLOW DEPTH(FEET) = 1.01 TRAVEL TIME(MIN.) = 2.27
Tc(MIN.) = 13.30
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 24.73
EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 30.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.19 FLOW VELOCITY(FEET/SEC.) = 7.20
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.912

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 11.70 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.80

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.77
AVERAGE FLOW DEPTH(FEET) = 1.32 TRAVEL TIME(MIN.) = 1.57
Tc(MIN.) = 14.87
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 19.92
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 47.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 8.08
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 19.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.51
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 47.05
PIPE TRAVEL TIME(MIN.) = 2.45 Tc(MIN.) = 17.31
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 17.31
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.10 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 2.30 0.30 0.900 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 8.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 16.57
EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 59.40

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 17.31
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.767
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 6.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900
SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 8.35
EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98
TOTAL AREA(ACRES) = 51.1 PEAK FLOW RATE(CFS) = 67.76
=====

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 51.1 TC(MIN.) = 17.31
EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR)= 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.979
PEAK FLOW RATE(CFS) = 67.76
=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 25-YR EV SEPT 2022 ROKAMOTO *

FILE NAME: 3025EVRL.DAT
TIME/DATE OF STUDY: 12:12 09/20/2022

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.985
- 2) 10.00; 3.243
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.773
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.201
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1200.00; 0.220

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.260
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66	9.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.13
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.13

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.094
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.90	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.83
AVERAGE FLOW DEPTH(FEET) = 0.58 TRAVEL TIME(MIN.) = 1.01
Tc(MIN.) = 10.96
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 7.29
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 9.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.68 FLOW VELOCITY(FEET/SEC.) = 6.63

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.769

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 14.80 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.01
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.93
AVERAGE FLOW DEPTH(FEET) = 1.12 TRAVEL TIME(MIN.) = 2.10
Tc(MIN.) = 13.06
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 33.34
EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 41.56

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.34 FLOW VELOCITY(FEET/SEC.) = 7.74
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.544

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 11.70 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 55.43

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.40
AVERAGE FLOW DEPTH(FEET) = 1.48 TRAVEL TIME(MIN.) = 1.45
Tc(MIN.) = 14.51
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 27.72
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 65.49

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.58 FLOW VELOCITY(FEET/SEC.) = 8.78
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 21.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.94
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 65.49
PIPE TRAVEL TIME(MIN.) = 2.26 Tc(MIN.) = 16.77
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.77
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.315
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" A 0.10 0.40 1.000 44
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 2.30 0.30 0.900 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 8.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 22.72
EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 81.52

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.77

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.315

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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RESIDENTIAL

".4 DWELLING/ACRE"	B	6.20	0.30	0.900	56
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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 11.41

EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 51.1 PEAK FLOW RATE(CFS) = 92.92
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 51.1 TC(MIN.) = 16.77

EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR)= 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.979

PEAK FLOW RATE(CFS) = 92.92
=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 BODR 2022 - SUBWATERSHED O *
* RATIONAL METHOD HYDROLOGY MODEL REGIONAL LOCAL *
* 50-YR EV SEPT 2022 ROKAMOTO *

FILE NAME: 3050EVRL.DAT
TIME/DATE OF STUDY: 12:11 09/20/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.515
- 2) 10.00; 3.520
- 3) 15.00; 2.687
- 4) 20.00; 2.242
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.473
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.757
- 13) 360.00; 0.563
- 14) 1200.00; 0.248

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP (FT) (FT)	MANNING HIKE FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0312	0.167 0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312	0.167 0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312	0.125 0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 600.00 TO NODE 601.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 322.00
ELEVATION DATA: UPSTREAM(FEET) = 695.00 DOWNSTREAM(FEET) = 635.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.951
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.539
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66	9.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.33
TOTAL AREA(ACRES) = 0.80 PEAK FLOW RATE(CFS) = 2.33

FLOW PROCESS FROM NODE 601.00 TO NODE 602.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 635.00 DOWNSTREAM(FEET) = 585.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 352.00 CHANNEL SLOPE = 0.1420
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.366
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	2.90	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.34
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.02
AVERAGE FLOW DEPTH(FEET) = 0.59 TRAVEL TIME(MIN.) = 0.97
Tc(MIN.) = 10.93
SUBAREA AREA(ACRES) = 2.90 SUBAREA RUNOFF(CFS) = 8.00
EFFECTIVE AREA(ACRES) = 3.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.7 PEAK FLOW RATE(CFS) = 10.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.71 FLOW VELOCITY(FEET/SEC.) = 6.81

LONGEST FLOWPATH FROM NODE 600.00 TO NODE 602.00 = 674.00 FEET.

FLOW PROCESS FROM NODE 602.00 TO NODE 603.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 585.00 DOWNSTREAM(FEET) = 515.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 872.00 CHANNEL SLOPE = 0.0803
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.023

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 14.80 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.999
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 28.64
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.06
AVERAGE FLOW DEPTH(FEET) = 1.16 TRAVEL TIME(MIN.) = 2.06
Tc(MIN.) = 12.98
SUBAREA AREA(ACRES) = 15.00 SUBAREA RUNOFF(CFS) = 36.77
EFFECTIVE AREA(ACRES) = 18.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.7 PEAK FLOW RATE(CFS) = 45.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.39 FLOW VELOCITY(FEET/SEC.) = 7.96
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 603.00 = 1546.00 FEET.

FLOW PROCESS FROM NODE 603.00 TO NODE 604.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 515.00 DOWNSTREAM(FEET) = 455.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 733.00 CHANNEL SLOPE = 0.0819
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.787

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 11.70 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 1.90 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.986
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 61.20

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.62
AVERAGE FLOW DEPTH(FEET) = 1.54 TRAVEL TIME(MIN.) = 1.42
Tc(MIN.) = 14.40
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 30.71
EFFECTIVE AREA(ACRES) = 32.40 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 32.4 PEAK FLOW RATE(CFS) = 72.57

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.64 FLOW VELOCITY(FEET/SEC.) = 9.02
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 604.00 = 2279.00 FEET.

FLOW PROCESS FROM NODE 604.00 TO NODE 605.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 455.00 DOWNSTREAM(FEET) = 325.00
FLOW LENGTH(FEET) = 2571.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.93
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.57
PIPE TRAVEL TIME(MIN.) = 2.15 Tc(MIN.) = 16.55
LONGEST FLOWPATH FROM NODE 600.00 TO NODE 605.00 = 4850.00 FEET.

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 16.55
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" A 0.10 0.40 1.000 44
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 2.30 0.30 0.900 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 8.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.982
SUBAREA AREA(ACRES) = 12.50 SUBAREA RUNOFF(CFS) = 25.35
EFFECTIVE AREA(ACRES) = 44.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.99
TOTAL AREA(ACRES) = 44.9 PEAK FLOW RATE(CFS) = 90.99

FLOW PROCESS FROM NODE 605.00 TO NODE 605.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.55

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.549

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
-------------------------------	-------------------	-----------------	-----------------	-----------------	-----------

RESIDENTIAL

".4 DWELLING/ACRE"	B	6.20	0.30	0.900	56
--------------------	---	------	------	-------	----

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.900

SUBAREA AREA(ACRES) = 6.20 SUBAREA RUNOFF(CFS) = 12.72

EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR) = 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.98

TOTAL AREA(ACRES) = 51.1 PEAK FLOW RATE(CFS) = 103.71
=====

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 51.1 TC(MIN.) = 16.55

EFFECTIVE AREA(ACRES) = 51.10 AREA-AVERAGED Fm(INCH/HR)= 0.29

AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.979

PEAK FLOW RATE(CFS) = 103.71
=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 100-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E00EVRL.DAT
TIME/DATE OF STUDY: 06:51 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.101
- 2) 10.00; 3.900
- 3) 15.00; 3.005
- 4) 20.00; 2.465
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.419
- 9) 60.00; 1.320
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.826
- 13) 360.00; 0.617
- 14) 1200.00; 0.271

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

- 1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 - 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 6.101
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56	8.00
COMMERCIAL	B	0.80	0.30	0.100	56	5.00
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 8.04
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 8.04

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.12
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.44
HALFSTREET FLOOD WIDTH(FEET) = 15.27
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.32
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.45
STREET FLOW TRAVEL TIME(MIN.) = 1.36 Tc(MIN.) = 6.36

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 5.504
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	2.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 14.14
 EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 21.38

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.48 HALFSTREET FLOOD WIDTH (FEET) = 17.62
 FLOW VELOCITY (FEET/SEC.) = 3.60 DEPTH*VELOCITY (FT*FT/SEC.) = 1.72
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

 FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<
 =====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
 STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 34.42
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.54
 HALFSTREET FLOOD WIDTH (FEET) = 21.21
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.09
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.21
 STREET FLOW TRAVEL TIME (MIN.) = 1.59 Tc (MIN.) = 7.95
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.802

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
COMMERCIAL	B	3.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
COMMERCIAL	B	1.70	0.30	0.100	56
RESIDENTIAL					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 26.03
 EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.08
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 44.62

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.58 HALFSTREET FLOOD WIDTH (FEET) = 23.48
 FLOW VELOCITY (FEET/SEC.) = 4.36 DEPTH*VELOCITY (FT*FT/SEC.) = 2.54
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

 FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
 FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 17.5 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 18.20
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 44.62
 PIPE TRAVEL TIME (MIN.) = 0.77 Tc (MIN.) = 8.72
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

MAINLINE Tc (MIN.) = 8.72
 * 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.463
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.00	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56
COMMERCIAL	B	5.30	0.30	0.100	56
COMMERCIAL	B	7.10	0.30	0.100	56
COMMERCIAL	B	8.60	0.30	0.100	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 115.47
 EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 156.88

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
 =====

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=====
MAINLINE Tc(MIN.) = 8.72
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.463
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B         0.60   0.30   0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B         1.30   0.30   0.900  56
COMMERCIAL           B         5.60   0.30   0.100  56
COMMERCIAL           B         8.30   0.30   0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA(ACRES) = 15.80   SUBAREA RUNOFF(CFS) = 62.62
EFFECTIVE AREA(ACRES) = 55.70   AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7   PEAK FLOW RATE(CFS) = 219.51

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*****
FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.72
RAINFALL INTENSITY(INCH/HR) = 4.46
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 219.51

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*****
FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00   DOWNSTREAM(FEET) = 705.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.283
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.10   0.30   1.000  63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.10   0.30   1.000  66   9.13
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.20   0.30   1.000  63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.50   0.30   1.000  66   9.13

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.23
TOTAL AREA(ACRES) = 0.90   PEAK FLOW RATE(CFS) = 3.23

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*****
FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 705.00   DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00   CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.840

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```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN

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```

NATURAL FAIR COVER
"OPEN BRUSH"           B         2.10   0.30   1.000  66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         3.10   0.30   1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"           B         3.20   0.30   1.000  66

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.59
AVERAGE FLOW DEPTH(FEET) = 0.76   TRAVEL TIME(MIN.) = 1.21
Tc(MIN.) = 10.34
SUBAREA AREA(ACRES) = 8.40   SUBAREA RUNOFF(CFS) = 26.76
EFFECTIVE AREA(ACRES) = 9.30   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.3   PEAK FLOW RATE(CFS) = 29.63

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.94   FLOW VELOCITY(FEET/SEC.) = 11.10
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

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*****
FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51
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```

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 525.00   DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00   CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.437

```

```

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN

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NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.10   0.30   1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.30   0.30   1.000  66

```

NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.70 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.20 0.30 1.000 63
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.80 0.30 1.000 66
 NATURAL FAIR COVER
 "OPEN BRUSH" B 6.30 0.30 1.000 66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 49.98
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.48
 AVERAGE FLOW DEPTH(FEET) = 1.49 TRAVEL TIME(MIN.) = 2.25
 Tc(MIN.) = 12.59
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 40.65
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 66.91

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.67 FLOW VELOCITY(FEET/SEC.) = 8.03
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.437
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 10.40 0.30 1.000 63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 29.36
 EFFECTIVE AREA(ACRES) = 34.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 34.1 PEAK FLOW RATE(CFS) = 96.27

FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 398.00
 FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.79
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 96.27
 PIPE TRAVEL TIME(MIN.) = 0.77 Tc(MIN.) = 13.35
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 13.35
 RAINFALL INTENSITY(INCH/HR) = 3.30
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 34.10
 TOTAL STREAM AREA(ACRES) = 34.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 96.27

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	219.51	8.72	4.463	0.30(0.08)	0.28	55.7	800.00
2	96.27	13.35	3.300	0.30(0.30)	1.00	34.1	810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	306.76	8.72	4.463	0.30(0.15)	0.49	78.0	800.00
2	257.48	13.35	3.300	0.30(0.17)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 306.76 Tc(MIN.) = 8.72
 EFFECTIVE AREA(ACRES) = 77.97 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
 TOTAL AREA(ACRES) = 89.8
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 341.00
 FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 35.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.50
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 306.76
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 9.11
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.11
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.292
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.60	0.30	0.200	56
APARTMENTS	B	12.30	0.30	0.200	56
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	5.40	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372
 SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 123.02
 EFFECTIVE AREA(ACRES) = 110.67 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 413.99

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.11
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.292
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 37.97
 EFFECTIVE AREA(ACRES) = 120.57 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 451.97

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.11
 RAINFALL INTENSITY(INCH/HR) = 4.29
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.42
 EFFECTIVE STREAM AREA(ACRES) = 120.57
 TOTAL STREAM AREA(ACRES) = 132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 451.97

 FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
 ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.400
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63	8.86
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66	8.86
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63	8.86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.69
 TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.69

 FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
COMMERCIAL	B	1.30	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	2.40	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 16.84
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.85
 AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 2.84
 Tc(MIN.) = 11.70
 SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 26.17
 EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86
 TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 29.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.11 FLOW VELOCITY(FEET/SEC.) = 7.87
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	4.00	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	7.10	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 32.92
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 62.05

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.70
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	3.40	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	1.80	0.30	1.000	63
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	3.60	0.30	1.000	63
COMMERCIAL	B	1.00	0.30	0.100	56
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.50	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 31.09
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 93.14

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 11.70

* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.595

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"OPEN BRUSH"	B	4.60	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	2.60	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 21.95
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 115.09

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.27
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 115.09
PIPE TRAVEL TIME(MIN.) = 0.97 Tc(MIN.) = 12.67
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.67
RAINFALL INTENSITY(INCH/HR) = 3.42
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 38.60
TOTAL STREAM AREA(ACRES) = 38.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 115.09

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	451.97	9.11	4.292	0.30(0.13)	0.42	120.6	800.00
1	367.58	13.76	3.227	0.30(0.14)	0.47	132.4	810.00
2	115.09	12.67	3.422	0.30(0.28)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	557.65	9.11	4.292	0.30 (0.16)	0.52	148.3	800.00
2	502.46	12.67	3.422	0.30 (0.17)	0.57	168.2	818.00
3	475.51	13.76	3.227	0.30 (0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 557.65 Tc(MIN.) = 9.11
EFFECTIVE AREA(ACRES) = 148.33 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.11
EFFECTIVE AREA(ACRES) = 148.33 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.520
PEAK FLOW RATE(CFS) = 557.65

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	557.65	9.11	4.292	0.30 (0.16)	0.52	148.3	800.00
2	502.46	12.67	3.422	0.30 (0.17)	0.57	168.2	818.00
3	475.51	13.76	3.227	0.30 (0.17)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 2-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E02EVRL.DAT
TIME/DATE OF STUDY: 07:02 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.400
- 10) 90.00; 0.346
- 11) 120.00; 0.290
- 12) 180.00; 0.236
- 13) 360.00; 0.180
- 14) 1200.00; 0.084

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.873
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
".4 DWELLING/ACRE"	-	0.20	0.60	0.900	56	8.00
COMMERCIAL	-	0.80	0.60	0.100	56	5.00
RESIDENTIAL						
".4 DWELLING/ACRE"	-	0.50	0.60	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 2.15
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 2.15

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.07
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.31
HALFSTREET FLOOD WIDTH(FEET) = 8.34
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.49
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.78
STREET FLOW TRAVEL TIME(MIN.) = 1.80 Tc(MIN.) = 6.80

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.648
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	0.100	-
USER-DEFINED	-	2.10	0.60	0.100	-
USER-DEFINED	-	0.70	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 3.84
 EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.21
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 5.68

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.34 HALFSTREET FLOOD WIDTH (FEET) = 9.91
 FLOW VELOCITY (FEET/SEC.) = 2.66 DEPTH*VELOCITY (FT*FT/SEC.) = 0.90
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

 FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<<
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<<

=====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
 STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.14

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH (FEET) = 0.38
 HALFSTREET FLOOD WIDTH (FEET) = 12.23
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 2.99
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.14

STREET FLOW TRAVEL TIME (MIN.) = 2.18 Tc (MIN.) = 8.99

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.376

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	0.900	-
USER-DEFINED	-	3.00	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	1.70	0.60	0.100	-
USER-DEFINED	-	0.50	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 6.88

EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 11.48

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.40 HALFSTREET FLOOD WIDTH (FEET) = 13.48
 FLOW VELOCITY (FEET/SEC.) = 3.16 DEPTH*VELOCITY (FT*FT/SEC.) = 1.28
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

 FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
 FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
 ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.23
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 11.48
 PIPE TRAVEL TIME (MIN.) = 1.06 Tc (MIN.) = 10.05
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<<

=====

MAINLINE Tc (MIN.) = 10.05
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.246
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.60	0.900	-
USER-DEFINED	-	2.20	0.60	0.900	-
USER-DEFINED	-	4.20	0.60	0.900	-
USER-DEFINED	-	5.30	0.60	0.100	-
USER-DEFINED	-	7.10	0.60	0.100	-
USER-DEFINED	-	8.60	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 27.76
 EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.19
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 38.02

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<<

=====

MAINLINE Tc (MIN.) = 10.05
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.246
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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USER-DEFINED - 0.60 0.60 0.900 -
 USER-DEFINED - 1.30 0.60 0.900 -
 USER-DEFINED - 5.60 0.60 0.100 -
 USER-DEFINED - 8.30 0.60 0.100 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 15.80 SUBAREA RUNOFF(CFS) = 16.05
 EFFECTIVE AREA(ACRES) = 55.70 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.28
 TOTAL AREA(ACRES) = 55.7 PEAK FLOW RATE(CFS) = 54.06

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.05
 RAINFALL INTENSITY(INCH/HR) = 1.25
 AREA-AVERAGED Fm(INCH/HR) = 0.17
 AREA-AVERAGED Fp(INCH/HR) = 0.60
 AREA-AVERAGED Ap = 0.28
 EFFECTIVE STREAM AREA(ACRES) = 55.70
 TOTAL STREAM AREA(ACRES) = 55.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 54.06

 FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
 ELEVATION DATA: UPSTREAM(FEET) = 785.00 DOWNSTREAM(FEET) = 705.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.358
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.10	0.60	1.000	56	9.13
NATURAL FAIR COVER "OPEN BRUSH"	-	0.10	0.60	1.000	56	9.13
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.20	0.60	1.000	56	9.13
NATURAL FAIR COVER "OPEN BRUSH"	-	0.50	0.60	1.000	56	9.13

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 0.61
 TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 0.61

 FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 705.00 DOWNSTREAM(FEET) = 525.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00 CHANNEL SLOPE = 0.2590
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.189
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.60	1.000	-
USER-DEFINED	-	3.10	0.60	1.000	-
USER-DEFINED	-	3.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.86
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.15
 AVERAGE FLOW DEPTH(FEET) = 0.39 TRAVEL TIME(MIN.) = 1.88
 Tc(MIN.) = 11.01
 SUBAREA AREA(ACRES) = 8.40 SUBAREA RUNOFF(CFS) = 4.45
 EFFECTIVE AREA(ACRES) = 9.30 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 9.3 PEAK FLOW RATE(CFS) = 4.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 0.48 FLOW VELOCITY(FEET/SEC.) = 7.03
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

 FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 525.00 DOWNSTREAM(FEET) = 460.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00 CHANNEL SLOPE = 0.0644
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.972
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	5.80	0.60	1.000	-
USER-DEFINED	-	6.30	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.40
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.64
 AVERAGE FLOW DEPTH(FEET) = 0.73 TRAVEL TIME(MIN.) = 3.63
 Tc(MIN.) = 14.65
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 4.82
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.60
 AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 23.7 PEAK FLOW RATE (CFS) = 7.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.75 FLOW VELOCITY (FEET/SEC.) = 4.70
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 14.65

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.972

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	10.40	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA (ACRES) = 10.40 SUBAREA RUNOFF (CFS) = 3.48

EFFECTIVE AREA (ACRES) = 34.10 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 34.1 PEAK FLOW RATE (CFS) = 11.43

FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 460.00 DOWNSTREAM (FEET) = 398.00

FLOW LENGTH (FEET) = 1046.00 MANNING'S N = 0.013

ESTIMATED PIPE DIAMETER (INCH) INCREASED TO 18.000

DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.7 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.52

ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 11.43

PIPE TRAVEL TIME (MIN.) = 1.29 Tc (MIN.) = 15.93

LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 15.93

RAINFALL INTENSITY (INCH/HR) = 0.92

AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60

AREA-AVERAGED Ap = 1.00

EFFECTIVE STREAM AREA (ACRES) = 34.10

TOTAL STREAM AREA (ACRES) = 34.10

PEAK FLOW RATE (CFS) AT CONFLUENCE = 11.43

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	54.06	10.05	1.246	0.60 (0.17)	0.28	55.7	800.00
2	11.43	15.93	0.918	0.60 (0.60)	1.00	34.1	810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	65.49	10.05	1.246	0.60 (0.29)	0.48	77.2	800.00
2	49.06	15.93	0.918	0.60 (0.33)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 65.49 Tc (MIN.) = 10.05

EFFECTIVE AREA (ACRES) = 77.20 AREA-AVERAGED Fm (INCH/HR) = 0.29

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.48

TOTAL AREA (ACRES) = 89.8

LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 398.00 DOWNSTREAM (FEET) = 341.00

FLOW LENGTH (FEET) = 756.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.5 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 22.60

ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 65.49

PIPE TRAVEL TIME (MIN.) = 0.56 Tc (MIN.) = 10.61

LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc (MIN.) = 10.61

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.213

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	5.60	0.60	0.200	-
USER-DEFINED	-	12.30	0.60	0.200	-
USER-DEFINED	-	0.50	0.60	0.100	-
USER-DEFINED	-	5.40	0.60	0.100	-
USER-DEFINED	-	4.70	0.60	0.900	-
USER-DEFINED	-	4.20	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372

SUBAREA AREA (ACRES) = 32.70 SUBAREA RUNOFF (CFS) = 29.12

EFFECTIVE AREA (ACRES) = 109.90 AREA-AVERAGED Fm (INCH/HR) = 0.27

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.45

TOTAL AREA (ACRES) = 122.5 PEAK FLOW RATE (CFS) = 93.38

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*****
FLOW PROCESS FROM NODE      809.00 TO NODE      809.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.61
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.213
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -      9.90      0.60      0.100      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.90      SUBAREA RUNOFF(CFS) = 10.27
EFFECTIVE AREA(ACRES) = 119.80  AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 132.4      PEAK FLOW RATE(CFS) = 103.66

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*****
FLOW PROCESS FROM NODE      809.00 TO NODE      809.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.61
RAINFALL INTENSITY(INCH/HR) = 1.21
AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.42
EFFECTIVE STREAM AREA(ACRES) = 119.80
TOTAL STREAM AREA(ACRES) = 132.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 103.66

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FLOW PROCESS FROM NODE      818.00 TO NODE      819.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 625.00  DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.391
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS  Tc
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  -      0.10      0.60      1.000      56  8.86
NATURAL FAIR COVER
"OPEN BRUSH"          -      0.30      0.60      1.000      56  8.86
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  -      0.60      0.60      1.000      56  8.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

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SUBAREA RUNOFF(CFS) = 0.71
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 0.71
*****
FLOW PROCESS FROM NODE      819.00 TO NODE      820.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 517.00  DOWNSTREAM(FEET) = 395.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00  CHANNEL SLOPE = 0.1045
CHANNEL BASE(FEET) = 0.00  "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040  MAXIMUM DEPTH(FEET) = 20.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.054
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -      0.10      0.60      0.100      -
USER-DEFINED            -      0.90      0.60      0.900      -
USER-DEFINED            -      1.30      0.60      0.100      -
USER-DEFINED            -      0.80      0.60      1.000      -
USER-DEFINED            -      2.40      0.60      1.000      -
USER-DEFINED            -      3.20      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 2.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.42
AVERAGE FLOW DEPTH(FEET) = 0.47  TRAVEL TIME(MIN.) = 4.40
Tc(MIN.) = 13.27
SUBAREA AREA(ACRES) = 8.70      SUBAREA RUNOFF(CFS) = 4.29
EFFECTIVE AREA(ACRES) = 9.70      AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 9.7      PEAK FLOW RATE(CFS) = 4.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.56  FLOW VELOCITY(FEET/SEC.) = 4.96
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

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FLOW PROCESS FROM NODE      820.00 TO NODE      820.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 13.27
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.054
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp      Ap      SCS
LAND USE                GROUP  (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED            -      4.00      0.60      1.000      -
USER-DEFINED            -      7.10      0.60      1.000      -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10      SUBAREA RUNOFF(CFS) = 4.54
EFFECTIVE AREA(ACRES) = 20.80  AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.60  AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8      PEAK FLOW RATE(CFS) = 9.24

```

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.27

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.054

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.40	0.60	1.000	-
USER-DEFINED	-	1.80	0.60	1.000	-
USER-DEFINED	-	3.60	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	0.100	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913

SUBAREA AREA (ACRES) = 10.40 SUBAREA RUNOFF (CFS) = 4.74

EFFECTIVE AREA (ACRES) = 31.20 AREA-AVERAGED Fm (INCH/HR) = 0.56

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.93

TOTAL AREA (ACRES) = 31.2 PEAK FLOW RATE (CFS) = 13.98

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.27

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.054

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.60	1.000	-
USER-DEFINED	-	2.60	0.60	1.000	-
USER-DEFINED	-	0.20	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997

SUBAREA AREA (ACRES) = 7.40 SUBAREA RUNOFF (CFS) = 3.04

EFFECTIVE AREA (ACRES) = 38.60 AREA-AVERAGED Fm (INCH/HR) = 0.56

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94

TOTAL AREA (ACRES) = 38.6 PEAK FLOW RATE (CFS) = 17.02

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 395.00 DOWNSTREAM (FEET) = 340.00

FLOW LENGTH (FEET) = 1232.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 18.0 INCH PIPE IS 12.3 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 13.26

ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 17.02

PIPE TRAVEL TIME (MIN.) = 1.55 Tc (MIN.) = 14.81

LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2

CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:

TIME OF CONCENTRATION (MIN.) = 14.81

RAINFALL INTENSITY (INCH/HR) = 0.96

AREA-AVERAGED Fm (INCH/HR) = 0.56

AREA-AVERAGED Fp (INCH/HR) = 0.60

AREA-AVERAGED Ap = 0.94

EFFECTIVE STREAM AREA (ACRES) = 38.60

TOTAL STREAM AREA (ACRES) = 38.60

PEAK FLOW RATE (CFS) AT CONFLUENCE = 17.02

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	103.66	10.61	1.213	0.60 (0.25)	0.42	119.8	800.00
1	73.03	16.53	0.898	0.60 (0.28)	0.47	132.4	810.00
2	17.02	14.81	0.962	0.60 (0.56)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO

CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	120.67	10.61	1.213	0.60 (0.31)	0.52	147.4	800.00
2	98.94	14.81	0.962	0.60 (0.34)	0.57	167.3	818.00
3	87.28	16.53	0.898	0.60 (0.35)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 120.67 Tc (MIN.) = 10.61

EFFECTIVE AREA (ACRES) = 147.44 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.52

TOTAL AREA (ACRES) = 171.0

LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 171.0 TC (MIN.) = 10.61

EFFECTIVE AREA (ACRES) = 147.44 AREA-AVERAGED Fm (INCH/HR) = 0.31

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.517

PEAK FLOW RATE (CFS) = 120.67

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	120.67	10.61	1.213	0.60 (0.31)	0.52	147.4	800.00
2	98.94	14.81	0.962	0.60 (0.34)	0.57	167.3	818.00
3	87.28	16.53	0.898	0.60 (0.35)	0.58	171.0	810.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 5-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E05EVRL.DAT
TIME/DATE OF STUDY: 07:01 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.738
- 2) 10.00; 1.815
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.989
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1200.00; 0.125

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.738
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	-	0.20	0.50	0.900	56	8.00
COMMERCIAL	-	0.80	0.50	0.100	56	5.00
RESIDENTIAL ".4 DWELLING/ACRE"	-	0.50	0.50	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 3.38
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 3.38

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.36
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.35
HALFSTREET FLOOD WIDTH(FEET) = 10.43
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.73
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 0.95
STREET FLOW TRAVEL TIME(MIN.) = 1.65 Tc(MIN.) = 6.65

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.434
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.100	-
USER-DEFINED	-	2.10	0.50	0.100	-
USER-DEFINED	-	0.70	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 5.97
 EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.18
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 8.94

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.38 HALFSTREET FLOOD WIDTH (FEET) = 12.15
 FLOW VELOCITY (FEET/SEC.) = 2.96 DEPTH*VELOCITY (FT*FT/SEC.) = 1.12
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

 FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

 >>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
 STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.35
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.43
 HALFSTREET FLOOD WIDTH (FEET) = 14.80
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.34
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.42
 STREET FLOW TRAVEL TIME (MIN.) = 1.95 Tc (MIN.) = 8.60

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.073
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	0.900	-
USER-DEFINED	-	3.00	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	1.70	0.50	0.100	-
USER-DEFINED	-	0.50	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 10.82

EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.13
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 18.33

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.45
 FLOW VELOCITY (FEET/SEC.) = 3.51 DEPTH*VELOCITY (FT*FT/SEC.) = 1.60
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

 FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
 FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 18.0 INCH PIPE IS 11.9 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 14.72
 ESTIMATED PIPE DIAMETER (INCH) = 18.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 18.33
 PIPE TRAVEL TIME (MIN.) = 0.95 Tc (MIN.) = 9.56
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.897
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.00	0.50	0.900	-
USER-DEFINED	-	2.20	0.50	0.900	-
USER-DEFINED	-	4.20	0.50	0.900	-
USER-DEFINED	-	5.30	0.50	0.100	-
USER-DEFINED	-	7.10	0.50	0.100	-
USER-DEFINED	-	8.60	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 45.85
 EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.16
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 62.51

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 9.56
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.897
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	0.900	-

USER-DEFINED - 1.30 0.50 0.900 -
 USER-DEFINED - 5.60 0.50 0.100 -
 USER-DEFINED - 8.30 0.50 0.100 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA (ACRES) = 15.80 SUBAREA RUNOFF (CFS) = 25.58
 EFFECTIVE AREA (ACRES) = 55.70 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.28
 TOTAL AREA (ACRES) = 55.7 PEAK FLOW RATE (CFS) = 88.09

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION (MIN.) = 9.56
 RAINFALL INTENSITY (INCH/HR) = 1.90
 AREA-AVERAGED Fm (INCH/HR) = 0.14
 AREA-AVERAGED Fp (INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.28
 EFFECTIVE STREAM AREA (ACRES) = 55.70
 TOTAL STREAM AREA (ACRES) = 55.70
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 88.09

 FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 307.00
 ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 705.00

$T_c = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20$
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.130
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.976

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.10	0.50	1.000	56	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.10	0.50	1.000	56	9.13
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.20	0.50	1.000	56	9.13
NATURAL FAIR COVER						
"OPEN BRUSH"	-	0.50	0.50	1.000	56	9.13

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF (CFS) = 1.20
 TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.20

 FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 705.00 DOWNSTREAM (FEET) = 525.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 695.00 CHANNEL SLOPE = 0.2590
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.747

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	2.10	0.50	1.000	-
USER-DEFINED	-	3.10	0.50	1.000	-
USER-DEFINED	-	3.20	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.92
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.42
 AVERAGE FLOW DEPTH (FEET) = 0.52 TRAVEL TIME (MIN.) = 1.56
 Tc (MIN.) = 10.69
 SUBAREA AREA (ACRES) = 8.40 SUBAREA RUNOFF (CFS) = 9.43
 EFFECTIVE AREA (ACRES) = 9.30 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 9.3 PEAK FLOW RATE (CFS) = 10.44

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.64 FLOW VELOCITY (FEET/SEC.) = 8.55
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

 FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 460.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 1010.00 CHANNEL SLOPE = 0.0644
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.457

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	5.80	0.50	1.000	-
USER-DEFINED	-	6.30	0.50	1.000	-

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 16.69
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.69
 AVERAGE FLOW DEPTH (FEET) = 0.99 TRAVEL TIME (MIN.) = 2.96
 Tc (MIN.) = 13.65
 SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 12.40
 EFFECTIVE AREA (ACRES) = 23.70 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 23.7 PEAK FLOW RATE (CFS) = 20.41

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.07 FLOW VELOCITY(FEET/SEC.) = 6.00
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

 FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.65
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.457
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 10.40 0.50 1.000 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 8.96
 EFFECTIVE AREA(ACRES) = 34.10 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 34.1 PEAK FLOW RATE(CFS) = 29.37

 FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 398.00
 FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.91
 ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 29.37
 PIPE TRAVEL TIME(MIN.) = 1.03 Tc(MIN.) = 14.68
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 14.68
 RAINFALL INTENSITY(INCH/HR) = 1.36
 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 34.10
 TOTAL STREAM AREA(ACRES) = 34.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 29.37

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	88.09	9.56	1.897	0.50(0.14)	0.28	55.7	800.00
2	29.37	14.68	1.356	0.50(0.50)	1.00	34.1	810.00

1	88.09	9.56	1.897	0.50(0.14)	0.28	55.7	800.00
2	29.37	14.68	1.356	0.50(0.50)	1.00	34.1	810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap (DECIMAL)	Ae (ACRES)	HEADWATER NODE
1	117.46	9.56	1.897	0.50(0.24)	0.48	77.9	800.00
2	90.35	14.68	1.356	0.50(0.28)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 117.46 Tc(MIN.) = 9.56
 EFFECTIVE AREA(ACRES) = 77.90 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.48
 TOTAL AREA(ACRES) = 89.8
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 341.00
 FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 26.05
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 117.46
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 10.04
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 10.04
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 5.60 0.50 0.200 -
 USER-DEFINED - 12.30 0.50 0.200 -
 USER-DEFINED - 0.50 0.50 0.100 -
 USER-DEFINED - 5.40 0.50 0.100 -
 USER-DEFINED - 4.70 0.50 0.900 -
 USER-DEFINED - 4.20 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372
 SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 47.82
 EFFECTIVE AREA(ACRES) = 110.60 AREA-AVERAGED Fm(INCH/HR) = 0.23
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 157.79

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 10.04
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.811
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.90 0.50 0.100 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 15.69
EFFECTIVE AREA(ACRES) = 120.50 AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.42
TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 173.48

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.04
RAINFALL INTENSITY(INCH/HR) = 1.81
AREA-AVERAGED Fm(INCH/HR) = 0.21
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.42
EFFECTIVE STREAM AREA(ACRES) = 120.50
TOTAL STREAM AREA(ACRES) = 132.40
PEAK FLOW RATE(CFS) AT CONFLUENCE = 173.48

FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.025
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.10 0.50 1.000 56 8.86
NATURAL FAIR COVER
"OPEN BRUSH" - 0.30 0.50 1.000 56 8.86
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" - 0.60 0.50 1.000 56 8.86
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.37
TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 1.37

FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 0.100 -
USER-DEFINED - 0.90 0.50 0.900 -
USER-DEFINED - 1.30 0.50 0.100 -
USER-DEFINED - 0.80 0.50 1.000 -
USER-DEFINED - 2.40 0.50 1.000 -
USER-DEFINED - 3.20 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.25
AVERAGE FLOW DEPTH(FEET) = 0.61 TRAVEL TIME(MIN.) = 3.70
Tc(MIN.) = 12.57
SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 8.93
EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.86
TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 9.89

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.74 FLOW VELOCITY(FEET/SEC.) = 5.97
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.57
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 4.00 0.50 1.000 -
USER-DEFINED - 7.10 0.50 1.000 -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 10.62
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 20.51

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 12.57
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.40	0.50	1.000	-
USER-DEFINED	-	1.80	0.50	1.000	-
USER-DEFINED	-	3.60	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913
 SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 10.36
 EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.46
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.93
 TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 30.87

 FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

=====

MAINLINE Tc(MIN.) = 12.57
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.564
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	4.60	0.50	1.000	-
USER-DEFINED	-	2.60	0.50	1.000	-
USER-DEFINED	-	0.20	0.50	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
 SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 7.09
 EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.47
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94
 TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 37.96

 FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<

>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
 FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 16.16
 ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 37.96
 PIPE TRAVEL TIME(MIN.) = 1.27 Tc(MIN.) = 13.84
 LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

 FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

=====

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 13.84
 RAINFALL INTENSITY(INCH/HR) = 1.44
 AREA-AVERAGED Fm(INCH/HR) = 0.47
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 0.94
 EFFECTIVE STREAM AREA(ACRES) = 38.60
 TOTAL STREAM AREA(ACRES) = 38.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 37.96

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	173.48	10.04	1.811	0.50(0.21)	0.42	120.5	800.00
1	128.70	15.20	1.317	0.50(0.24)	0.47	132.4	810.00
2	37.96	13.84	1.439	0.50(0.47)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	211.44	10.04	1.811	0.50(0.26)	0.52	148.5	800.00
2	178.48	13.84	1.439	0.50(0.29)	0.57	167.9	818.00
3	161.90	15.20	1.317	0.50(0.29)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 211.44 Tc(MIN.) = 10.04
 EFFECTIVE AREA(ACRES) = 148.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.52
 TOTAL AREA(ACRES) = 171.0
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 10.04
 EFFECTIVE AREA(ACRES) = 148.50 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.521
 PEAK FLOW RATE(CFS) = 211.44

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	211.44	10.04	1.811	0.50(0.26)	0.52	148.5	800.00
2	178.48	13.84	1.439	0.50(0.29)	0.57	167.9	818.00
3	161.90	15.20	1.317	0.50(0.29)	0.58	171.0	810.00

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 10-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E10EVRL.DAT
TIME/DATE OF STUDY: 06:56 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.912
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.547
- 13) 360.00; 0.406
- 14) 1200.00; 0.179

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP (FT)	HIKE (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.912

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56	8.00
COMMERCIAL	B	0.80	0.30	0.100	56	5.00
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 5.09
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 5.09

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.57
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.39
HALFSTREET FLOOD WIDTH(FEET) = 12.54
AVERAGE FLOW VELOCITY(FEET/SEC.) = 2.99
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.16
STREET FLOW TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 6.50

* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.515
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	2.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 8.95
 EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 13.50

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.42 HALFSTREET FLOOD WIDTH (FEET) = 14.57
 FLOW VELOCITY (FEET/SEC.) = 3.23 DEPTH*VELOCITY (FT*FT/SEC.) = 1.37
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

 FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

>>>> COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> (STREET TABLE SECTION # 1 USED) <<<<<

=====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
 STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 21.70
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.48
 HALFSTREET FLOOD WIDTH (FEET) = 17.62
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.66
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.75
 STREET FLOW TRAVEL TIME (MIN.) = 1.78 Tc (MIN.) = 8.28
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.045

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
COMMERCIAL	B	3.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
COMMERCIAL	B	1.70	0.30	0.100	56
RESIDENTIAL					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 16.38
 EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.08
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 28.02

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.51 HALFSTREET FLOOD WIDTH (FEET) = 19.49
 FLOW VELOCITY (FEET/SEC.) = 3.91 DEPTH*VELOCITY (FT*FT/SEC.) = 1.99
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

 FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<<
 >>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
 FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 21.0 INCH PIPE IS 14.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 16.35
 ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 28.02
 PIPE TRAVEL TIME (MIN.) = 0.86 Tc (MIN.) = 9.14
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

=====

MAINLINE Tc (MIN.) = 9.14
 * 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.818
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.00	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56
COMMERCIAL	B	5.30	0.30	0.100	56
COMMERCIAL	B	7.10	0.30	0.100	56
COMMERCIAL	B	8.60	0.30	0.100	56

 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 71.96
 EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 97.84

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>> ADDITION OF SUBAREA TO MAINLINE PEAK FLOW <<<<<

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=====
MAINLINE Tc(MIN.) = 9.14
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.818
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
".4 DWELLING/ACRE"   B         0.60     0.30     0.900     56
RESIDENTIAL
".4 DWELLING/ACRE"   B         1.30     0.30     0.900     56
COMMERCIAL           B         5.60     0.30     0.100     56
COMMERCIAL           B         8.30     0.30     0.100     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA(ACRES) = 15.80     SUBAREA RUNOFF(CFS) = 39.24
EFFECTIVE AREA(ACRES) = 55.70     AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30     AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7     PEAK FLOW RATE(CFS) = 137.08

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FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 9.14
RAINFALL INTENSITY(INCH/HR) = 2.82
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 137.08

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FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00     DOWNSTREAM(FEET) = 705.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.822
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.10     0.30     1.000     63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.10     0.30     1.000     66   9.13
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.20     0.30     1.000     63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.50     0.30     1.000     66   9.13

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.04
TOTAL AREA(ACRES) = 0.90     PEAK FLOW RATE(CFS) = 2.04

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FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 705.00     DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00     CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00     "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040     MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.525

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"           B         2.10     0.30     1.000     66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         3.10     0.30     1.000     63
NATURAL FAIR COVER
"OPEN BRUSH"           B         3.20     0.30     1.000     66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.57
AVERAGE FLOW DEPTH(FEET) = 0.64     TRAVEL TIME(MIN.) = 1.35
Tc(MIN.) = 10.48
SUBAREA AREA(ACRES) = 8.40     SUBAREA RUNOFF(CFS) = 16.82
EFFECTIVE AREA(ACRES) = 9.30     AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30     AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.3     PEAK FLOW RATE(CFS) = 18.62

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.80     FLOW VELOCITY(FEET/SEC.) = 9.79
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

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FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 525.00     DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00     CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00     "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040     MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.168

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B         0.10     0.30     1.000     63
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.30     0.30     1.000     66

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NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.70 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.20 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.80 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 6.30 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.60
AVERAGE FLOW DEPTH(FEET) = 1.25 TRAVEL TIME(MIN.) = 2.55
Tc(MIN.) = 13.03
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 24.21
EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 39.85

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.37 FLOW VELOCITY(FEET/SEC.) = 7.07
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 13.03
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.168
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 10.40 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 17.49
EFFECTIVE AREA(ACRES) = 34.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 34.1 PEAK FLOW RATE(CFS) = 57.34

FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 398.00
FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.99
ESTIMATED PIPE DIAMETER(INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 57.34
PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 13.90
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.90
RAINFALL INTENSITY (INCH/HR) = 2.05
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 34.10
TOTAL STREAM AREA(ACRES) = 34.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 57.34

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 137.08 9.14 2.818 0.30(0.08) 0.28 55.7 800.00
2 57.34 13.90 2.046 0.30(0.30) 1.00 34.1 810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 191.45 9.14 2.818 0.30(0.15) 0.49 78.1 800.00
2 155.71 13.90 2.046 0.30(0.17) 0.55 89.8 810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 191.45 Tc(MIN.) = 9.14
EFFECTIVE AREA(ACRES) = 78.12 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 89.8
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 341.00
FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.30
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 191.45
PIPE TRAVEL TIME(MIN.) = 0.43 Tc(MIN.) = 9.57
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.57
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.705
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.60	0.30	0.200	56
APARTMENTS	B	12.30	0.30	0.200	56
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	5.40	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372
 SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 76.31
 EFFECTIVE AREA(ACRES) = 110.82 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 256.23

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.57
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.705
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 23.83
 EFFECTIVE AREA(ACRES) = 120.72 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 280.06

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.57
 RAINFALL INTENSITY(INCH/HR) = 2.70
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.42
 EFFECTIVE STREAM AREA(ACRES) = 120.72
 TOTAL STREAM AREA(ACRES) = 132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 280.06

 FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
 ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.892
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63	8.86
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66	8.86
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63	8.86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 2.33
 TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 2.33

 FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
COMMERCIAL	B	1.30	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	2.40	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 10.42
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.04
 AVERAGE FLOW DEPTH(FEET) = 0.76 TRAVEL TIME(MIN.) = 3.22
 Tc(MIN.) = 12.08
 SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 16.03
 EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86
 TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 17.83

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 0.93 FLOW VELOCITY(FEET/SEC.) = 6.93
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.10 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 19.99
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 37.82

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.08
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.80 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.60 0.30 1.000 63
COMMERCIAL B 1.00 0.30 0.100 56
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.50 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 18.97
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 56.79

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.08

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.301

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 4.60 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.60 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 13.33
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 70.13

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 21.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.81
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 70.13
PIPE TRAVEL TIME(MIN.) = 1.09 Tc(MIN.) = 13.17
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.17
RAINFALL INTENSITY(INCH/HR) = 2.15
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 38.60
TOTAL STREAM AREA(ACRES) = 38.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 70.13

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	280.06	9.57	2.705	0.30(0.13)	0.42	120.7	800.00
1	219.32	14.36	1.983	0.30(0.14)	0.47	132.4	810.00
2	70.13	13.17	2.148	0.30(0.28)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.22	9.57	2.705	0.30 (0.16)	0.52	148.8	800.00
2	304.47	13.17	2.148	0.30 (0.17)	0.57	168.1	818.00
3	283.23	14.36	1.983	0.30 (0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 346.22 Tc(MIN.) = 9.57
EFFECTIVE AREA(ACRES) = 148.77 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.57
EFFECTIVE AREA(ACRES) = 148.77 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 346.22

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	346.22	9.57	2.705	0.30 (0.16)	0.52	148.8	800.00
2	304.47	13.17	2.148	0.30 (0.17)	0.57	168.1	818.00
3	283.23	14.36	1.983	0.30 (0.17)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 25-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E25EVRL.DAT
TIME/DATE OF STUDY: 06:55 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.985
- 2) 10.00; 3.243
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.773
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.201
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1200.00; 0.220

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.985

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56	8.00
COMMERCIAL	B	0.80	0.30	0.100	56	5.00
RESIDENTIAL ".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473
SUBAREA RUNOFF(CFS) = 6.54
TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 6.54

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00
INSIDE STREET CROSSFALL(DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL(DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.29
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH(FEET) = 0.41
HALFSTREET FLOOD WIDTH(FEET) = 14.02
AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.15
PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.30
STREET FLOW TRAVEL TIME(MIN.) = 1.43 Tc(MIN.) = 6.43

* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.487
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.10 0.30 0.100 56
COMMERCIAL B 2.10 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.293
SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 11.48
EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 17.35

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.45 HALFSTREET FLOOD WIDTH (FEET) = 16.13
FLOW VELOCITY (FEET/SEC.) = 3.45 DEPTH*VELOCITY (FT*FT/SEC.) = 1.55
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<
=====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
INSIDE STREET CROSSFALL (DECIMAL) = 0.018
OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 27.92
STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
STREET FLOW DEPTH (FEET) = 0.51
HALFSTREET FLOOD WIDTH (FEET) = 19.49
AVERAGE FLOW VELOCITY (FEET/SEC.) = 3.89
PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 1.99
STREET FLOW TRAVEL TIME (MIN.) = 1.67 Tc (MIN.) = 8.10
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.904

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 0.60 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
COMMERCIAL B 3.00 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
COMMERCIAL B 1.70 0.30 0.100 56
RESIDENTIAL

".4 DWELLING/ACRE" B 0.50 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.205
SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 21.10
EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.08
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27
TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 36.14

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH (FEET) = 0.55 HALFSTREET FLOOD WIDTH (FEET) = 21.60
FLOW VELOCITY (FEET/SEC.) = 4.14 DEPTH*VELOCITY (FT*FT/SEC.) = 2.27
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 17.52
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 36.14
PIPE TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 8.90
LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 8.90
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.625
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 2.00 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.20 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 4.20 0.30 0.900 56
COMMERCIAL B 5.30 0.30 0.100 56
COMMERCIAL B 7.10 0.30 0.100 56
COMMERCIAL B 8.60 0.30 0.100 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.329
SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 93.30
EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.09
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 126.80

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 8.90
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.625
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B         0.60   0.30   0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B         1.30   0.30   0.900  56
COMMERCIAL           B         5.60   0.30   0.100  56
COMMERCIAL           B         8.30   0.30   0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA(ACRES) = 15.80   SUBAREA RUNOFF(CFS) = 50.71
EFFECTIVE AREA(ACRES) = 55.70   AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7   PEAK FLOW RATE(CFS) = 177.50

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FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.90
RAINFALL INTENSITY(INCH/HR) = 3.62
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 177.50

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*****
FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00   DOWNSTREAM(FEET) = 705.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.546
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B         0.10   0.30   1.000  63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"         B         0.10   0.30   1.000  66   9.13
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B         0.20   0.30   1.000  63   9.13
NATURAL FAIR COVER
"OPEN BRUSH"         B         0.50   0.30   1.000  66   9.13

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.63
TOTAL AREA(ACRES) = 0.90   PEAK FLOW RATE(CFS) = 2.63

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FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 705.00   DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00   CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.180

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN

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NATURAL FAIR COVER
"OPEN BRUSH"         B         2.10   0.30   1.000  66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B         3.10   0.30   1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"         B         3.20   0.30   1.000  66

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```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.54
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.08
AVERAGE FLOW DEPTH(FEET) = 0.70   TRAVEL TIME(MIN.) = 1.28
Tc(MIN.) = 10.41
SUBAREA AREA(ACRES) = 8.40   SUBAREA RUNOFF(CFS) = 21.77
EFFECTIVE AREA(ACRES) = 9.30   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.3   PEAK FLOW RATE(CFS) = 24.11

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.87   FLOW VELOCITY(FEET/SEC.) = 10.51
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

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FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 525.00   DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00   CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.812

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN

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NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B         0.10   0.30   1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"         B         0.30   0.30   1.000  66

```

NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.70 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.20 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.80 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 6.30 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 40.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.10
AVERAGE FLOW DEPTH(FEET) = 1.38 TRAVEL TIME(MIN.) = 2.37
Tc(MIN.) = 12.78
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 32.56
EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 53.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.53 FLOW VELOCITY(FEET/SEC.) = 7.62
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.78
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 2.812
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 10.40 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 23.52
EFFECTIVE AREA(ACRES) = 34.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 34.1 PEAK FLOW RATE(CFS) = 77.11

FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 398.00
FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 30.0 INCH PIPE IS 20.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.51
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 77.11
PIPE TRAVEL TIME(MIN.) = 0.81 Tc(MIN.) = 13.59
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.59
RAINFALL INTENSITY (INCH/HR) = 2.69
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 34.10
TOTAL STREAM AREA(ACRES) = 34.10
PEAK FLOW RATE(CFS) AT CONFLUENCE = 77.11

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	177.50	8.90	3.625	0.30(0.08)	0.28	55.7	800.00
2	77.11	13.59	2.687	0.30(0.30)	1.00	34.1	810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	247.89	8.90	3.625	0.30(0.15)	0.49	78.0	800.00
2	207.60	13.59	2.687	0.30(0.17)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 247.89 Tc(MIN.) = 8.90
EFFECTIVE AREA(ACRES) = 78.05 AREA-AVERAGED Fm(INCH/HR) = 0.15
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
TOTAL AREA(ACRES) = 89.8
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 341.00
FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 32.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.99
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 247.89
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 9.31
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.31
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.483
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.60	0.30	0.200	56
APARTMENTS	B	12.30	0.30	0.200	56
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	5.40	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372
 SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 99.22
 EFFECTIVE AREA(ACRES) = 110.75 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 333.64

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.31
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.483
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 30.77
 EFFECTIVE AREA(ACRES) = 120.65 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 364.40

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.31
 RAINFALL INTENSITY(INCH/HR) = 3.48
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.42
 EFFECTIVE STREAM AREA(ACRES) = 120.65
 TOTAL STREAM AREA(ACRES) = 132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 364.40

 FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
 ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.639
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63	8.86
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66	8.86
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63	8.86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.00
 TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.00

 FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.956
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
COMMERCIAL	B	1.30	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	2.40	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.65
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.51
 AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 2.99
 Tc(MIN.) = 11.85
 SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 21.16
 EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86
 TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 23.55

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.03 FLOW VELOCITY(FEET/SEC.) = 7.44
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.85
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.956
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.10 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 26.53
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 50.08

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.85
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.956
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.80 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.60 0.30 1.000 63
COMMERCIAL B 1.00 0.30 0.100 56
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.50 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 25.10
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 75.18

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.85

* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.956
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 4.60 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.60 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 17.69
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 92.87

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.12
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 92.87
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 12.87
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.87
RAINFALL INTENSITY(INCH/HR) = 2.80
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 38.60
TOTAL STREAM AREA(ACRES) = 38.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 92.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	364.40	9.31	3.483	0.30(0.13)	0.42	120.6	800.00
1	295.32	14.01	2.621	0.30(0.14)	0.47	132.4	810.00
2	92.87	12.87	2.798	0.30(0.28)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	449.88	9.31	3.483	0.30 (0.16)	0.52	148.6	800.00
2	404.95	12.87	2.798	0.30 (0.17)	0.57	168.1	818.00
3	381.66	14.01	2.621	0.30 (0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 449.88 Tc(MIN.) = 9.31
EFFECTIVE AREA(ACRES) = 148.56 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.31
EFFECTIVE AREA(ACRES) = 148.56 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 449.88

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	449.88	9.31	3.483	0.30 (0.16)	0.52	148.6	800.00
2	404.95	12.87	2.798	0.30 (0.17)	0.57	168.1	818.00
3	381.66	14.01	2.621	0.30 (0.17)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA E *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 50-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4E50EVRL.DAT
TIME/DATE OF STUDY: 06:53 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.515
- 2) 10.00; 3.520
- 3) 15.00; 2.687
- 4) 20.00; 2.242
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.473
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.757
- 13) 360.00; 0.563
- 14) 1200.00; 0.248

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH LIP HIKE (FT) (FT) (FT)	MANNING FACTOR (n)
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00 0.0313 0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00 0.0312 0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00 0.0312 0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
 2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
- *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 800.00 TO NODE 801.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 455.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 5.000
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 5.515

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56	8.00
COMMERCIAL	B	0.80	0.30	0.100	56	5.00
RESIDENTIAL						
".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56	8.00

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.473

SUBAREA RUNOFF(CFS) = 7.25

TOTAL AREA(ACRES) = 1.50 PEAK FLOW RATE(CFS) = 7.25

FLOW PROCESS FROM NODE 801.00 TO NODE 801.10 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION(FEET) = 455.00 DOWNSTREAM ELEVATION(FEET) = 451.00
STREET LENGTH(FEET) = 270.00 CURB HEIGHT(INCHES) = 8.0
STREET HALFWIDTH(FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) = 20.00

INSIDE STREET CROSSFALL(DECIMAL) = 0.018

OUTSIDE STREET CROSSFALL(DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2

STREET PARKWAY CROSSFALL(DECIMAL) = 0.020

Manning's FRICTION FACTOR for Streetflow Section(curbs-to-curbs) = 0.0150

Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 13.62

STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:

STREET FLOW DEPTH(FEET) = 0.42

HALFSTREET FLOOD WIDTH(FEET) = 14.65

AVERAGE FLOW VELOCITY(FEET/SEC.) = 3.23

PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) = 1.37

STREET FLOW TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 6.39

* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.959
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
COMMERCIAL	B	2.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.70	0.30	0.900	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.293
 SUBAREA AREA (ACRES) = 2.90 SUBAREA RUNOFF (CFS) = 12.71
 EFFECTIVE AREA (ACRES) = 4.40 AREA-AVERAGED Fm (INCH/HR) = 0.11
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.35
 TOTAL AREA (ACRES) = 4.4 PEAK FLOW RATE (CFS) = 19.22

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.46 HALFSTREET FLOOD WIDTH (FEET) = 16.84
 FLOW VELOCITY (FEET/SEC.) = 3.53 DEPTH*VELOCITY (FT*FT/SEC.) = 1.63
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 801.10 = 600.00 FEET.

 FLOW PROCESS FROM NODE 801.10 TO NODE 802.00 IS CODE = 62

>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>(STREET TABLE SECTION # 1 USED)<<<<<

=====

UPSTREAM ELEVATION (FEET) = 451.00 DOWNSTREAM ELEVATION (FEET) = 445.00
 STREET LENGTH (FEET) = 391.00 CURB HEIGHT (INCHES) = 8.0
 STREET HALFWIDTH (FEET) = 30.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK (FEET) = 20.00
 INSIDE STREET CROSSFALL (DECIMAL) = 0.018
 OUTSIDE STREET CROSSFALL (DECIMAL) = 0.018

SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF = 2
 STREET PARKWAY CROSSFALL (DECIMAL) = 0.020
 Manning's FRICTION FACTOR for Streetflow Section (curb-to-curb) = 0.0150
 Manning's FRICTION FACTOR for Back-of-Walk Flow Section = 0.0200

**TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 30.89
 STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
 STREET FLOW DEPTH (FEET) = 0.52
 HALFSTREET FLOOD WIDTH (FEET) = 20.27
 AVERAGE FLOW VELOCITY (FEET/SEC.) = 4.00
 PRODUCT OF DEPTH&VELOCITY (FT*FT/SEC.) = 2.10
 STREET FLOW TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 8.02
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.308

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.60	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.20	0.30	0.900	56
COMMERCIAL	B	3.00	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
COMMERCIAL	B	1.70	0.30	0.100	56
RESIDENTIAL					

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
".4 DWELLING/ACRE"	B	0.50	0.30	0.900	56

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.205
 SUBAREA AREA (ACRES) = 6.10 SUBAREA RUNOFF (CFS) = 23.31
 EFFECTIVE AREA (ACRES) = 10.50 AREA-AVERAGED Fm (INCH/HR) = 0.08
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.27
 TOTAL AREA (ACRES) = 10.5 PEAK FLOW RATE (CFS) = 39.95

END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH (FEET) = 0.56 HALFSTREET FLOOD WIDTH (FEET) = 22.46
 FLOW VELOCITY (FEET/SEC.) = 4.25 DEPTH*VELOCITY (FT*FT/SEC.) = 2.40
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 802.00 = 991.00 FEET.

 FLOW PROCESS FROM NODE 802.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 445.00 DOWNSTREAM (FEET) = 398.00
 FLOW LENGTH (FEET) = 843.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.1 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 17.87
 ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 39.95
 PIPE TRAVEL TIME (MIN.) = 0.79 Tc (MIN.) = 8.81
 LONGEST FLOWPATH FROM NODE 800.00 TO NODE 808.00 = 1834.00 FEET.

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 8.81
 * 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.995
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.00	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	2.20	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56
COMMERCIAL	B	5.30	0.30	0.100	56
COMMERCIAL	B	7.10	0.30	0.100	56
COMMERCIAL	B	8.60	0.30	0.100	56

 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.329
 SUBAREA AREA (ACRES) = 29.40 SUBAREA RUNOFF (CFS) = 103.09
 EFFECTIVE AREA (ACRES) = 39.90 AREA-AVERAGED Fm (INCH/HR) = 0.09
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.31
 TOTAL AREA (ACRES) = 39.9 PEAK FLOW RATE (CFS) = 140.08

 FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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=====
MAINLINE Tc(MIN.) = 8.81
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.995
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"    B        0.60    0.30    0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"    B        1.30    0.30    0.900  56
COMMERCIAL            B        5.60    0.30    0.100  56
COMMERCIAL            B        8.30    0.30    0.100  56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA(ACRES) = 15.80    SUBAREA RUNOFF(CFS) = 55.97
EFFECTIVE AREA(ACRES) = 55.70    AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 0.28
TOTAL AREA(ACRES) = 55.7    PEAK FLOW RATE(CFS) = 196.04

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*****
FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 8.81
RAINFALL INTENSITY(INCH/HR) = 3.99
AREA-AVERAGED Fm(INCH/HR) = 0.08
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.28
EFFECTIVE STREAM AREA(ACRES) = 55.70
TOTAL STREAM AREA(ACRES) = 55.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 196.04

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*****
FLOW PROCESS FROM NODE 810.00 TO NODE 811.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 307.00
ELEVATION DATA: UPSTREAM(FEET) = 785.00    DOWNSTREAM(FEET) = 705.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.130
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.867
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS    Tc
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    B        0.10    0.30    1.000  63    9.13
NATURAL FAIR COVER
"OPEN BRUSH"            B        0.10    0.30    1.000  66    9.13
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    B        0.20    0.30    1.000  63    9.13
NATURAL FAIR COVER
"OPEN BRUSH"            B        0.50    0.30    1.000  66    9.13

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.89
TOTAL AREA(ACRES) = 0.90    PEAK FLOW RATE(CFS) = 2.89

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*****
FLOW PROCESS FROM NODE 811.00 TO NODE 812.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

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```

ELEVATION DATA: UPSTREAM(FEET) = 705.00    DOWNSTREAM(FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 695.00    CHANNEL SLOPE = 0.2590
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.457

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH"            B        2.10    0.30    1.000  66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    B        3.10    0.30    1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"            B        3.20    0.30    1.000  66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 14.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.29
AVERAGE FLOW DEPTH(FEET) = 0.73    TRAVEL TIME(MIN.) = 1.25
Tc(MIN.) = 10.38
SUBAREA AREA(ACRES) = 8.40    SUBAREA RUNOFF(CFS) = 23.87
EFFECTIVE AREA(ACRES) = 9.30    AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30    AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 9.3    PEAK FLOW RATE(CFS) = 26.43

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.91    FLOW VELOCITY(FEET/SEC.) = 10.75
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 812.00 = 1002.00 FEET.

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*****
FLOW PROCESS FROM NODE 812.00 TO NODE 813.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----

```

```

ELEVATION DATA: UPSTREAM(FEET) = 525.00    DOWNSTREAM(FEET) = 460.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1010.00    CHANNEL SLOPE = 0.0644
CHANNEL BASE(FEET) = 0.00    "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040    MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.070

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/    SCS SOIL    AREA    Fp    Ap    SCS
LAND USE            GROUP    (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"    B        0.10    0.30    1.000  63
NATURAL FAIR COVER
"OPEN BRUSH"            B        0.30    0.30    1.000  66

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NATURAL FAIR COVER
 "WOODLAND,GRASS" B 0.70 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 1.20 0.30 1.000 63
 NATURAL FAIR COVER
 "OPEN BRUSH" B 5.80 0.30 1.000 66
 NATURAL FAIR COVER
 "OPEN BRUSH" B 6.30 0.30 1.000 66
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 44.43
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.25
 AVERAGE FLOW DEPTH(FEET) = 1.43 TRAVEL TIME(MIN.) = 2.32
 Tc(MIN.) = 12.70
 SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 35.90
 EFFECTIVE AREA(ACRES) = 23.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 23.7 PEAK FLOW RATE(CFS) = 59.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) = 1.59 FLOW VELOCITY(FEET/SEC.) = 7.79
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 813.00 = 2012.00 FEET.

FLOW PROCESS FROM NODE 813.00 TO NODE 813.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.70
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.070
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 10.40 0.30 1.000 63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 25.93
 EFFECTIVE AREA(ACRES) = 34.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 34.1 PEAK FLOW RATE(CFS) = 85.02

FLOW PROCESS FROM NODE 813.00 TO NODE 808.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 460.00 DOWNSTREAM(FEET) = 398.00
 FLOW LENGTH(FEET) = 1046.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.83
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 85.02
 PIPE TRAVEL TIME(MIN.) = 0.80 Tc(MIN.) = 13.50
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 808.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 13.50
 RAINFALL INTENSITY(INCH/HR) = 2.94
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 34.10
 TOTAL STREAM AREA(ACRES) = 34.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 85.02

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	196.04	8.81	3.995	0.30(0.08)	0.28	55.7	800.00
2	85.02	13.50	2.937	0.30(0.30)	1.00	34.1	810.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	273.79	8.81	3.995	0.30(0.15)	0.49	78.0	800.00
2	228.06	13.50	2.937	0.30(0.17)	0.55	89.8	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 273.79 Tc(MIN.) = 8.81
 EFFECTIVE AREA(ACRES) = 77.96 AREA-AVERAGED Fm(INCH/HR) = 0.15
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.49
 TOTAL AREA(ACRES) = 89.8
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 808.00 = 3058.00 FEET.

FLOW PROCESS FROM NODE 808.00 TO NODE 809.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 398.00 DOWNSTREAM(FEET) = 341.00
 FLOW LENGTH(FEET) = 756.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 45.0 INCH PIPE IS 32.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 32.12
 ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 273.79
 PIPE TRAVEL TIME(MIN.) = 0.39 Tc(MIN.) = 9.20
 LONGEST FLOWPATH FROM NODE 810.00 TO NODE 809.00 = 3814.00 FEET.

FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 9.20
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.838
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
APARTMENTS	B	5.60	0.30	0.200	56
APARTMENTS	B	12.30	0.30	0.200	56
COMMERCIAL	B	0.50	0.30	0.100	56
COMMERCIAL	B	5.40	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.70	0.30	0.900	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	4.20	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.372
 SUBAREA AREA(ACRES) = 32.70 SUBAREA RUNOFF(CFS) = 109.67
 EFFECTIVE AREA(ACRES) = 110.66 AREA-AVERAGED Fm(INCH/HR) = 0.14
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.45
 TOTAL AREA(ACRES) = 122.5 PEAK FLOW RATE(CFS) = 368.74

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 9.20
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.838
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	9.90	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 9.90 SUBAREA RUNOFF(CFS) = 33.93
 EFFECTIVE AREA(ACRES) = 120.56 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.42
 TOTAL AREA(ACRES) = 132.4 PEAK FLOW RATE(CFS) = 402.67

 FLOW PROCESS FROM NODE 809.00 TO NODE 809.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
 TIME OF CONCENTRATION(MIN.) = 9.20
 RAINFALL INTENSITY(INCH/HR) = 3.84
 AREA-AVERAGED Fm(INCH/HR) = 0.13
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.42
 EFFECTIVE STREAM AREA(ACRES) = 120.56
 TOTAL STREAM AREA(ACRES) = 132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 402.67

 FLOW PROCESS FROM NODE 818.00 TO NODE 819.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<

>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 323.00
 ELEVATION DATA: UPSTREAM(FEET) = 625.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.864
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.973
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63	8.86
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66	8.86
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63	8.86

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.31
 TOTAL AREA(ACRES) = 1.00 PEAK FLOW RATE(CFS) = 3.31

 FLOW PROCESS FROM NODE 819.00 TO NODE 820.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 395.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1167.00 CHANNEL SLOPE = 0.1045
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 20.00
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	0.10	0.30	0.100	56
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.90	0.30	0.900	56
COMMERCIAL	B	1.30	0.30	0.100	56
NATURAL FAIR COVER "OPEN BRUSH"	B	0.80	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	2.40	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.845
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 15.01
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 6.66
 AVERAGE FLOW DEPTH(FEET) = 0.87 TRAVEL TIME(MIN.) = 2.92
 Tc(MIN.) = 11.79
 SUBAREA AREA(ACRES) = 8.70 SUBAREA RUNOFF(CFS) = 23.25
 EFFECTIVE AREA(ACRES) = 9.70 AREA-AVERAGED Fm(INCH/HR) = 0.26
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.86
 TOTAL AREA(ACRES) = 9.7 PEAK FLOW RATE(CFS) = 25.88

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 7.63
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 820.00 = 1490.00 FEET.

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.79
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.00 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.10 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 11.10 SUBAREA RUNOFF(CFS) = 29.20
EFFECTIVE AREA(ACRES) = 20.80 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 20.8 PEAK FLOW RATE(CFS) = 55.08

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.79
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.40 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.80 0.30 1.000 63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 3.60 0.30 1.000 63
COMMERCIAL B 1.00 0.30 0.100 56
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.50 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.913
SUBAREA AREA(ACRES) = 10.40 SUBAREA RUNOFF(CFS) = 27.60
EFFECTIVE AREA(ACRES) = 31.20 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.93
TOTAL AREA(ACRES) = 31.2 PEAK FLOW RATE(CFS) = 82.67

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.79

* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.223

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 4.60 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.60 0.30 1.000 66
RESIDENTIAL
".4 DWELLING/ACRE" B 0.20 0.30 0.900 56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.997
SUBAREA AREA(ACRES) = 7.40 SUBAREA RUNOFF(CFS) = 19.47
EFFECTIVE AREA(ACRES) = 38.60 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 38.6 PEAK FLOW RATE(CFS) = 102.14

FLOW PROCESS FROM NODE 820.00 TO NODE 817.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 395.00 DOWNSTREAM(FEET) = 340.00
FLOW LENGTH(FEET) = 1232.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 33.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.33
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 102.14
PIPE TRAVEL TIME(MIN.) = 1.01 Tc(MIN.) = 12.80
LONGEST FLOWPATH FROM NODE 818.00 TO NODE 817.00 = 2722.00 FEET.

FLOW PROCESS FROM NODE 817.00 TO NODE 817.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.80
RAINFALL INTENSITY(INCH/HR) = 3.05
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 38.60
TOTAL STREAM AREA(ACRES) = 38.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 102.14

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	402.67	9.20	3.838	0.30(0.13)	0.42	120.6	800.00
1	324.89	13.91	2.869	0.30(0.14)	0.47	132.4	810.00
2	102.14	12.80	3.054	0.30(0.28)	0.94	38.6	818.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	496.91	9.20	3.838	0.30 (0.16)	0.52	148.3	800.00
2	445.43	12.80	3.054	0.30 (0.17)	0.57	168.2	818.00
3	420.20	13.91	2.869	0.30 (0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 496.91 Tc(MIN.) = 9.20
EFFECTIVE AREA(ACRES) = 148.32 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.52
TOTAL AREA(ACRES) = 171.0
LONGEST FLOWPATH FROM NODE 810.00 TO NODE 817.00 = 3814.00 FEET.

=====
END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 171.0 TC(MIN.) = 9.20
EFFECTIVE AREA(ACRES) = 148.32 AREA-AVERAGED Fm(INCH/HR) = 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.520
PEAK FLOW RATE(CFS) = 496.91

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	496.91	9.20	3.838	0.30 (0.16)	0.52	148.3	800.00
2	445.43	12.80	3.054	0.30 (0.17)	0.57	168.2	818.00
3	420.20	13.91	2.869	0.30 (0.17)	0.58	171.0	810.00

=====
END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-3 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 100-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F00EVRL.DAT
TIME/DATE OF STUDY: 07:06 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 100.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 6.101
- 2) 10.00; 3.900
- 3) 15.00; 3.005
- 4) 20.00; 2.465
- 5) 25.00; 2.128
- 6) 30.00; 1.900
- 7) 40.00; 1.644
- 8) 50.00; 1.419
- 9) 60.00; 1.320
- 10) 90.00; 1.119
- 11) 120.00; 0.983
- 12) 180.00; 0.826
- 13) 360.00; 0.617
- 14) 1200.00; 0.271

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.227

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.70	0.30	1.000	63	13.76
NATURAL FAIR COVER "OPEN BRUSH"	B	0.50	0.30	1.000	66	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.16
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 3.16

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.85
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.16
PIPE TRAVEL TIME(MIN.) = 2.65 Tc(MIN.) = 16.41
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.41
RAINFALL INTENSITY(INCH/HR) = 2.85
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 1.20
TOTAL STREAM AREA (ACRES) = 1.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 3.16

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.718
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.10 0.30 1.000 63 8.14
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.50 0.30 1.000 63 8.14
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66 8.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 6.36
TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 6.36

FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.314
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 15.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.32
AVERAGE FLOW DEPTH (FEET) = 0.78 TRAVEL TIME (MIN.) = 0.92

Tc (MIN.) = 9.06
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 17.70
EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 23.48

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.92 FLOW VELOCITY (FEET/SEC.) = 9.28
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.851
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.60 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 4.00 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.70 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 50.84
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.47
AVERAGE FLOW DEPTH (FEET) = 1.41 TRAVEL TIME (MIN.) = 1.22
Tc (MIN.) = 10.27
SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 54.65
EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 75.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.64 FLOW VELOCITY (FEET/SEC.) = 9.38
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 39.0 INCH PIPE IS 28.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.82
 ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 75.42
 PIPE TRAVEL TIME(MIN.) = 1.26 Tc(MIN.) = 11.53
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.53
 RAINFALL INTENSITY(INCH/HR) = 3.63
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 23.60
 TOTAL STREAM AREA(ACRES) = 23.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 75.42

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	3.16	16.41	2.852	0.30(0.30)	1.00	1.2	900.00
2	75.42	11.53	3.626	0.30(0.30)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	78.31	11.53	3.626	0.30(0.30)	1.00	24.4	910.00
2	61.04	16.41	2.852	0.30(0.30)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 78.31 Tc(MIN.) = 11.53
 EFFECTIVE AREA(ACRES) = 24.44 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 24.8
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.53
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.626
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
 COMMERCIAL B 5.50 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
 COMMERCIAL B 1.00 0.30 0.100 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175
 SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 22.84
 EFFECTIVE AREA(ACRES) = 31.54 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
 TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 96.01

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.53
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.626
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 COMMERCIAL B 3.40 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 3.30 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.712
 SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 33.48
 EFFECTIVE AREA(ACRES) = 42.44 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
 TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 129.48

 FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
 FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 27.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.79
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 129.48
 PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 12.01
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.01
RAINFALL INTENSITY(INCH/HR) = 3.54
AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.44
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 129.48

FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.896
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66 7.74
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66 7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.72
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.72

FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 4.454
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.20 0.30 1.000 65
NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.40 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 6.70 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 29.38
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.86
AVERAGE FLOW DEPTH(FEET) = 1.00 TRAVEL TIME(MIN.) = 1.00
Tc(MIN.) = 8.74
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 51.22
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 54.59

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.26 FLOW VELOCITY(FEET/SEC.) = 11.43
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.952
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.70 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 1.40 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 5.40 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 66.92
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.83
AVERAGE FLOW DEPTH(FEET) = 1.59 TRAVEL TIME(MIN.) = 1.14
Tc(MIN.) = 9.88
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 24.65
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 72.64

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.64 FLOW VELOCITY(FEET/SEC.) = 9.03
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.80 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.80 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 5.20 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 94.85
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.81
AVERAGE FLOW DEPTH(FEET) = 1.89 TRAVEL TIME(MIN.) = 1.61
Tc(MIN.) = 11.49
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 44.40
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 110.71

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.01 FLOW VELOCITY(FEET/SEC.) = 9.14
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.49
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.634
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 9.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 17.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 36.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 189.91
EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 300.62

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.478

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.60 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.90 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.90 0.30 1.000 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 305.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.65
AVERAGE FLOW DEPTH(FEET) = 2.96 TRAVEL TIME(MIN.) = 0.87
Tc(MIN.) = 12.36
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 10.01
EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 300.62

NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.94 FLOW VELOCITY(FEET/SEC.) = 11.59
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.36
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.478
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER

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"OPEN BRUSH"      B      3.80   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      4.20   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      5.10   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      7.00   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     12.00   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 32.10   SUBAREA RUNOFF(CFS) = 91.81
EFFECTIVE AREA(ACRES) = 135.80   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 135.8   PEAK FLOW RATE(CFS) = 388.42

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FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 457.00   DOWNSTREAM(FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 884.00   CHANNEL SLOPE = 0.0192
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.149

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"            B      0.50   0.30   1.000   69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      0.70   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      2.30   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      2.40   0.30   1.000   66
NATURAL FAIR COVER
"GRASS"            B      2.50   0.30   1.000   69
NATURAL FAIR COVER
"GRASS"            B      3.20   0.30   1.000   69

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 403.30
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.02
AVERAGE FLOW DEPTH(FEET) = 4.09   TRAVEL TIME(MIN.) = 1.84
Tc(MIN.) = 14.19
SUBAREA AREA(ACRES) = 11.60   SUBAREA RUNOFF(CFS) = 29.75
EFFECTIVE AREA(ACRES) = 147.40   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 147.4   PEAK FLOW RATE(CFS) = 388.42
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 4.04   FLOW VELOCITY(FEET/SEC.) = 7.94
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

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*****
FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.19
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.149
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      7.40   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B     12.40   0.30   1.000   66
NATURAL FAIR COVER
"OPEN BRUSH"      B     28.20   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     31.40   0.30   1.000   63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     42.40   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 121.80   SUBAREA RUNOFF(CFS) = 312.33
EFFECTIVE AREA(ACRES) = 269.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 269.2   PEAK FLOW RATE(CFS) = 690.31

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*****
FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00   DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 1341.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 90.0 INCH PIPE IS 68.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.13
ESTIMATED PIPE DIAMETER(INCH) = 90.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 690.31
PIPE TRAVEL TIME(MIN.) = 1.17   Tc(MIN.) = 15.36
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.36
RAINFALL INTENSITY(INCH/HR) = 2.97
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 269.20
TOTAL STREAM AREA(ACRES) = 269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 690.31

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*****
FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 715.00 DOWNSTREAM (FEET) = 517.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.954
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.801
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.60 0.30 1.000 63 7.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 2.43
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.43

*****
FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 517.00 DOWNSTREAM (FEET) = 430.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.1964
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.391
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.88
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.93
AVERAGE FLOW DEPTH (FEET) = 0.71 TRAVEL TIME (MIN.) = 0.93
Tc (MIN.) = 8.88
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 18.88
EFFECTIVE AREA (ACRES) = 5.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 5.7 PEAK FLOW RATE (CFS) = 21.09

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.87 FLOW VELOCITY (FEET/SEC.) = 9.19
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

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*****
FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 426.00
FLOW LENGTH (FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 16.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 9.49
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 21.09
PIPE TRAVEL TIME (MIN.) = 0.45 Tc (MIN.) = 9.33
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION (MIN.) = 9.33
RAINFALL INTENSITY (INCH/HR) = 4.19
AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA (ACRES) = 5.70
TOTAL STREAM AREA (ACRES) = 5.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 21.09

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 129.48 12.01 3.540 0.30 ( 0.24) 0.79 42.4 910.00
2 100.75 16.92 2.798 0.30 ( 0.24) 0.79 42.8 900.00
3 690.31 15.36 2.966 0.30 ( 0.30) 1.00 269.2 920.00
4 21.09 9.33 4.194 0.30 ( 0.28) 0.94 5.7 930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 754.13 9.33 4.194 0.30 ( 0.29) 0.96 202.2 930.00
2 802.96 12.01 3.540 0.30 ( 0.29) 0.96 258.6 910.00
3 814.64 15.36 2.966 0.30 ( 0.29) 0.97 317.6 920.00
4 761.05 16.92 2.798 0.30 ( 0.29) 0.97 317.7 900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 814.64 Tc (MIN.) = 15.36
EFFECTIVE AREA (ACRES) = 317.59 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA (ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.36
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.966
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.50   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.10   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       3.00   0.30  0.900  56
COMMERCIAL           B       5.90   0.30  0.100  56
COMMERCIAL           B       7.70   0.30  0.100  56
COMMERCIAL           B      13.60   0.30  0.100  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80   SUBAREA RUNOFF(CFS) = 85.46
EFFECTIVE AREA(ACRES) = 350.39   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.90
TOTAL AREA(ACRES) = 350.5   PEAK FLOW RATE(CFS) = 849.96

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	832.39	9.33	4.194	0.30(0.26)	0.86	235.0	930.00
2	859.05	12.01	3.540	0.30(0.26)	0.88	291.4	910.00
3	849.96	15.36	2.966	0.30(0.27)	0.90	350.4	920.00
4	797.15	16.92	2.798	0.30(0.27)	0.90	350.5	900.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 859.05 Tc(MIN.) = 12.01
 AREA-AVERAGED Fm(INCH/HR) = 0.26 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.88 EFFECTIVE AREA(ACRES) = 291.37

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 54.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 39.32
ESTIMATED PIPE DIAMETER(INCH) = 69.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 859.05
PIPE TRAVEL TIME(MIN.) = 0.38 Tc(MIN.) = 12.39
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.39
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.473
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B       3.80   0.30  0.100  56
COMMERCIAL           B       0.60   0.30  0.100  56
NATURAL FAIR COVER
"GRASS"              B       0.10   0.30  1.000  69
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.40   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.20   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.30   0.30  0.900  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 28.04
EFFECTIVE AREA(ACRES) = 300.77   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 359.9   PEAK FLOW RATE(CFS) = 869.26

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 75.0 INCH PIPE IS 55.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 35.42
ESTIMATED PIPE DIAMETER(INCH) = 75.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 869.26
PIPE TRAVEL TIME(MIN.) = 0.41 Tc(MIN.) = 12.80
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.80
RAINFALL INTENSITY(INCH/HR) = 3.40
AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.87
EFFECTIVE STREAM AREA(ACRES) = 300.77
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 869.26

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*****
FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 304.00
ELEVATION DATA: UPSTREAM (FEET) = 858.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.692

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.916

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include NATURAL FAIR COVER, CHAPARRAL, BROADLEAF, OPEN BRUSH, and summary statistics for average pervious loss rate, area fraction, runoff, and total area.

FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW <<<<
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT) <<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1008.00 CHANNEL SLOPE = 0.2679
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 4.288

SUBAREA LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, GRASS, WOODLAND, GRASS, OPEN BRUSH, CHAPARRAL, BROADLEAF, OPEN BRUSH, and summary statistics for average pervious loss rate, area fraction, travel time, average flow depth, effective area, area-averaged Fp, and total area.

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.27 FLOW VELOCITY (FEET/SEC.) = 13.70

LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.

FLOW PROCESS FROM NODE 942.00 TO NODE 905.00 IS CODE = 31

>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA <<<<
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW) <<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1041.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 19.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 22.23
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 66.41
PIPE TRAVEL TIME (MIN.) = 0.78 Tc (MIN.) = 9.90
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE <<<<

=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 9.90
RAINFALL INTENSITY (INCH/HR) = 3.94
AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 18.50
TOTAL STREAM AREA (ACRES) = 18.50
PEAK FLOW RATE (CFS) AT CONFLUENCE = 66.41

FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS <<<<
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA <<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 1053.00 DOWNSTREAM (FEET) = 990.00

Tc = K * [(LENGTH ** 3.00) / (ELEVATION CHANGE)] ** 0.20

SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.965

* 100 YEAR RAINFALL INTENSITY (INCH/HR) = 3.916

SUBAREA Tc AND LOSS RATE DATA (AMC II):

Table with 7 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN, Tc (MIN.). Rows include NATURAL FAIR COVER, OPEN BRUSH, and summary statistics for average pervious loss rate, area fraction, runoff, and total area.

FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.0911
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.660

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, OPEN BRUSH, GRASS, and GRASS.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 7.28
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.31
AVERAGE FLOW DEPTH(FEET) = 0.68 TRAVEL TIME(MIN.) = 1.38
Tc(MIN.) = 11.34
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 5.44
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 9.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.75 FLOW VELOCITY(FEET/SEC.) = 5.70
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.463

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, CHAPARRAL, BROADLEAF, GRASS, GRASS, and OPEN BRUSH.

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.20 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 30.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.28
AVERAGE FLOW DEPTH(FEET) = 0.91 TRAVEL TIME(MIN.) = 1.10
Tc(MIN.) = 12.44
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 40.99
EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 50.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.09 FLOW VELOCITY(FEET/SEC.) = 13.96
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.249

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, GRASS, OPEN BRUSH, OPEN BRUSH, GRASS, GRASS, CHAPARRAL, BROADLEAF, OPEN BRUSH.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 85.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 13.32
AVERAGE FLOW DEPTH(FEET) = 1.46 TRAVEL TIME(MIN.) = 1.19
Tc(MIN.) = 13.64
SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 70.60
EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 117.31

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.65 FLOW VELOCITY(FEET/SEC.) = 14.45
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

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FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.017
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.40 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.90 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 5.20 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 9.50 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 139.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.49
AVERAGE FLOW DEPTH(FEET) = 2.11 TRAVEL TIME(MIN.) = 1.29
Tc(MIN.) = 14.93
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 45.25
EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 153.35

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.18 FLOW VELOCITY(FEET/SEC.) = 10.76
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

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FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 375.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 643.00 CHANNEL SLOPE = 0.0544
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER

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"WOODLAND,GRASS" B 0.50 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 1.20 0.30 1.000 69
NATURAL FAIR COVER
"WOODLAND,GRASS" B 3.60 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 3.80 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 6.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 171.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.56
AVERAGE FLOW DEPTH(FEET) = 2.44 TRAVEL TIME(MIN.) = 1.12
Tc(MIN.) = 16.05
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 35.92
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 182.15

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.50 FLOW VELOCITY(FEET/SEC.) = 9.72
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

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FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 16.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 14.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 21.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 83.73
EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 265.88

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FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.05
* 100 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
NATURAL FAIR COVER

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"OPEN BRUSH" B 0.30 0.30 1.000 66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.60 0.30 1.000 63
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 2.30 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 15.63
 EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 281.51

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 51.0 INCH PIPE IS 39.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 23.86
 ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 281.51
 PIPE TRAVEL TIME(MIN.) = 0.91 Tc(MIN.) = 16.96
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION(MIN.) = 16.96
 RAINFALL INTENSITY(INCH/HR) = 2.79
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 120.70
 TOTAL STREAM AREA(ACRES) = 120.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 281.51

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	832.39	10.13	3.877	0.30(0.25)	0.85	244.4	930.00
1	869.26	12.80	3.399	0.30(0.26)	0.87	300.8	910.00
1	860.42	16.16	2.880	0.30(0.27)	0.89	359.8	920.00
1	806.09	17.72	2.711	0.30(0.27)	0.89	359.9	900.00
2	66.41	9.90	3.945	0.30(0.30)	1.00	18.5	940.00
3	281.51	16.96	2.793	0.30(0.30)	1.00	120.7	950.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1135.16	9.90	3.945	0.30(0.27)	0.89	327.7	940.00
2	1138.76	10.13	3.877	0.30(0.27)	0.89	335.0	930.00
3	1189.76	12.80	3.399	0.30(0.27)	0.91	410.3	910.00
4	1184.94	16.16	2.880	0.30(0.28)	0.92	493.3	920.00
5	1159.49	16.96	2.793	0.30(0.28)	0.92	499.0	950.00
6	1122.25	17.72	2.711	0.30(0.28)	0.92	499.1	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1189.76 Tc(MIN.) = 12.80
 EFFECTIVE AREA(ACRES) = 410.34 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.91
 TOTAL AREA(ACRES) = 499.1
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.80
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.399
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	12.30	0.30	0.100	56
COMMERCIAL	B	26.80	0.30	0.100	56
COMMERCIAL	B	2.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 140.39
 EFFECTIVE AREA(ACRES) = 457.04 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83
 TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 1295.38

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.80
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) = 3.399
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	8.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 24.26

EFFECTIVE AREA (ACRES) = 465.04 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
 TOTAL AREA (ACRES) = 553.8 PEAK FLOW RATE (CFS) = 1319.64

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 553.8 TC (MIN.) = 12.80
 EFFECTIVE AREA (ACRES) = 465.04 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.820
 PEAK FLOW RATE (CFS) = 1319.64

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1276.24	9.90	3.945	0.30 (0.24)	0.79	382.4	940.00
2	1276.37	10.13	3.877	0.30 (0.24)	0.79	389.7	930.00
3	1319.64	12.80	3.399	0.30 (0.25)	0.82	465.0	910.00
4	1294.78	16.16	2.880	0.30 (0.25)	0.85	548.0	920.00
5	1265.04	16.96	2.793	0.30 (0.25)	0.85	553.7	950.00
6	1224.20	17.72	2.711	0.30 (0.25)	0.85	553.8	900.00

=====
 END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 2-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F02EVRL.DAT
TIME/DATE OF STUDY: 07:11 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 2.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 1.873
- 2) 10.00; 1.249
- 3) 15.00; 0.951
- 4) 20.00; 0.777
- 5) 25.00; 0.669
- 6) 30.00; 0.593
- 7) 40.00; 0.511
- 8) 50.00; 0.454
- 9) 60.00; 0.400
- 10) 90.00; 0.346
- 11) 120.00; 0.290
- 12) 180.00; 0.236
- 13) 360.00; 0.180
- 14) 1200.00; 0.084

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / SIDE/ WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.025
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.70	0.60	1.000	56	13.76
NATURAL FAIR COVER "OPEN BRUSH"	-	0.50	0.60	1.000	56	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.46
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 0.46

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 2.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.89
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 0.46
PIPE TRAVEL TIME(MIN.) = 4.67 Tc(MIN.) = 18.44
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 18.44
RAINFALL INTENSITY(INCH/HR) = 0.83
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60

AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 1.20
TOTAL STREAM AREA (ACRES) = 1.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 0.46

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.481

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.10	0.60	1.000	56	8.14
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.50	0.60	1.000	56	8.14
NATURAL FAIR COVER						
"OPEN BRUSH"	-	1.00	0.60	1.000	56	8.14

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 1.27

TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 1.27

FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.307

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.84

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.49

AVERAGE FLOW DEPTH (FEET) = 0.41 TRAVEL TIME (MIN.) = 1.39

Tc (MIN.) = 9.53

SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 3.12

EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 4.14

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.48 FLOW VELOCITY (FEET/SEC.) = 6.04

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00

* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.164

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	4.60	0.60	1.000	-
USER-DEFINED	-	4.00	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	2.70	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 8.50

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.44

AVERAGE FLOW DEPTH (FEET) = 0.72 TRAVEL TIME (MIN.) = 1.89

Tc (MIN.) = 11.43

SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 8.68

EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 11.98

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.82 FLOW VELOCITY (FEET/SEC.) = 5.92

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH (FEET) = 890.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 7.56

ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 11.98

PIPE TRAVEL TIME (MIN.) = 1.96 Tc (MIN.) = 13.39

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 13.39
RAINFALL INTENSITY(INCH/HR) = 1.05
AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 23.60
TOTAL STREAM AREA(ACRES) = 23.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.98

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	0.46	18.44	0.831	0.60(0.60)	1.00	1.2	900.00
2	11.98	13.39	1.047	0.60(0.60)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	12.44	13.39	1.047	0.60(0.60)	1.00	24.5	910.00
2	6.66	18.44	0.831	0.60(0.60)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 12.44 Tc(MIN.) = 13.39
EFFECTIVE AREA(ACRES) = 24.47 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.8
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.047

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	5.50	0.60	0.100	-
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	1.00	0.60	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 6.02
EFFECTIVE AREA(ACRES) = 31.57 AREA-AVERAGED Fm(INCH/HR) = 0.49
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 15.87

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 13.39
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.047

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	0.900	-
USER-DEFINED	-	3.20	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	0.100	-
USER-DEFINED	-	3.30	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.712
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 6.08
EFFECTIVE AREA(ACRES) = 42.47 AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 21.95

FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 14.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.44
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 21.95
PIPE TRAVEL TIME(MIN.) = 0.75 Tc(MIN.) = 14.14
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 14.14
RAINFALL INTENSITY(INCH/HR) = 1.00
AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.47
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 21.95

FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 286.00
ELEVATION DATA: UPSTREAM (FEET) = 860.00 DOWNSTREAM (FEET) = 712.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.737
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.531
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 0.20 0.60 1.000 56 7.74
NATURAL FAIR COVER
"OPEN BRUSH" - 0.70 0.60 1.000 56 7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 0.75
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 0.75

FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.338
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.60 1.000 -
USER-DEFINED - 1.00 0.60 1.000 -
USER-DEFINED - 1.40 0.60 1.000 -
USER-DEFINED - 4.40 0.60 1.000 -
USER-DEFINED - 6.70 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.38
AVERAGE FLOW DEPTH (FEET) = 0.53 TRAVEL TIME (MIN.) = 1.55
Tc (MIN.) = 9.29
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 9.10
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 9.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.66 FLOW VELOCITY (FEET/SEC.) = 7.44
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.186
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.60 1.000 -
USER-DEFINED - 1.40 0.60 1.000 -
USER-DEFINED - 5.40 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 11.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.70
AVERAGE FLOW DEPTH (FEET) = 0.83 TRAVEL TIME (MIN.) = 1.77
Tc (MIN.) = 11.05
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 3.96
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 11.66

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.83 FLOW VELOCITY (FEET/SEC.) = 5.69
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.034
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.60 1.000 -
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 0.80 0.60 1.000 -
USER-DEFINED - 1.10 0.60 1.000 -
USER-DEFINED - 5.20 0.60 1.000 -
USER-DEFINED - 6.30 0.60 1.000 -

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.54
AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 2.55
Tc (MIN.) = 13.61
SUBAREA AREA (ACRES) = 14.80 SUBAREA RUNOFF (CFS) = 5.78
EFFECTIVE AREA (ACRES) = 36.90 AREA-AVERAGED Fm (INCH/HR) = 0.60

AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 36.9 PEAK FLOW RATE (CFS) = 14.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 5.49
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 13.61
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.034
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	9.70	0.60	1.000	-
USER-DEFINED	-	17.00	0.60	1.000	-
USER-DEFINED	-	36.60	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 63.30 SUBAREA RUNOFF (CFS) = 24.73
EFFECTIVE AREA (ACRES) = 100.20 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 100.2 PEAK FLOW RATE (CFS) = 39.15

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.949
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-
USER-DEFINED	-	0.90	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.70
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.99
AVERAGE FLOW DEPTH (FEET) = 1.38 TRAVEL TIME (MIN.) = 1.45
Tc (MIN.) = 15.05
SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 1.10
EFFECTIVE AREA (ACRES) = 103.70 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 103.7 PEAK FLOW RATE (CFS) = 39.15
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 6.97
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 15.05
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.949
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	3.80	0.60	1.000	-
USER-DEFINED	-	4.20	0.60	1.000	-
USER-DEFINED	-	5.10	0.60	1.000	-
USER-DEFINED	-	7.00	0.60	1.000	-
USER-DEFINED	-	12.00	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 32.10 SUBAREA RUNOFF (CFS) = 10.09
EFFECTIVE AREA (ACRES) = 135.80 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 135.8 PEAK FLOW RATE (CFS) = 42.68

FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 457.00 DOWNSTREAM (FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 884.00 CHANNEL SLOPE = 0.0192
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.838
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	2.40	0.60	1.000	-
USER-DEFINED	-	2.50	0.60	1.000	-
USER-DEFINED	-	3.20	0.60	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 43.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.61
AVERAGE FLOW DEPTH (FEET) = 1.78 TRAVEL TIME (MIN.) = 3.20
Tc (MIN.) = 18.25
SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 2.48
EFFECTIVE AREA (ACRES) = 147.40 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 147.4 PEAK FLOW RATE (CFS) = 42.68
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.77 FLOW VELOCITY (FEET/SEC.) = 4.57
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.25
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.838
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 7.40 0.60 1.000 -
USER-DEFINED - 12.40 0.60 1.000 -
USER-DEFINED - 28.20 0.60 1.000 -
USER-DEFINED - 31.40 0.60 1.000 -
USER-DEFINED - 42.40 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 121.80 SUBAREA RUNOFF (CFS) = 26.09
EFFECTIVE AREA (ACRES) = 269.20 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 269.2 PEAK FLOW RATE (CFS) = 57.66

FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 440.00 DOWNSTREAM (FEET) = 426.00
FLOW LENGTH (FEET) = 1341.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 10.34
ESTIMATED PIPE DIAMETER (INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 57.66
PIPE TRAVEL TIME (MIN.) = 2.16 Tc (MIN.) = 20.41
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 20.41
RAINFALL INTENSITY (INCH/HR) = 0.77
AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 269.20
TOTAL STREAM AREA (ACRES) = 269.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 57.66

FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 715.00 DOWNSTREAM (FEET) = 517.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.954
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.504
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" - 0.60 0.60 1.000 56 7.95
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 0.49
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.49

FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 517.00 DOWNSTREAM (FEET) = 430.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.1964
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.330
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.60 0.900 -
USER-DEFINED - 0.40 0.60 0.100 -
USER-DEFINED - 0.30 0.60 1.000 -
USER-DEFINED - 4.30 0.60 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.28
AVERAGE FLOW DEPTH (FEET) = 0.38 TRAVEL TIME (MIN.) = 1.40
Tc (MIN.) = 9.35
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 3.55
EFFECTIVE AREA (ACRES) = 5.70 AREA-AVERAGED Fm (INCH/HR) = 0.56
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 5.7 PEAK FLOW RATE (CFS) = 3.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.47 FLOW VELOCITY (FEET/SEC.) = 6.00
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31

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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 6.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.27
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 3.94
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 10.03
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

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FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 10.03
RAINFALL INTENSITY(INCH/HR) = 1.25
AREA-AVERAGED Fm(INCH/HR) = 0.56
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 5.70
TOTAL STREAM AREA(ACRES) = 5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 3.94

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** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	21.95	14.14	1.002	0.60(0.47)	0.79	42.5	910.00
1	13.78	19.25	0.803	0.60(0.47)	0.79	42.8	900.00
2	57.66	20.41	0.768	0.60(0.60)	1.00	269.2	920.00
3	3.94	10.03	1.247	0.60(0.56)	0.94	5.7	930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	83.55	10.03	1.247	0.60(0.58)	0.96	168.1	930.00
2	82.14	14.14	1.002	0.60(0.58)	0.96	234.7	910.00
3	72.83	19.25	0.803	0.60(0.58)	0.97	302.4	900.00
4	71.17	20.41	0.768	0.60(0.58)	0.97	317.7	920.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 83.55 Tc(MIN.) = 10.03
EFFECTIVE AREA(ACRES) = 168.05 AREA-AVERAGED Fm(INCH/HR) = 0.58
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81

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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 10.03
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.247
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.60 0.900 -
USER-DEFINED - 2.10 0.60 0.900 -
USER-DEFINED - 3.00 0.60 0.900 -
USER-DEFINED - 5.90 0.60 0.100 -
USER-DEFINED - 7.70 0.60 0.100 -
USER-DEFINED - 13.60 0.60 0.100 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80 SUBAREA RUNOFF(CFS) = 32.63
EFFECTIVE AREA(ACRES) = 200.85 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 350.5 PEAK FLOW RATE(CFS) = 134.21

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 25.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 25.11
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 134.21
PIPE TRAVEL TIME(MIN.) = 0.59 Tc(MIN.) = 10.62
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.212
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.80 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.40 0.60 0.900 -
USER-DEFINED - 2.20 0.60 0.900 -
USER-DEFINED - 0.30 0.60 0.900 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 7.58
EFFECTIVE AREA(ACRES) = 210.25 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 359.9 PEAK FLOW RATE(CFS) = 135.38

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.62
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.212
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.80 0.60 0.100 -
USER-DEFINED - 0.60 0.60 0.100 -
USER-DEFINED - 0.10 0.60 1.000 -
USER-DEFINED - 2.40 0.60 0.900 -
USER-DEFINED - 2.20 0.60 0.900 -
USER-DEFINED - 0.30 0.60 0.900 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 7.58
EFFECTIVE AREA(ACRES) = 210.25 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.83
TOTAL AREA(ACRES) = 359.9 PEAK FLOW RATE(CFS) = 135.38

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*****
FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 29.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 21.86
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 135.38
PIPE TRAVEL TIME(MIN.) = 0.66 Tc(MIN.) = 11.29
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

*****
FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 11.29
RAINFALL INTENSITY(INCH/HR) = 1.17
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 0.83
EFFECTIVE STREAM AREA(ACRES) = 210.25
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 135.38

*****
FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 304.00
ELEVATION DATA: UPSTREAM(FEET) = 858.00 DOWNSTREAM(FEET) = 675.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.692
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.537
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" -      0.10   0.60   1.000   56   7.69
NATURAL FAIR COVER
"OPEN BRUSH"         -      1.10   0.60   1.000   56   7.69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.01
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.01

*****
FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.2679
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.264
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP  (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED       -      0.10   0.60   1.000   -
USER-DEFINED       -      0.80   0.60   1.000   -
USER-DEFINED       -      1.10   0.60   1.000   -
USER-DEFINED       -      1.50   0.60   1.000   -
USER-DEFINED       -      3.60   0.60   1.000   -
USER-DEFINED       -     10.20   0.60   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.31
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.67
AVERAGE FLOW DEPTH(FEET) = 0.52 TRAVEL TIME(MIN.) = 2.19
Tc(MIN.) = 9.88
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 10.34
EFFECTIVE AREA(ACRES) = 18.50 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.5 PEAK FLOW RATE(CFS) = 11.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.65 FLOW VELOCITY(FEET/SEC.) = 8.84
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.

*****
FLOW PROCESS FROM NODE    942.00 TO NODE    905.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1041.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 8.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.41
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 11.05
PIPE TRAVEL TIME(MIN.) = 1.20 Tc(MIN.) = 11.09
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

*****
FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 11.09
RAINFALL INTENSITY(INCH/HR) = 1.18

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AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 18.50
TOTAL STREAM AREA(ACRES) = 18.50
PEAK FLOW RATE(CFS) AT CONFLUENCE = 11.05

FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
ELEVATION DATA: UPSTREAM(FEET) = 1053.00 DOWNSTREAM(FEET) = 990.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.965
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.253
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.40	0.60	1.000	56	9.96
NATURAL FAIR COVER "OPEN BRUSH"	-	1.00	0.60	1.000	56	9.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 0.82
TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 0.82

FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.0911
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.124

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	0.70	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 1.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 3.44
AVERAGE FLOW DEPTH(FEET) = 0.35 TRAVEL TIME(MIN.) = 2.13
Tc(MIN.) = 12.09
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 0.85
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00

TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 1.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.38 FLOW VELOCITY(FEET/SEC.) = 3.55
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.018

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	1.50	0.60	1.000	-
USER-DEFINED	-	1.70	0.60	1.000	-
USER-DEFINED	-	3.40	0.60	1.000	-
USER-DEFINED	-	7.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.25
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.59
AVERAGE FLOW DEPTH(FEET) = 0.43 TRAVEL TIME(MIN.) = 1.78
Tc(MIN.) = 13.87
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 5.42
EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.60
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 6.62

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.51 FLOW VELOCITY(FEET/SEC.) = 8.36
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.920

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	2.10	0.60	1.000	-

USER-DEFINED - 8.90 0.60 1.000 -
 USER-DEFINED - 14.80 0.60 1.000 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.48
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.86
 AVERAGE FLOW DEPTH (FEET) = 0.67 TRAVEL TIME (MIN.) = 2.02
 Tc (MIN.) = 15.90
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF (CFS) = 7.66
 EFFECTIVE AREA (ACRES) = 44.20 AREA-AVERAGED Fm (INCH/HR) = 0.60
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 44.2 PEAK FLOW RATE (CFS) = 12.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 8.31
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

 FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 475.00 DOWNSTREAM (FEET) = 410.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 814.00 CHANNEL SLOPE = 0.0799
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.841

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	0.40	0.60	1.000	-
USER-DEFINED	-	2.90	0.60	1.000	-
USER-DEFINED	-	5.20	0.60	1.000	-
USER-DEFINED	-	9.50	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.00
 AVERAGE FLOW DEPTH (FEET) = 0.91 TRAVEL TIME (MIN.) = 2.26
 Tc (MIN.) = 18.16
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 4.01
 EFFECTIVE AREA (ACRES) = 62.70 AREA-AVERAGED Fm (INCH/HR) = 0.60
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 62.7 PEAK FLOW RATE (CFS) = 13.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.88 FLOW VELOCITY (FEET/SEC.) = 5.85
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

 FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 375.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 643.00 CHANNEL SLOPE = 0.0544
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.60	1.000	-
USER-DEFINED	-	0.50	0.60	1.000	-
USER-DEFINED	-	1.20	0.60	1.000	-
USER-DEFINED	-	3.60	0.60	1.000	-
USER-DEFINED	-	3.80	0.60	1.000	-
USER-DEFINED	-	6.10	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 14.80
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.20
 AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 2.06
 Tc (MIN.) = 20.22
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 2.39
 EFFECTIVE AREA (ACRES) = 78.10 AREA-AVERAGED Fm (INCH/HR) = 0.60
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 78.1 PEAK FLOW RATE (CFS) = 13.61
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.94 FLOW VELOCITY (FEET/SEC.) = 5.10
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.22
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.30	0.60	1.000	-
USER-DEFINED	-	21.60	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 35.90 SUBAREA RUNOFF (CFS) = 5.57
 EFFECTIVE AREA (ACRES) = 114.00 AREA-AVERAGED Fm (INCH/HR) = 0.60
 AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 114.0 PEAK FLOW RATE (CFS) = 17.69

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 20.22
 * 2 YEAR RAINFALL INTENSITY (INCH/HR) = 0.772
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.30	0.60	1.000	-
USER-DEFINED	-	21.60	0.60	1.000	-

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.30	0.60	1.000	-
USER-DEFINED	-	0.60	0.60	1.000	-
USER-DEFINED	-	2.30	0.60	1.000	-
USER-DEFINED	-	3.20	0.60	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 6.70 SUBAREA RUNOFF (CFS) = 1.04
EFFECTIVE AREA (ACRES) = 120.70 AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 120.7 PEAK FLOW RATE (CFS) = 18.73

FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1304.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 12.6 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 12.45
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 18.73
PIPE TRAVEL TIME (MIN.) = 1.75 Tc (MIN.) = 21.97
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
=====

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION (MIN.) = 21.97
RAINFALL INTENSITY (INCH/HR) = 0.73
AREA-AVERAGED Fm (INCH/HR) = 0.60
AREA-AVERAGED Fp (INCH/HR) = 0.60
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 120.70
TOTAL STREAM AREA (ACRES) = 120.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 18.73

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	135.38	11.29	1.172	0.60 (0.50)	0.83	210.3	930.00
1	115.39	15.44	0.936	0.60 (0.52)	0.86	276.9	910.00
1	79.84	20.68	0.762	0.60 (0.53)	0.89	344.6	900.00
1	71.64	21.88	0.736	0.60 (0.54)	0.89	359.9	920.00
2	11.05	11.09	1.184	0.60 (0.60)	1.00	18.5	940.00
3	18.73	21.97	0.735	0.60 (0.60)	1.00	120.7	950.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	165.10	11.09	1.184	0.60 (0.53)	0.88	285.9	940.00
2	164.93	11.29	1.172	0.60 (0.53)	0.88	290.8	930.00
3	140.46	15.44	0.936	0.60 (0.54)	0.90	380.3	910.00
4	101.64	20.68	0.762	0.60 (0.55)	0.92	476.8	900.00
5	92.95	21.88	0.736	0.60 (0.55)	0.92	498.6	920.00
6	92.28	21.97	0.735	0.60 (0.55)	0.92	499.1	950.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 165.10 Tc (MIN.) = 11.09
EFFECTIVE AREA (ACRES) = 285.92 AREA-AVERAGED Fm (INCH/HR) = 0.53
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.88
TOTAL AREA (ACRES) = 499.1
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 11.09
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.184
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	12.30	0.60	0.100	-
USER-DEFINED	-	26.80	0.60	0.100	-
USER-DEFINED	-	2.00	0.60	0.100	-
USER-DEFINED	-	2.70	0.60	0.900	-
USER-DEFINED	-	0.80	0.60	0.900	-
USER-DEFINED	-	2.10	0.60	0.900	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA (ACRES) = 46.70 SUBAREA RUNOFF (CFS) = 44.83
EFFECTIVE AREA (ACRES) = 332.62 AREA-AVERAGED Fm (INCH/HR) = 0.47
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.78
TOTAL AREA (ACRES) = 545.8 PEAK FLOW RATE (CFS) = 214.43

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
=====

MAINLINE Tc (MIN.) = 11.09
* 2 YEAR RAINFALL INTENSITY (INCH/HR) = 1.184
SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.00	0.60	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 8.09
EFFECTIVE AREA (ACRES) = 340.62 AREA-AVERAGED Fm (INCH/HR) = 0.46
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76
TOTAL AREA (ACRES) = 553.8 PEAK FLOW RATE (CFS) = 222.53

END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 553.8 TC (MIN.) = 11.09
EFFECTIVE AREA (ACRES) = 340.62 AREA-AVERAGED Fm (INCH/HR) = 0.46
AREA-AVERAGED Fp (INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.764
PEAK FLOW RATE (CFS) = 222.53

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp (Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	222.53	11.09	1.184	0.60 (0.46)	0.76	340.6	940.00
2	221.70	11.29	1.172	0.60 (0.46)	0.77	345.5	930.00
3	176.56	15.44	0.936	0.60 (0.48)	0.81	435.0	910.00
4	122.82	20.68	0.762	0.60 (0.51)	0.84	531.5	900.00
5	113.09	21.88	0.736	0.60 (0.51)	0.85	553.3	920.00
6	112.26	21.97	0.735	0.60 (0.51)	0.85	553.8	950.00

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=====

END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 5-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F05EVRL.DAT
TIME/DATE OF STUDY: 07:10 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 5.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 2.738
- 2) 10.00; 1.815
- 3) 15.00; 1.325
- 4) 20.00; 1.135
- 5) 25.00; 0.989
- 6) 30.00; 0.885
- 7) 40.00; 0.759
- 8) 50.00; 0.676
- 9) 60.00; 0.615
- 10) 90.00; 0.513
- 11) 120.00; 0.455
- 12) 180.00; 0.383
- 13) 360.00; 0.284
- 14) 1200.00; 0.125

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK-	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.446
SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	-	0.70	0.50	1.000	56	13.76
NATURAL FAIR COVER "OPEN BRUSH"	-	0.50	0.50	1.000	56	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.02
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.02

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 3.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 4.93
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.02
PIPE TRAVEL TIME(MIN.) = 3.68 Tc(MIN.) = 17.45
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 17.45
RAINFALL INTENSITY(INCH/HR) = 1.23
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50

AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA (ACRES) = 1.20
 TOTAL STREAM AREA (ACRES) = 1.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.02

 FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
 =====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.158

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.10	0.50	1.000	56	8.14
NATURAL FAIR COVER						
"CHAPARRAL, BROADLEAF"	-	0.50	0.50	1.000	56	8.14
NATURAL FAIR COVER						
"OPEN BRUSH"	-	1.00	0.50	1.000	56	8.14

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA RUNOFF (CFS) = 2.39

TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 2.39

 FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.939

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	1.00	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	2.30	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 5.57

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.44

AVERAGE FLOW DEPTH (FEET) = 0.54 TRAVEL TIME (MIN.) = 1.18

Tc (MIN.) = 9.33

SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 6.35

EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 8.42

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 0.62 FLOW VELOCITY (FEET/SEC.) = 7.24

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

 FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890

CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.726

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	4.60	0.50	1.000	-
USER-DEFINED	-	4.00	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	2.70	0.50	1.000	-
USER-DEFINED	-	5.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 17.88

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.51

AVERAGE FLOW DEPTH (FEET) = 0.96 TRAVEL TIME (MIN.) = 1.58

Tc (MIN.) = 10.91

SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 18.87

EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 26.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 7.15

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

 FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
 =====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH (FEET) = 890.00 MANNING'S N = 0.013

DEPTH OF FLOW IN 27.0 INCH PIPE IS 18.2 INCHES

PIPE-FLOW VELOCITY (FEET/SEC.) = 9.12

ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1

PIPE-FLOW (CFS) = 26.04

PIPE TRAVEL TIME (MIN.) = 1.63 Tc (MIN.) = 12.53

LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 12.53
RAINFALL INTENSITY(INCH/HR) = 1.57
AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 23.60
TOTAL STREAM AREA(ACRES) = 23.60
PEAK FLOW RATE(CFS) AT CONFLUENCE = 26.04

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.02	17.45	1.232	0.50(0.50)	1.00	1.2	900.00
2	26.04	12.53	1.567	0.50(0.50)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	27.06	12.53	1.567	0.50(0.50)	1.00	24.5	910.00
2	18.89	17.45	1.232	0.50(0.50)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 27.06 Tc(MIN.) = 12.53
EFFECTIVE AREA(ACRES) = 24.46 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 24.8
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.53
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	5.50	0.50	0.100	-
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	1.00	0.50	0.100	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 9.45
EFFECTIVE AREA(ACRES) = 31.56 AREA-AVERAGED Fm(INCH/HR) = 0.41
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.81

TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 32.93

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<

MAINLINE Tc(MIN.) = 12.53
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.567

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	3.20	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	0.100	-
USER-DEFINED	-	3.30	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	0.900	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.712
SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 11.88
EFFECTIVE AREA(ACRES) = 42.46 AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79
TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 44.81

FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.43
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.81
PIPE TRAVEL TIME(MIN.) = 0.63 Tc(MIN.) = 13.16
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.16
RAINFALL INTENSITY(INCH/HR) = 1.51
AREA-AVERAGED Fm(INCH/HR) = 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.46
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 44.81

FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

INITIAL SUBAREA FLOW-LENGTH (FEET) = 286.00
ELEVATION DATA: UPSTREAM (FEET) = 860.00 DOWNSTREAM (FEET) = 712.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.737
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.233
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" - 0.20 0.50 1.000 56 7.74
NATURAL FAIR COVER
"OPEN BRUSH" - 0.70 0.50 1.000 56 7.74
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 1.40
TOTAL AREA (ACRES) = 0.90 PEAK FLOW RATE (CFS) = 1.40

FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 712.00 DOWNSTREAM (FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.992

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.20 0.50 1.000 -
USER-DEFINED - 1.00 0.50 1.000 -
USER-DEFINED - 1.40 0.50 1.000 -
USER-DEFINED - 4.40 0.50 1.000 -
USER-DEFINED - 6.70 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.66
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.60
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 1.30
Tc (MIN.) = 9.04
SUBAREA AREA (ACRES) = 13.70 SUBAREA RUNOFF (CFS) = 18.40
EFFECTIVE AREA (ACRES) = 14.60 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 14.6 PEAK FLOW RATE (CFS) = 19.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.86 FLOW VELOCITY (FEET/SEC.) = 8.85
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 600.00 DOWNSTREAM (FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.765

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.70 0.50 1.000 -
USER-DEFINED - 1.40 0.50 1.000 -
USER-DEFINED - 5.40 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 23.87
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.84
AVERAGE FLOW DEPTH (FEET) = 1.08 TRAVEL TIME (MIN.) = 1.47
Tc (MIN.) = 10.51
SUBAREA AREA (ACRES) = 7.50 SUBAREA RUNOFF (CFS) = 8.54
EFFECTIVE AREA (ACRES) = 22.10 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 22.1 PEAK FLOW RATE (CFS) = 25.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.10 FLOW VELOCITY (FEET/SEC.) = 6.91
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 550.00 DOWNSTREAM (FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.559

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 0.80 0.50 1.000 -
USER-DEFINED - 0.80 0.50 1.000 -
USER-DEFINED - 1.10 0.50 1.000 -
USER-DEFINED - 5.20 0.50 1.000 -
USER-DEFINED - 6.30 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.22
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.73
AVERAGE FLOW DEPTH (FEET) = 1.26 TRAVEL TIME (MIN.) = 2.10
Tc (MIN.) = 12.62
SUBAREA AREA (ACRES) = 14.80 SUBAREA RUNOFF (CFS) = 14.10
EFFECTIVE AREA (ACRES) = 36.90 AREA-AVERAGED Fm (INCH/HR) = 0.50

AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 36.9 PEAK FLOW RATE (CFS) = 35.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.31 FLOW VELOCITY (FEET/SEC.) = 6.85
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 12.62
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.559
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 9.70 0.50 1.000 -
USER-DEFINED - 17.00 0.50 1.000 -
USER-DEFINED - 36.60 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 63.30 SUBAREA RUNOFF (CFS) = 60.30
EFFECTIVE AREA (ACRES) = 100.20 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 100.2 PEAK FLOW RATE (CFS) = 95.45

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 495.00 DOWNSTREAM (FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 0.30 0.50 1.000 -
USER-DEFINED - 0.60 0.50 1.000 -
USER-DEFINED - 0.70 0.50 1.000 -
USER-DEFINED - 0.90 0.50 1.000 -
USER-DEFINED - 0.90 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 96.94
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.72
AVERAGE FLOW DEPTH (FEET) = 1.93 TRAVEL TIME (MIN.) = 1.16
Tc (MIN.) = 13.78
SUBAREA AREA (ACRES) = 3.50 SUBAREA RUNOFF (CFS) = 2.98
EFFECTIVE AREA (ACRES) = 103.70 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 103.7 PEAK FLOW RATE (CFS) = 95.45
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.91 FLOW VELOCITY (FEET/SEC.) = 8.70
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.78
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.445
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.80 0.50 1.000 -
USER-DEFINED - 4.20 0.50 1.000 -
USER-DEFINED - 5.10 0.50 1.000 -
USER-DEFINED - 7.00 0.50 1.000 -
USER-DEFINED - 12.00 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA (ACRES) = 32.10 SUBAREA RUNOFF (CFS) = 27.29
EFFECTIVE AREA (ACRES) = 135.80 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 135.8 PEAK FLOW RATE (CFS) = 115.46

FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<

>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 457.00 DOWNSTREAM (FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 884.00 CHANNEL SLOPE = 0.0192
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.277
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 1.000 -
USER-DEFINED - 0.70 0.50 1.000 -
USER-DEFINED - 2.30 0.50 1.000 -
USER-DEFINED - 2.40 0.50 1.000 -
USER-DEFINED - 2.50 0.50 1.000 -
USER-DEFINED - 3.20 0.50 1.000 -
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 119.52
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 5.91
AVERAGE FLOW DEPTH (FEET) = 2.60 TRAVEL TIME (MIN.) = 2.49
Tc (MIN.) = 16.27
SUBAREA AREA (ACRES) = 11.60 SUBAREA RUNOFF (CFS) = 8.11
EFFECTIVE AREA (ACRES) = 147.40 AREA-AVERAGED Fm (INCH/HR) = 0.50
AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 147.4 PEAK FLOW RATE (CFS) = 115.46
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 2.56 FLOW VELOCITY (FEET/SEC.) = 5.87
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

 FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc (MIN.) = 16.27
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.277
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.40	0.50	1.000	-
USER-DEFINED	-	12.40	0.50	1.000	-
USER-DEFINED	-	28.20	0.50	1.000	-
USER-DEFINED	-	31.40	0.50	1.000	-
USER-DEFINED	-	42.40	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 121.80 SUBAREA RUNOFF (CFS) = 85.12
 EFFECTIVE AREA (ACRES) = 269.20 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 269.2 PEAK FLOW RATE (CFS) = 188.14

 FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 440.00 DOWNSTREAM (FEET) = 426.00
 FLOW LENGTH (FEET) = 1341.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 54.0 INCH PIPE IS 43.6 INCHES
 PIPE-FLOW VELOCITY (FEET/SEC.) = 13.66
 ESTIMATED PIPE DIAMETER (INCH) = 54.00 NUMBER OF PIPES = 1
 PIPE-FLOW (CFS) = 188.14
 PIPE TRAVEL TIME (MIN.) = 1.64 Tc (MIN.) = 17.91
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

 FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION (MIN.) = 17.91
 RAINFALL INTENSITY (INCH/HR) = 1.21
 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA (ACRES) = 269.20
 TOTAL STREAM AREA (ACRES) = 269.20
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 188.14

 FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
 ELEVATION DATA: UPSTREAM (FEET) = 715.00 DOWNSTREAM (FEET) = 517.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.954
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 2.193
 SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL, BROADLEAF"	-	0.60	0.50	1.000	56	7.95

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF (CFS) = 0.91
 TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 0.91

 FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 517.00 DOWNSTREAM (FEET) = 430.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.1964
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.973
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	0.900	-
USER-DEFINED	-	0.40	0.50	0.100	-
USER-DEFINED	-	0.30	0.50	1.000	-
USER-DEFINED	-	4.30	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 4.39
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.21
 AVERAGE FLOW DEPTH (FEET) = 0.49 TRAVEL TIME (MIN.) = 1.19
 Tc (MIN.) = 9.14
 SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 6.93
 EFFECTIVE AREA (ACRES) = 5.70 AREA-AVERAGED Fm (INCH/HR) = 0.47
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.94
 TOTAL AREA (ACRES) = 5.7 PEAK FLOW RATE (CFS) = 7.72

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.60 FLOW VELOCITY (FEET/SEC.) = 7.15
 LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

 FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31

```

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 7.72
PIPE TRAVEL TIME(MIN.) = 0.57 Tc(MIN.) = 9.71
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====

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```

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.71
RAINFALL INTENSITY(INCH/HR) = 1.87
AREA-AVERAGED Fm(INCH/HR) = 0.47
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 5.70
TOTAL STREAM AREA(ACRES) = 5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 7.72

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** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	44.81	13.16	1.505	0.50(0.39)	0.79	42.5	910.00
1	32.24	18.13	1.206	0.50(0.40)	0.79	42.8	900.00
2	188.14	17.91	1.215	0.50(0.50)	1.00	269.2	920.00
3	7.72	9.71	1.868	0.50(0.47)	0.94	5.7	930.00

```

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	240.56	9.71	1.868	0.50(0.48)	0.96	183.0	930.00
2	238.67	13.16	1.505	0.50(0.48)	0.96	246.0	910.00
3	225.06	17.91	1.215	0.50(0.49)	0.97	317.7	920.00
4	222.23	18.13	1.206	0.50(0.49)	0.97	317.7	900.00

```

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 240.56 Tc(MIN.) = 9.71
EFFECTIVE AREA(ACRES) = 183.03 AREA-AVERAGED Fm(INCH/HR) = 0.48
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.96
TOTAL AREA(ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 9.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.868
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 0.50 0.50 0.900 -
USER-DEFINED - 2.10 0.50 0.900 -
USER-DEFINED - 3.00 0.50 0.900 -
USER-DEFINED - 5.90 0.50 0.100 -
USER-DEFINED - 7.70 0.50 0.100 -
USER-DEFINED - 13.60 0.50 0.100 -

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```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80 SUBAREA RUNOFF(CFS) = 51.66
EFFECTIVE AREA(ACRES) = 215.83 AREA-AVERAGED Fm(INCH/HR) = 0.43
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.85
TOTAL AREA(ACRES) = 350.5 PEAK FLOW RATE(CFS) = 280.19

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 45.0 INCH PIPE IS 36.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 29.60
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 280.19
PIPE TRAVEL TIME(MIN.) = 0.50 Tc(MIN.) = 10.22
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 10.22
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.794
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED - 3.80 0.50 0.100 -
USER-DEFINED - 0.60 0.50 0.100 -
USER-DEFINED - 0.10 0.50 1.000 -
USER-DEFINED - 2.40 0.50 0.900 -
USER-DEFINED - 2.20 0.50 0.900 -
USER-DEFINED - 0.30 0.50 0.900 -

```

```

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40 SUBAREA RUNOFF(CFS) = 12.95
EFFECTIVE AREA(ACRES) = 225.23 AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.84
TOTAL AREA(ACRES) = 359.9 PEAK FLOW RATE(CFS) = 280.19
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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*****
FLOW PROCESS FROM NODE    904.00 TO NODE    905.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 48.0 INCH PIPE IS 37.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 26.45
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 280.19
PIPE TRAVEL TIME(MIN.) = 0.55 Tc(MIN.) = 10.77
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.
*****
FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 10.77
RAINFALL INTENSITY(INCH/HR) = 1.74
AREA-AVERAGED Fm(INCH/HR) = 0.42
AREA-AVERAGED Fp(INCH/HR) = 0.50
AREA-AVERAGED Ap = 0.84
EFFECTIVE STREAM AREA(ACRES) = 225.23
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 280.19
*****
FLOW PROCESS FROM NODE    940.00 TO NODE    941.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 304.00
ELEVATION DATA: UPSTREAM(FEET) = 858.00 DOWNSTREAM(FEET) = 675.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.692
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 2.241
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" -      0.10   0.50   1.000   56   7.69
NATURAL FAIR COVER
"OPEN BRUSH"        -      1.10   0.50   1.000   56   7.69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.88
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.88
*****
FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE = 51

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-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.2679
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.898
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
USER-DEFINED        -      0.10   0.50   1.000   -
USER-DEFINED        -      0.80   0.50   1.000   -
USER-DEFINED        -      1.10   0.50   1.000   -
USER-DEFINED        -      1.50   0.50   1.000   -
USER-DEFINED        -      3.60   0.50   1.000   -
USER-DEFINED        -     10.20   0.50   1.000   -
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 12.90
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.04
AVERAGE FLOW DEPTH(FEET) = 0.69 TRAVEL TIME(MIN.) = 1.86
Tc(MIN.) = 9.55
SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 21.76
EFFECTIVE AREA(ACRES) = 18.50 AREA-AVERAGED Fm(INCH/HR) = 0.50
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 18.5 PEAK FLOW RATE(CFS) = 23.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.86 FLOW VELOCITY(FEET/SEC.) = 10.55
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.
*****
FLOW PROCESS FROM NODE    942.00 TO NODE    905.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 1041.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 18.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.05
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 23.27
PIPE TRAVEL TIME(MIN.) = 1.02 Tc(MIN.) = 10.57
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.
*****
FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 10.57
RAINFALL INTENSITY(INCH/HR) = 1.76
AREA-AVERAGED Fm(INCH/HR) = 0.50

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AREA-AVERAGED Fp (INCH/HR) = 0.50
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA (ACRES) = 18.50
 TOTAL STREAM AREA (ACRES) = 18.50
 PEAK FLOW RATE (CFS) AT CONFLUENCE = 23.27

 FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
 ELEVATION DATA: UPSTREAM (FEET) = 1053.00 DOWNSTREAM (FEET) = 990.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.965
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.822

SUBAREA Tc AND LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	-	0.40	0.50	1.000	56	9.96
NATURAL FAIR COVER "OPEN BRUSH"	-	1.00	0.50	1.000	56	9.96

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF (CFS) = 1.66
 TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 1.66

 FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 990.00 DOWNSTREAM (FEET) = 950.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 439.00 CHANNEL SLOPE = 0.0911
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.642

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	0.70	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 2.59
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 4.07
 AVERAGE FLOW DEPTH (FEET) = 0.46 TRAVEL TIME (MIN.) = 1.80
 Tc (MIN.) = 11.76
 SUBAREA AREA (ACRES) = 1.80 SUBAREA RUNOFF (CFS) = 1.85
 EFFECTIVE AREA (ACRES) = 3.20 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 3.2 PEAK FLOW RATE (CFS) = 3.29

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.51 FLOW VELOCITY (FEET/SEC.) = 4.28
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

 FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 950.00 DOWNSTREAM (FEET) = 675.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 810.00 CHANNEL SLOPE = 0.3395
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00

* 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.500

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	1.50	0.50	1.000	-
USER-DEFINED	-	1.70	0.50	1.000	-
USER-DEFINED	-	3.40	0.50	1.000	-
USER-DEFINED	-	7.20	0.50	1.000	-

SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.79
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.30
 AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 1.45
 Tc (MIN.) = 13.21
 SUBAREA AREA (ACRES) = 14.40 SUBAREA RUNOFF (CFS) = 12.96
 EFFECTIVE AREA (ACRES) = 17.60 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 17.6 PEAK FLOW RATE (CFS) = 15.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 0.71 FLOW VELOCITY (FEET/SEC.) = 10.40
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

 FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====

ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 475.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 955.00 CHANNEL SLOPE = 0.2094
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000

MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.342

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.60	0.50	1.000	-
USER-DEFINED	-	2.10	0.50	1.000	-
USER-DEFINED	-	8.90	0.50	1.000	-

USER-DEFINED - 14.80 0.50 1.000 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 25.96
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 9.89
 AVERAGE FLOW DEPTH (FEET) = 0.94 TRAVEL TIME (MIN.) = 1.61
 Tc (MIN.) = 14.82
 SUBAREA AREA (ACRES) = 26.60 SUBAREA RUNOFF (CFS) = 20.16
 EFFECTIVE AREA (ACRES) = 44.20 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 44.2 PEAK FLOW RATE (CFS) = 33.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 1.03 FLOW VELOCITY (FEET/SEC.) = 10.58
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

 FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 475.00 DOWNSTREAM (FEET) = 410.00
 CHANNEL LENGTH THRU SUBAREA (FEET) = 814.00 CHANNEL SLOPE = 0.0799
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.264

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.10	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	0.40	0.50	1.000	-
USER-DEFINED	-	2.90	0.50	1.000	-
USER-DEFINED	-	5.20	0.50	1.000	-
USER-DEFINED	-	9.50	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 39.86
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.66
 AVERAGE FLOW DEPTH (FEET) = 1.32 TRAVEL TIME (MIN.) = 1.77
 Tc (MIN.) = 16.59
 SUBAREA AREA (ACRES) = 18.50 SUBAREA RUNOFF (CFS) = 12.72
 EFFECTIVE AREA (ACRES) = 62.70 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 62.7 PEAK FLOW RATE (CFS) = 43.13

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 1.36 FLOW VELOCITY (FEET/SEC.) = 7.83
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

 FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 410.00 DOWNSTREAM (FEET) = 375.00

CHANNEL LENGTH THRU SUBAREA (FEET) = 643.00 CHANNEL SLOPE = 0.0544
 CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.206

SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.20	0.50	1.000	-
USER-DEFINED	-	0.50	0.50	1.000	-
USER-DEFINED	-	1.20	0.50	1.000	-
USER-DEFINED	-	3.60	0.50	1.000	-
USER-DEFINED	-	3.80	0.50	1.000	-
USER-DEFINED	-	6.10	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 48.02
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 6.97
 AVERAGE FLOW DEPTH (FEET) = 1.52 TRAVEL TIME (MIN.) = 1.54
 Tc (MIN.) = 18.13
 SUBAREA AREA (ACRES) = 15.40 SUBAREA RUNOFF (CFS) = 9.78
 EFFECTIVE AREA (ACRES) = 78.10 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 78.1 PEAK FLOW RATE (CFS) = 49.61

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH (FEET) = 1.54 FLOW VELOCITY (FEET/SEC.) = 7.01
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.13
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.206
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	14.30	0.50	1.000	-
USER-DEFINED	-	21.60	0.50	1.000	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA (ACRES) = 35.90 SUBAREA RUNOFF (CFS) = 22.80
 EFFECTIVE AREA (ACRES) = 114.00 AREA-AVERAGED Fm (INCH/HR) = 0.50
 AREA-AVERAGED Fp (INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA (ACRES) = 114.0 PEAK FLOW RATE (CFS) = 72.41

 FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 18.13
 * 5 YEAR RAINFALL INTENSITY (INCH/HR) = 1.206
 SUBAREA LOSS RATE DATA (AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	0.30	0.50	1.000	-

USER-DEFINED - 0.30 0.50 1.000 -
 USER-DEFINED - 0.60 0.50 1.000 -
 USER-DEFINED - 2.30 0.50 1.000 -
 USER-DEFINED - 3.20 0.50 1.000 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 4.26
 EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 76.67

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 22.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 17.52
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 76.67
 PIPE TRAVEL TIME(MIN.) = 1.24 Tc(MIN.) = 19.37
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION(MIN.) = 19.37
 RAINFALL INTENSITY(INCH/HR) = 1.16
 AREA-AVERAGED Fm(INCH/HR) = 0.50
 AREA-AVERAGED Fp(INCH/HR) = 0.50
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 120.70
 TOTAL STREAM AREA(ACRES) = 120.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 76.67

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	280.19	10.77	1.740	0.50(0.42)	0.84	225.2	930.00
1	267.71	14.22	1.402	0.50(0.43)	0.87	288.2	910.00
1	242.56	18.99	1.173	0.50(0.45)	0.89	359.9	920.00
1	239.65	19.23	1.164	0.50(0.45)	0.89	359.9	900.00
2	23.27	10.57	1.759	0.50(0.50)	1.00	18.5	940.00
3	76.67	19.37	1.159	0.50(0.50)	1.00	120.7	950.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM	Q	Tc	Intensity	Fp(Fm)	Ap	Ae	HEADWATER
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NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)	(ACRES)	NODE
1	379.02	10.57	1.759	0.50(0.44)	0.88	305.4 940.00
2	379.77	10.77	1.740	0.50(0.44)	0.88	310.8 930.00
3	361.04	14.22	1.402	0.50(0.45)	0.90	395.3 910.00
4	331.67	18.99	1.173	0.50(0.46)	0.92	496.7 920.00
5	328.60	19.23	1.164	0.50(0.46)	0.92	498.2 900.00
6	326.69	19.37	1.159	0.50(0.46)	0.92	499.1 950.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 379.77 Tc(MIN.) = 10.77
 EFFECTIVE AREA(ACRES) = 310.80 AREA-AVERAGED Fm(INCH/HR) = 0.44
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.88
 TOTAL AREA(ACRES) = 499.1
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.77
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.740
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 12.30 0.50 0.100 -
 USER-DEFINED - 26.80 0.50 0.100 -
 USER-DEFINED - 2.00 0.50 0.100 -
 USER-DEFINED - 2.70 0.50 0.900 -
 USER-DEFINED - 0.80 0.50 0.900 -
 USER-DEFINED - 2.10 0.50 0.900 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 69.01
 EFFECTIVE AREA(ACRES) = 357.50 AREA-AVERAGED Fm(INCH/HR) = 0.40
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.79
 TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 432.25

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 10.77
 * 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.740
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 USER-DEFINED - 8.00 0.50 0.100 -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 12.17
 EFFECTIVE AREA(ACRES) = 365.50 AREA-AVERAGED Fm(INCH/HR) = 0.39
 AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.78
 TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 444.42

END OF STUDY SUMMARY:

TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 10.77

EFFECTIVE AREA(ACRES) = 365.50 AREA-AVERAGED Fm(INCH/HR)= 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.778
PEAK FLOW RATE(CFS) = 444.42

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	444.41	10.57	1.759	0.50(0.39)	0.78	360.1	940.00
2	444.42	10.77	1.740	0.50(0.39)	0.78	365.5	930.00
3	402.73	14.22	1.402	0.50(0.41)	0.81	450.0	910.00
4	371.68	18.99	1.173	0.50(0.42)	0.85	551.4	920.00
5	368.10	19.23	1.164	0.50(0.42)	0.85	552.9	900.00
6	365.93	19.37	1.159	0.50(0.42)	0.85	553.8	950.00

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END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 10-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F10EVRL.DAT
TIME/DATE OF STUDY: 07:09 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 10.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 3.912
- 2) 10.00; 2.592
- 3) 15.00; 1.893
- 4) 20.00; 1.621
- 5) 25.00; 1.412
- 6) 30.00; 1.265
- 7) 40.00; 1.084
- 8) 50.00; 0.966
- 9) 60.00; 0.879
- 10) 90.00; 0.732
- 11) 120.00; 0.650
- 12) 180.00; 0.547
- 13) 360.00; 0.406
- 14) 1200.00; 0.179

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.066

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.70	0.30	1.000	63	13.76
NATURAL FAIR COVER "OPEN BRUSH"	B	0.50	0.30	1.000	66	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.91
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 1.91

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 4.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.93
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 1.91
PIPE TRAVEL TIME(MIN.) = 3.06 Tc(MIN.) = 16.82
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.82
RAINFALL INTENSITY(INCH/HR) = 1.79
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 1.20
TOTAL STREAM AREA (ACRES) = 1.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 1.91

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.083
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.10 0.30 1.000 63 8.14
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.50 0.30 1.000 63 8.14
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66 8.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 4.01
TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 4.01

FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.813
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 9.56
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.46
AVERAGE FLOW DEPTH (FEET) = 0.65 TRAVEL TIME (MIN.) = 1.02

Tc (MIN.) = 9.16
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 11.08
EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 14.70

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.77 FLOW VELOCITY (FEET/SEC.) = 8.31
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.518
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.60 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 4.00 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.70 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 31.79
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.54
AVERAGE FLOW DEPTH (FEET) = 1.19 TRAVEL TIME (MIN.) = 1.37
Tc (MIN.) = 10.53
SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 34.13
EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 47.11

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.37 FLOW VELOCITY (FEET/SEC.) = 8.36
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 10.53
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 47.11
 PIPE TRAVEL TIME(MIN.) = 1.41 Tc(MIN.) = 11.94
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.94
 RAINFALL INTENSITY(INCH/HR) = 2.32
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 23.60
 TOTAL STREAM AREA(ACRES) = 23.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 47.11

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1.91	16.82	1.794	0.30(0.30)	1.00	1.2	900.00
2	47.11	11.94	2.321	0.30(0.30)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	48.94	11.94	2.321	0.30(0.30)	1.00	24.5	910.00
2	36.73	16.82	1.794	0.30(0.30)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 48.94 Tc(MIN.) = 11.94
 EFFECTIVE AREA(ACRES) = 24.45 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 24.8
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.94
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.321
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
 COMMERCIAL B 5.50 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
 COMMERCIAL B 1.00 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175
 SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 14.50
 EFFECTIVE AREA(ACRES) = 31.55 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
 TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 58.97

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.94
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.321
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 COMMERCIAL B 3.40 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 3.30 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.712
 SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 20.67
 EFFECTIVE AREA(ACRES) = 42.45 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
 TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 79.64

 FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
 FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 30.0 INCH PIPE IS 22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 20.18
 ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 79.64
 PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 12.48
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

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FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.48
RAINFALL INTENSITY(INCH/HR) = 2.25
AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.45
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 79.64

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FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.189
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66 7.74
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66 7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.34
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 2.34

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FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.891
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.20 0.30 1.000 65
NATURAL FAIR COVER

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"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.40 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 6.70 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.74
AVERAGE FLOW DEPTH(FEET) = 0.84 TRAVEL TIME(MIN.) = 1.13
Tc(MIN.) = 8.87
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 31.94
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 34.04

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 10.18
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

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FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.571
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.70 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 1.40 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 5.40 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 41.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.86
AVERAGE FLOW DEPTH(FEET) = 1.33 TRAVEL TIME(MIN.) = 1.28
Tc(MIN.) = 10.15
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 15.33
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 45.17

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.37 FLOW VELOCITY(FEET/SEC.) = 8.02
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

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FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.318

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.80 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.80 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 5.20 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 58.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.81
AVERAGE FLOW DEPTH(FEET) = 1.58 TRAVEL TIME(MIN.) = 1.81
Tc(MIN.) = 11.96
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 26.87
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 67.00

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.67 FLOW VELOCITY(FEET/SEC.) = 8.05
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.96
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.318
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 9.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 17.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 36.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 114.94
EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 181.94

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.60 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.90 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.90 0.30 1.000 69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 184.90
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.25
AVERAGE FLOW DEPTH(FEET) = 2.45 TRAVEL TIME(MIN.) = 0.99
Tc(MIN.) = 12.95
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 5.92
EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 181.94
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.44 FLOW VELOCITY(FEET/SEC.) = 10.21
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.95
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.180
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER

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"OPEN BRUSH"      B      3.80   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      4.20   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      5.10   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      7.00   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     12.00   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 32.10   SUBAREA RUNOFF(CFS) = 54.30
EFFECTIVE AREA(ACRES) = 135.80   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 135.8   PEAK FLOW RATE(CFS) = 229.72

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FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 457.00   DOWNSTREAM(FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 884.00   CHANNEL SLOPE = 0.0192
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.890

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"            B      0.50   0.30   1.000   69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      0.70   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      2.30   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      2.40   0.30   1.000   66
NATURAL FAIR COVER
"GRASS"            B      2.50   0.30   1.000   69
NATURAL FAIR COVER
"GRASS"            B      3.20   0.30   1.000   69

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 238.02
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.03
AVERAGE FLOW DEPTH(FEET) = 3.36   TRAVEL TIME(MIN.) = 2.10
Tc(MIN.) = 15.05
SUBAREA AREA(ACRES) = 11.60   SUBAREA RUNOFF(CFS) = 16.60
EFFECTIVE AREA(ACRES) = 147.40   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 147.4   PEAK FLOW RATE(CFS) = 229.72
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.32   FLOW VELOCITY(FEET/SEC.) = 6.96
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

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FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 15.05
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.890
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"    B      7.40   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B     12.40   0.30   1.000   66
NATURAL FAIR COVER
"OPEN BRUSH"      B     28.20   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     31.40   0.30   1.000   63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     42.40   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 121.80   SUBAREA RUNOFF(CFS) = 174.35
EFFECTIVE AREA(ACRES) = 269.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 269.2   PEAK FLOW RATE(CFS) = 385.34

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*****
FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00   DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 1341.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 72.0 INCH PIPE IS 55.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.51
ESTIMATED PIPE DIAMETER(INCH) = 72.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 385.34
PIPE TRAVEL TIME(MIN.) = 1.35   Tc(MIN.) = 16.40
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 16.40
RAINFALL INTENSITY(INCH/HR) = 1.82
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 269.20
TOTAL STREAM AREA(ACRES) = 269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 385.34

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FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 715.00 DOWNSTREAM (FEET) = 517.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.954
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 3.132
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS   Tc
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF"   B       0.60   0.30   1.000   63   7.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 1.53
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 1.53

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FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 517.00 DOWNSTREAM (FEET) = 430.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.1964
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.857
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.10   0.30   0.900   56
COMMERCIAL           B       0.40   0.30   0.100   56
NATURAL FAIR COVER
"WOODLAND, GRASS"   B       0.30   0.30   1.000   65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF"   B       4.30   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 7.46
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.09
AVERAGE FLOW DEPTH (FEET) = 0.59 TRAVEL TIME (MIN.) = 1.04
Tc (MIN.) = 8.99
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 11.84
EFFECTIVE AREA (ACRES) = 5.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 5.7 PEAK FLOW RATE (CFS) = 13.22

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.74 FLOW VELOCITY (FEET/SEC.) = 8.15
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

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*****
FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 426.00
FLOW LENGTH (FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 13.0 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.49
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 13.22
PIPE TRAVEL TIME (MIN.) = 0.50 Tc (MIN.) = 9.49
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION (MIN.) = 9.49
RAINFALL INTENSITY (INCH/HR) = 2.73
AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA (ACRES) = 5.70
TOTAL STREAM AREA (ACRES) = 5.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 13.22

** CONFLUENCE DATA **
STREAM   Q   Tc   Intensity   Fp (Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1       79.64 12.48 2.245 0.30 (0.24) 0.79 42.5 910.00
1       59.97 17.40 1.762 0.30 (0.24) 0.79 42.8 900.00
2      385.34 16.40 1.817 0.30 (0.30) 1.00 269.2 920.00
3       13.22 9.49 2.726 0.30 (0.28) 0.94 5.7 930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM   Q   Tc   Intensity   Fp (Fm)   Ap   Ae   HEADWATER
NUMBER  (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1      445.00 9.49 2.726 0.30 (0.29) 0.96 193.8 930.00
2      466.32 12.48 2.245 0.30 (0.29) 0.96 253.0 910.00
3      457.63 16.40 1.817 0.30 (0.29) 0.97 317.6 920.00
4      439.45 17.40 1.762 0.30 (0.29) 0.97 317.7 900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 466.32 Tc (MIN.) = 12.48
EFFECTIVE AREA (ACRES) = 252.99 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.96
TOTAL AREA (ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.48
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.245
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
".4 DWELLING/ACRE"   B        0.50     0.30     0.900     56
RESIDENTIAL
".4 DWELLING/ACRE"   B        2.10     0.30     0.900     56
RESIDENTIAL
".4 DWELLING/ACRE"   B        3.00     0.30     0.900     56
COMMERCIAL           B        5.90     0.30     0.100     56
COMMERCIAL           B        7.70     0.30     0.100     56
COMMERCIAL           B       13.60     0.30     0.100     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80   SUBAREA RUNOFF(CFS) = 64.19
EFFECTIVE AREA(ACRES) = 285.79   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.88
TOTAL AREA(ACRES) = 350.5   PEAK FLOW RATE(CFS) = 509.67

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 426.00   DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 57.0 INCH PIPE IS 44.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.58
ESTIMATED PIPE DIAMETER(INCH) = 57.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 509.67
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 12.91
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 12.91
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.185
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS
LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL           B        3.80     0.30     0.100     56
COMMERCIAL           B        0.60     0.30     0.100     56
NATURAL FAIR COVER
"GRASS"              B        0.10     0.30     1.000     69
RESIDENTIAL
".4 DWELLING/ACRE"   B        2.40     0.30     0.900     56
RESIDENTIAL

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".4 DWELLING/ACRE"   B        2.20     0.30     0.900     56
RESIDENTIAL
".4 DWELLING/ACRE"   B        0.30     0.30     0.900     56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 17.15
EFFECTIVE AREA(ACRES) = 295.19   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 359.9   PEAK FLOW RATE(CFS) = 511.29

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 370.00   DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 60.0 INCH PIPE IS 47.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 30.70
ESTIMATED PIPE DIAMETER(INCH) = 60.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 511.29
PIPE TRAVEL TIME(MIN.) = 0.47   Tc(MIN.) = 13.38
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.38
RAINFALL INTENSITY(INCH/HR) = 2.12
AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.87
EFFECTIVE STREAM AREA(ACRES) = 295.19
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 511.29

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FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 304.00
ELEVATION DATA: UPSTREAM(FEET) = 858.00   DOWNSTREAM(FEET) = 675.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.692
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.201
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA      Fp        Ap      SCS   Tc
LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN   (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"   B        0.10     0.30     1.000     63   7.69

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NATURAL FAIR COVER
 "OPEN BRUSH" B 1.10 0.30 1.000 66 7.69
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 3.13
 TOTAL AREA (ACRES) = 1.20 PEAK FLOW RATE (CFS) = 3.13

 FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 405.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 1008.00 CHANNEL SLOPE = 0.2679
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.775

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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NATURAL FAIR COVER "GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER "WOODLAND,GRASS"	B	0.80	0.30	1.000	65
NATURAL FAIR COVER "OPEN BRUSH"	B	1.10	0.30	1.000	66
NATURAL FAIR COVER "WOODLAND,GRASS"	B	1.50	0.30	1.000	65
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.60	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	10.20	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 22.53
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.40
 AVERAGE FLOW DEPTH(FEET) = 0.85 TRAVEL TIME(MIN.) = 1.62
 Tc(MIN.) = 9.31
 SUBAREA AREA(ACRES) = 17.30 SUBAREA RUNOFF(CFS) = 38.53
 EFFECTIVE AREA(ACRES) = 18.50 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 18.5 PEAK FLOW RATE(CFS) = 41.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:

DEPTH(FEET) = 1.06 FLOW VELOCITY(FEET/SEC.) = 12.15
 LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.

 FLOW PROCESS FROM NODE 942.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 405.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1041.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 24.0 INCH PIPE IS 15.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 19.93

ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 41.21
 PIPE TRAVEL TIME(MIN.) = 0.87 Tc(MIN.) = 10.18
 LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 10.18
 RAINFALL INTENSITY(INCH/HR) = 2.57
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 18.50
 TOTAL STREAM AREA(ACRES) = 18.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 41.21

 FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 328.00
 ELEVATION DATA: UPSTREAM(FEET) = 1053.00 DOWNSTREAM(FEET) = 990.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 9.965
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.601
 SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66	9.96
NATURAL FAIR COVER "OPEN BRUSH"	B	1.00	0.30	1.000	66	9.96

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA RUNOFF(CFS) = 2.90
 TOTAL AREA(ACRES) = 1.40 PEAK FLOW RATE(CFS) = 2.90

 FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 950.00
 CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.0911
 CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
 MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
 * 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.380
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
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LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.10	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER "GRASS"	B	0.60	0.30	1.000	69
NATURAL FAIR COVER "GRASS"	B	0.70	0.30	1.000	69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 4.59
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 4.72
AVERAGE FLOW DEPTH(FEET) = 0.57 TRAVEL TIME(MIN.) = 1.55
Tc(MIN.) = 11.52
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 3.37
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 5.99

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.63 FLOW VELOCITY(FEET/SEC.) = 5.03
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.206
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63
NATURAL FAIR COVER					
"GRASS"	B	1.50	0.30	1.000	69
NATURAL FAIR COVER					
"GRASS"	B	1.70	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	3.40	0.30	1.000	66
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	7.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 18.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.86
AVERAGE FLOW DEPTH(FEET) = 0.75 TRAVEL TIME(MIN.) = 1.24
Tc(MIN.) = 12.76
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 24.71
EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 30.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.91 FLOW VELOCITY(FEET/SEC.) = 12.29
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.016
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER					
"GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.10	0.30	1.000	66
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.60	0.30	1.000	66
NATURAL FAIR COVER					
"GRASS"	B	2.10	0.30	1.000	69
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	8.90	0.30	1.000	63
NATURAL FAIR COVER					
"OPEN BRUSH"	B	14.80	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 50.76
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.70
AVERAGE FLOW DEPTH(FEET) = 1.20 TRAVEL TIME(MIN.) = 1.36
Tc(MIN.) = 14.12
SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 41.08
EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 68.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.35 FLOW VELOCITY(FEET/SEC.) = 12.57
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.860
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "GRASS"	B	0.10	0.30	1.000	69
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.40	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	0.40	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	2.90	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	5.20	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	9.50	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 81.26
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.16
AVERAGE FLOW DEPTH(FEET) = 1.72 TRAVEL TIME(MIN.) = 1.48
Tc(MIN.) = 15.60
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 25.98
EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 88.05

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.77 FLOW VELOCITY(FEET/SEC.) = 9.34
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====

ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 375.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 643.00 CHANNEL SLOPE = 0.0544
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.790

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	63
NATURAL FAIR COVER "WOODLAND,GRASS"	B	0.50	0.30	1.000	65
NATURAL FAIR COVER "GRASS"	B	1.20	0.30	1.000	69
NATURAL FAIR COVER "WOODLAND,GRASS"	B	3.60	0.30	1.000	65
NATURAL FAIR COVER "GRASS"	B	3.80	0.30	1.000	69
NATURAL FAIR COVER "OPEN BRUSH"	B	6.10	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 98.38

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.31
AVERAGE FLOW DEPTH(FEET) = 1.99 TRAVEL TIME(MIN.) = 1.29
Tc(MIN.) = 16.89
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 20.65
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 104.75

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.03 FLOW VELOCITY(FEET/SEC.) = 8.45
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.89
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.790
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	14.30	0.30	1.000	63
NATURAL FAIR COVER "OPEN BRUSH"	B	21.60	0.30	1.000	66

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 48.15
EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 152.90

FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====

MAINLINE Tc(MIN.) = 16.89
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.790
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER "OPEN BRUSH"	B	0.30	0.30	1.000	66
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.60	0.30	1.000	63
NATURAL FAIR COVER "WOODLAND,GRASS"	B	2.30	0.30	1.000	65
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	3.20	0.30	1.000	63

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 8.99
EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00

TOTAL AREA (ACRES) = 120.7 PEAK FLOW RATE (CFS) = 161.88

FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

ELEVATION DATA: UPSTREAM (FEET) = 375.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1304.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 42.0 INCH PIPE IS 31.5 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.89
ESTIMATED PIPE DIAMETER (INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 161.88
PIPE TRAVEL TIME (MIN.) = 1.04 Tc (MIN.) = 17.93
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION (MIN.) = 17.93
RAINFALL INTENSITY (INCH/HR) = 1.73
AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 120.70
TOTAL STREAM AREA (ACRES) = 120.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 161.88

** CONFLUENCE DATA **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 6 rows of data.

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 6 rows of data.

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE (CFS) = 697.66 Tc (MIN.) = 13.38
EFFECTIVE AREA (ACRES) = 403.79 AREA-AVERAGED Fm (INCH/HR) = 0.27
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90
TOTAL AREA (ACRES) = 499.1
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 13.38
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.119
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 12.30 0.30 0.100 56
COMMERCIAL B 26.80 0.30 0.100 56
COMMERCIAL B 2.00 0.30 0.100 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.70 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 0.80 0.30 0.900 56
RESIDENTIAL
".4 DWELLING/ACRE" B 2.10 0.30 0.900 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.196
SUBAREA AREA (ACRES) = 46.70 SUBAREA RUNOFF (CFS) = 86.58
EFFECTIVE AREA (ACRES) = 450.49 AREA-AVERAGED Fm (INCH/HR) = 0.25
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83
TOTAL AREA (ACRES) = 545.8 PEAK FLOW RATE (CFS) = 758.07

** PEAK FLOW RATE TABLE **

Table with 8 columns: STREAM NUMBER, Q (CFS), Tc (MIN.), Intensity (INCH/HR), Fp (Fm) (INCH/HR), Ap, Ae (ACRES), HEADWATER NODE. Contains 6 rows of data.

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE (CFS) = 767.16 Tc (MIN.) = 10.40
AREA-AVERAGED Fm (INCH/HR) = 0.24 AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.80 EFFECTIVE AREA (ACRES) = 371.24

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc (MIN.) = 10.40
* 10 YEAR RAINFALL INTENSITY (INCH/HR) = 2.536
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL B 8.00 0.30 0.100 56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp (INCH/HR) = 0.30

SUBAREA AVERAGE PERVIOUS AREA FRACTION, $A_p = 0.100$
 SUBAREA AREA (ACRES) = 8.00 SUBAREA RUNOFF (CFS) = 18.04
 EFFECTIVE AREA (ACRES) = 379.24 AREA-AVERAGED F_m (INCH/HR) = 0.24
 AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED $A_p = 0.79$
 TOTAL AREA (ACRES) = 553.8 PEAK FLOW RATE (CFS) = 785.21

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 553.8 TC (MIN.) = 10.40
 EFFECTIVE AREA (ACRES) = 379.24 AREA-AVERAGED F_m (INCH/HR) = 0.24
 AREA-AVERAGED F_p (INCH/HR) = 0.30 AREA-AVERAGED $A_p = 0.785$
 PEAK FLOW RATE (CFS) = 785.21

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	782.26	10.18	2.567	0.30 (0.24)	0.78	372.7	940.00
2	785.21	10.40	2.536	0.30 (0.24)	0.79	379.2	930.00
3	773.11	13.38	2.119	0.30 (0.25)	0.82	458.5	910.00
4	748.34	17.31	1.767	0.30 (0.25)	0.85	549.5	920.00
5	737.08	17.93	1.734	0.30 (0.25)	0.85	553.8	950.00
6	726.64	18.32	1.713	0.30 (0.25)	0.85	553.8	900.00

=====
 END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 25-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F25EVRL.DAT
TIME/DATE OF STUDY: 07:08 12/08/2022

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USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

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--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 25.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 4.985
- 2) 10.00; 3.243
- 3) 15.00; 2.468
- 4) 20.00; 2.035
- 5) 25.00; 1.773
- 6) 30.00; 1.553
- 7) 40.00; 1.354
- 8) 50.00; 1.201
- 9) 60.00; 1.077
- 10) 90.00; 0.909
- 11) 120.00; 0.800
- 12) 180.00; 0.670
- 13) 360.00; 0.498
- 14) 1200.00; 0.220

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF- CROWN TO		STREET-CROSSFALL: IN- / OUT-/PARK-	CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING FACTOR (n)
	WIDTH (FT)	CROSSFALL (FT)			WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018/0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020/ ---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020/ ---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.660

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.70	0.30	1.000	63	13.76
NATURAL FAIR COVER "OPEN BRUSH"	B	0.50	0.30	1.000	66	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.55
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.55

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.45
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.55
PIPE TRAVEL TIME(MIN.) = 2.82 Tc(MIN.) = 16.58
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

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TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.58
RAINFALL INTENSITY(INCH/HR) = 2.33
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 1.20
TOTAL STREAM AREA (ACRES) = 1.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.55

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.890
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.10 0.30 1.000 63 8.14
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.50 0.30 1.000 63 8.14
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66 8.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 5.17
TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 5.17

FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.554
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 12.36
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.90
AVERAGE FLOW DEPTH (FEET) = 0.72 TRAVEL TIME (MIN.) = 0.97

Tc (MIN.) = 9.11
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 14.35
EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 19.04

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.85 FLOW VELOCITY (FEET/SEC.) = 8.79
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.183
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.60 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 4.00 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.70 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 41.24
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.04
AVERAGE FLOW DEPTH (FEET) = 1.31 TRAVEL TIME (MIN.) = 1.28
Tc (MIN.) = 10.39
SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 44.37
EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 61.23

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.52 FLOW VELOCITY (FEET/SEC.) = 8.89
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
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ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 26.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.21
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 61.23
 PIPE TRAVEL TIME(MIN.) = 1.32 Tc(MIN.) = 11.71
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.71
 RAINFALL INTENSITY(INCH/HR) = 2.98
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 23.60
 TOTAL STREAM AREA(ACRES) = 23.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 61.23

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.55	16.58	2.331	0.30(0.30)	1.00	1.2	900.00
2	61.23	11.71	2.978	0.30(0.30)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	63.60	11.71	2.978	0.30(0.30)	1.00	24.4	910.00
2	48.99	16.58	2.331	0.30(0.30)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 63.60 Tc(MIN.) = 11.71
 EFFECTIVE AREA(ACRES) = 24.45 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 24.8
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.71
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
 COMMERCIAL B 5.50 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
 COMMERCIAL B 1.00 0.30 0.100 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.175
 SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 18.69
 EFFECTIVE AREA(ACRES) = 31.55 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81
 TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 77.61

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.71
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.978
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCSSOIL AREA Fp Ap SCSS
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 COMMERCIAL B 3.40 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 3.30 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.712
 SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 27.12
 EFFECTIVE AREA(ACRES) = 42.45 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
 TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 104.73

 FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
 FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 33.0 INCH PIPE IS 25.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 21.55
 ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 104.73
 PIPE TRAVEL TIME(MIN.) = 0.51 Tc(MIN.) = 12.22
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

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FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.22
RAINFALL INTENSITY(INCH/HR) = 2.90
AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.45
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 104.73

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FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
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INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 4.031
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66 7.74
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66 7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.02
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.02

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FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.658
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.20 0.30 1.000 65
NATURAL FAIR COVER

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"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.40 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 6.70 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 23.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.25
AVERAGE FLOW DEPTH(FEET) = 0.93 TRAVEL TIME(MIN.) = 1.07
Tc(MIN.) = 8.81
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 41.41
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 44.13

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.16 FLOW VELOCITY(FEET/SEC.) = 10.85
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

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FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.241
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.70 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 1.40 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 5.40 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 54.07
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.37
AVERAGE FLOW DEPTH(FEET) = 1.47 TRAVEL TIME(MIN.) = 1.20
Tc(MIN.) = 10.01
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 19.85
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 58.50

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 8.58
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

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FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.979

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.80 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.80 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 5.20 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 76.35
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.37
AVERAGE FLOW DEPTH(FEET) = 1.74 TRAVEL TIME(MIN.) = 1.69
Tc(MIN.) = 11.70
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 35.69
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 88.97

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.85 FLOW VELOCITY(FEET/SEC.) = 8.67
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.70
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.979
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 9.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 17.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 36.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 152.63
EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 241.60

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.837

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.60 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.90 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.90 0.30 1.000 69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 245.60
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.01
AVERAGE FLOW DEPTH(FEET) = 2.73 TRAVEL TIME(MIN.) = 0.92
Tc(MIN.) = 12.62
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 7.99
EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 241.60
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.71 FLOW VELOCITY(FEET/SEC.) = 11.00
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.62
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.837
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER

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"OPEN BRUSH"      B      3.80   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      4.20   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"   B      5.10   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      7.00   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     12.00   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 32.10   SUBAREA RUNOFF(CFS) = 73.29
EFFECTIVE AREA(ACRES) = 135.80   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 135.8   PEAK FLOW RATE(CFS) = 310.04

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FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 457.00   DOWNSTREAM(FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 884.00   CHANNEL SLOPE = 0.0192
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.535

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"            B      0.50   0.30   1.000   69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      0.70   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"   B      2.30   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      2.40   0.30   1.000   66
NATURAL FAIR COVER
"GRASS"            B      2.50   0.30   1.000   69
NATURAL FAIR COVER
"GRASS"            B      3.20   0.30   1.000   69

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 321.71
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.57
AVERAGE FLOW DEPTH(FEET) = 3.76   TRAVEL TIME(MIN.) = 1.95
Tc(MIN.) = 14.57
SUBAREA AREA(ACRES) = 11.60   SUBAREA RUNOFF(CFS) = 23.33
EFFECTIVE AREA(ACRES) = 147.40   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 147.4   PEAK FLOW RATE(CFS) = 310.04
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.71   FLOW VELOCITY(FEET/SEC.) = 7.51
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

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FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.57
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.535
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE           GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"   B      7.40   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B     12.40   0.30   1.000   66
NATURAL FAIR COVER
"OPEN BRUSH"      B     28.20   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     31.40   0.30   1.000   63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     42.40   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 121.80   SUBAREA RUNOFF(CFS) = 245.00
EFFECTIVE AREA(ACRES) = 269.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 269.2   PEAK FLOW RATE(CFS) = 541.49

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*****
FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00   DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 1341.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 81.0 INCH PIPE IS 63.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.89
ESTIMATED PIPE DIAMETER(INCH) = 81.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 541.49
PIPE TRAVEL TIME(MIN.) = 1.25   Tc(MIN.) = 15.82
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.82
RAINFALL INTENSITY(INCH/HR) = 2.40
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 269.20
TOTAL STREAM AREA(ACRES) = 269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 541.49

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FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 330.00
ELEVATION DATA: UPSTREAM(FEET) = 715.00 DOWNSTREAM(FEET) = 517.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.954
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.956
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.60 0.30 1.000 63 7.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 1.97
TOTAL AREA(ACRES) = 0.60 PEAK FLOW RATE(CFS) = 1.97

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FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 517.00 DOWNSTREAM(FEET) = 430.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 443.00 CHANNEL SLOPE = 0.1964
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.615
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 9.65
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.54
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 0.98
Tc(MIN.) = 8.93
SUBAREA AREA(ACRES) = 5.10 SUBAREA RUNOFF(CFS) = 15.31
EFFECTIVE AREA(ACRES) = 5.70 AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA(ACRES) = 5.7 PEAK FLOW RATE(CFS) = 17.10

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.81 FLOW VELOCITY(FEET/SEC.) = 8.66
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

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FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 430.00 DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.88
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 17.10
PIPE TRAVEL TIME(MIN.) = 0.48 Tc(MIN.) = 9.41
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION(MIN.) = 9.41
RAINFALL INTENSITY(INCH/HR) = 3.45
AREA-AVERAGED Fm(INCH/HR) = 0.28
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA(ACRES) = 5.70
TOTAL STREAM AREA(ACRES) = 5.70
PEAK FLOW RATE(CFS) AT CONFLUENCE = 17.10

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 104.73 12.22 2.899 0.30( 0.24) 0.79 42.4 910.00
2 80.67 17.12 2.284 0.30( 0.24) 0.79 42.8 900.00
3 541.49 15.82 2.397 0.30( 0.30) 1.00 269.2 920.00
4 17.10 9.41 3.449 0.30( 0.28) 0.94 5.7 930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp(Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 598.02 9.41 3.449 0.30( 0.29) 0.96 198.5 930.00
2 637.24 12.22 2.899 0.30( 0.29) 0.96 256.1 910.00
3 639.98 15.82 2.397 0.30( 0.29) 0.97 317.6 920.00
4 603.85 17.12 2.284 0.30( 0.29) 0.97 317.7 900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 639.98 Tc(MIN.) = 15.82
EFFECTIVE AREA(ACRES) = 317.61 AREA-AVERAGED Fm(INCH/HR) = 0.29
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA(ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.82
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.397
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.50   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.10   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       3.00   0.30  0.900  56
COMMERCIAL           B       5.90   0.30  0.100  56
COMMERCIAL           B       7.70   0.30  0.100  56
COMMERCIAL           B      13.60   0.30  0.100  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80   SUBAREA RUNOFF(CFS) = 68.67
EFFECTIVE AREA(ACRES) = 350.41   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.90
TOTAL AREA(ACRES) = 350.5   PEAK FLOW RATE(CFS) = 670.68

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	664.30	9.41	3.449	0.30(0.26)	0.86	231.3	930.00
2	685.09	12.22	2.899	0.30(0.26)	0.88	288.9	910.00
3	670.68	15.82	2.397	0.30(0.27)	0.90	350.4	920.00
4	635.27	17.12	2.284	0.30(0.27)	0.90	350.5	900.00

NEW PEAK FLOW DATA ARE:

PEAK FLOW RATE(CFS) = 685.09 Tc(MIN.) = 12.22
 AREA-AVERAGED Fm(INCH/HR) = 0.26 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 0.88 EFFECTIVE AREA(ACRES) = 288.88

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 426.00 DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 63.0 INCH PIPE IS 50.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 37.03
ESTIMATED PIPE DIAMETER(INCH) = 63.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 685.09
PIPE TRAVEL TIME(MIN.) = 0.40   Tc(MIN.) = 12.62
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.62
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.837
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B       3.80   0.30  0.100  56
COMMERCIAL           B       0.60   0.30  0.100  56
NATURAL FAIR COVER
"GRASS"              B       0.10   0.30  1.000  69
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.40   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.20   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.30   0.30  0.900  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 22.66
EFFECTIVE AREA(ACRES) = 298.28   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 359.9   PEAK FLOW RATE(CFS) = 691.50

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FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 370.00 DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 51.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.48
ESTIMATED PIPE DIAMETER(INCH) = 69.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 691.50
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 13.05
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 13.05
RAINFALL INTENSITY(INCH/HR) = 2.77
AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.87
EFFECTIVE STREAM AREA(ACRES) = 298.28
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 691.50

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*****
FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 304.00
ELEVATION DATA: UPSTREAM (FEET) = 858.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.692
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 4.047

SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.10 0.30 1.000 63 7.69
NATURAL FAIR COVER
"OPEN BRUSH" B 1.10 0.30 1.000 66 7.69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 4.05
TOTAL AREA (ACRES) = 1.20 PEAK FLOW RATE (CFS) = 4.05

FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51

>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1008.00 CHANNEL SLOPE = 0.2679
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.524

SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.80 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 1.10 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND, GRASS" B 1.50 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 3.60 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 10.20 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 29.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.19
AVERAGE FLOW DEPTH (FEET) = 0.93 TRAVEL TIME (MIN.) = 1.50
Tc (MIN.) = 9.19
SUBAREA AREA (ACRES) = 17.30 SUBAREA RUNOFF (CFS) = 50.20
EFFECTIVE AREA (ACRES) = 18.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 18.5 PEAK FLOW RATE (CFS) = 53.68

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.17 FLOW VELOCITY (FEET/SEC.) = 13.03

LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.

FLOW PROCESS FROM NODE 942.00 TO NODE 905.00 IS CODE = 31
>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<

=====
ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1041.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 24.0 INCH PIPE IS 18.3 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 20.83
ESTIMATED PIPE DIAMETER (INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 53.68
PIPE TRAVEL TIME (MIN.) = 0.83 Tc (MIN.) = 10.03
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<

=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 10.03
RAINFALL INTENSITY (INCH/HR) = 3.24
AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 18.50
TOTAL STREAM AREA (ACRES) = 18.50
PEAK FLOW RATE (CFS) AT CONFLUENCE = 53.68

FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21

>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 1053.00 DOWNSTREAM (FEET) = 990.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.965
* 25 YEAR RAINFALL INTENSITY (INCH/HR) = 3.255
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" B 0.40 0.30 1.000 66 9.96
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66 9.96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 3.72
TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 3.72

FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.0911
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 3.022

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 0.40 0.30 1.000 66
NATURAL FAIR COVER
"GRASS" B 0.60 0.30 1.000 69
NATURAL FAIR COVER
"GRASS" B 0.70 0.30 1.000 69

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 5.93
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.00
AVERAGE FLOW DEPTH(FEET) = 0.63 TRAVEL TIME(MIN.) = 1.46
Tc(MIN.) = 11.43
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.41
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 7.84

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.70 FLOW VELOCITY(FEET/SEC.) = 5.38
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.842

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.60 0.30 1.000 63
NATURAL FAIR COVER
"GRASS" B 1.50 0.30 1.000 69
NATURAL FAIR COVER
"GRASS" B 1.70 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 3.40 0.30 1.000 66

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.20 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 24.32
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.64
AVERAGE FLOW DEPTH(FEET) = 0.83 TRAVEL TIME(MIN.) = 1.16
Tc(MIN.) = 12.59
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 32.95
EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 40.27

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.01 FLOW VELOCITY(FEET/SEC.) = 13.16
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.646

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
NATURAL FAIR COVER
"GRASS" B 2.10 0.30 1.000 69

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 8.90 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 14.80 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 68.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.59
AVERAGE FLOW DEPTH(FEET) = 1.35 TRAVEL TIME(MIN.) = 1.26
Tc(MIN.) = 13.85
SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 56.17
EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 93.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.51 FLOW VELOCITY(FEET/SEC.) = 13.58
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

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FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.449
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.40 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.90 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 5.20 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 9.50 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 111.23
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.90
AVERAGE FLOW DEPTH(FEET) = 1.94 TRAVEL TIME(MIN.) = 1.37
Tc(MIN.) = 15.22
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 35.78
EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 121.26

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.00 FLOW VELOCITY(FEET/SEC.) = 10.15
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

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FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 375.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 643.00 CHANNEL SLOPE = 0.0544
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.346
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER

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"WOODLAND,GRASS" B 0.50 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 1.20 0.30 1.000 69
NATURAL FAIR COVER
"WOODLAND,GRASS" B 3.60 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 3.80 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 6.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 135.44
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.01
AVERAGE FLOW DEPTH(FEET) = 2.24 TRAVEL TIME(MIN.) = 1.19
Tc(MIN.) = 16.41
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 28.36
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 143.81

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.29 FLOW VELOCITY(FEET/SEC.) = 9.17
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

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*****
FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.346
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 14.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 21.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 66.10
EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 209.91

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*****
FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.41
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.346
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
NATURAL FAIR COVER

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"OPEN BRUSH" B 0.30 0.30 1.000 66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.60 0.30 1.000 63
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 2.30 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 12.34
 EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 222.24

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 34.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.72
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 222.24
 PIPE TRAVEL TIME(MIN.) = 0.96 Tc(MIN.) = 17.37
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

=====

TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.37
 RAINFALL INTENSITY(INCH/HR) = 2.26
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 120.70
 TOTAL STREAM AREA(ACRES) = 120.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 222.24

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	664.30	10.26	3.203	0.30(0.25)	0.85	240.7	930.00
1	691.50	13.05	2.770	0.30(0.26)	0.87	298.3	910.00
1	678.31	16.66	2.324	0.30(0.27)	0.89	359.8	920.00
1	641.88	17.97	2.211	0.30(0.27)	0.89	359.9	900.00
2	53.68	10.03	3.239	0.30(0.30)	1.00	18.5	940.00
3	222.24	17.37	2.263	0.30(0.30)	1.00	120.7	950.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	902.95	10.03	3.239	0.30(0.27)	0.89	323.5	940.00
2	911.45	10.26	3.203	0.30(0.27)	0.89	330.5	930.00
3	946.78	13.05	2.770	0.30(0.27)	0.90	407.5	910.00
4	935.14	16.66	2.324	0.30(0.28)	0.92	494.1	920.00
5	916.84	17.37	2.263	0.30(0.28)	0.92	499.1	950.00
6	893.10	17.97	2.211	0.30(0.28)	0.92	499.1	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 946.78 Tc(MIN.) = 13.05
 EFFECTIVE AREA(ACRES) = 407.51 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90
 TOTAL AREA(ACRES) = 499.1
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.05
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.770
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	12.30	0.30	0.100	56
COMMERCIAL	B	26.80	0.30	0.100	56
COMMERCIAL	B	2.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 113.93
 EFFECTIVE AREA(ACRES) = 454.21 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83
 TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 1030.15

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 13.05
 * 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.770
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	8.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 19.72

EFFECTIVE AREA (ACRES) = 462.21 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
 TOTAL AREA (ACRES) = 553.8 PEAK FLOW RATE (CFS) = 1049.87

=====
 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 553.8 TC (MIN.) = 13.05
 EFFECTIVE AREA (ACRES) = 462.21 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.819
 PEAK FLOW RATE (CFS) = 1049.87

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1022.10	10.03	3.239	0.30 (0.24)	0.79	378.2	940.00
2	1028.54	10.26	3.203	0.30 (0.24)	0.79	385.2	930.00
3	1049.87	13.05	2.770	0.30 (0.25)	0.82	462.2	910.00
4	1022.23	16.66	2.324	0.30 (0.25)	0.85	548.8	920.00
5	1000.92	17.37	2.263	0.30 (0.25)	0.85	553.8	950.00
6	974.91	17.97	2.211	0.30 (0.25)	0.85	553.8	900.00

=====
 END OF RATIONAL METHOD ANALYSIS

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
(Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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Ver. 20.0 Release Date: 06/01/2013 License ID 1237

Analysis prepared by:

***** DESCRIPTION OF STUDY *****
* RMV PA-4 SUBAREA F *
* RATIONAL METHOD - REGIONAL RAINFALL *
* 50-YR EV DEC 2022 ROKAMOTO *

FILE NAME: 4F50EVRL.DAT
TIME/DATE OF STUDY: 07:07 12/08/2022

=====

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

=====

--*TIME-OF-CONCENTRATION MODEL*--

USER SPECIFIED STORM EVENT(YEAR) = 50.00
SPECIFIED MINIMUM PIPE SIZE(INCH) = 18.00
SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
USER-DEFINED TABLED RAINFALL USED
NUMBER OF [TIME,INTENSITY] DATA PAIRS = 14

- 1) 5.00; 5.515
- 2) 10.00; 3.520
- 3) 15.00; 2.687
- 4) 20.00; 2.242
- 5) 25.00; 1.935
- 6) 30.00; 1.741
- 7) 40.00; 1.473
- 8) 50.00; 1.311
- 9) 60.00; 1.211
- 10) 90.00; 1.007
- 11) 120.00; 0.877
- 12) 180.00; 0.757
- 13) 360.00; 0.563
- 14) 1200.00; 0.248

ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD

USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL

NO.	HALF-	CROWN TO	STREET-CROSSFALL:		CURB HEIGHT (FT)	GUTTER-GEOMETRIES:			MANNING (n)
	WIDTH (FT)	CROSSFALL (FT)	IN- / SIDE	OUT- / PARK- / WAY		WIDTH (FT)	LIP (FT)	HIKE (FT)	
1	30.0	20.0	0.018/0.018	0.020	0.67	2.00	0.0313	0.167	0.0150
2	32.0	27.0	0.020/0.020	---	0.67	2.00	0.0312	0.167	0.0150
3	13.0	8.0	0.020/0.020	---	0.33	1.00	0.0312	0.125	0.0150

GLOBAL STREET FLOW-DEPTH CONSTRAINTS:

1. Relative Flow-Depth = 1.00 FEET
as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
2. (Depth)*(Velocity) Constraint = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
*USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

FLOW PROCESS FROM NODE 900.00 TO NODE 901.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

=====

INITIAL SUBAREA FLOW-LENGTH(FEET) = 314.00
ELEVATION DATA: UPSTREAM(FEET) = 496.00 DOWNSTREAM(FEET) = 485.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 13.762
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.893

SUBAREA Tc AND LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN	Tc (MIN.)
NATURAL FAIR COVER "CHAPARRAL,BROADLEAF"	B	0.70	0.30	1.000	63	13.76
NATURAL FAIR COVER "OPEN BRUSH"	B	0.50	0.30	1.000	66	13.76

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 2.80
TOTAL AREA(ACRES) = 1.20 PEAK FLOW RATE(CFS) = 2.80

FLOW PROCESS FROM NODE 901.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

=====

ELEVATION DATA: UPSTREAM(FEET) = 485.00 DOWNSTREAM(FEET) = 459.00
FLOW LENGTH(FEET) = 1090.00 MANNING'S N = 0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 5.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.63
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 2.80
PIPE TRAVEL TIME(MIN.) = 2.74 Tc(MIN.) = 16.50
LONGEST FLOWPATH FROM NODE 900.00 TO NODE 902.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<

=====

TOTAL NUMBER OF STREAMS = 2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 16.50
RAINFALL INTENSITY(INCH/HR) = 2.55
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30

AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 1.20
TOTAL STREAM AREA (ACRES) = 1.20
PEAK FLOW RATE (CFS) AT CONFLUENCE = 2.80

FLOW PROCESS FROM NODE 910.00 TO NODE 911.00 IS CODE = 21

>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====

INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 785.00 DOWNSTREAM (FEET) = 612.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 8.142
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.261
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.10 0.30 1.000 63 8.14
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.50 0.30 1.000 63 8.14
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66 8.14
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 5.70
TOTAL AREA (ACRES) = 1.60 PEAK FLOW RATE (CFS) = 5.70

FLOW PROCESS FROM NODE 911.00 TO NODE 912.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 612.00 DOWNSTREAM (FEET) = 525.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 458.00 CHANNEL SLOPE = 0.1900
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.884
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.60 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.00 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 13.62
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.06
AVERAGE FLOW DEPTH (FEET) = 0.75 TRAVEL TIME (MIN.) = 0.95

Tc (MIN.) = 9.09
SUBAREA AREA (ACRES) = 4.90 SUBAREA RUNOFF (CFS) = 15.80
EFFECTIVE AREA (ACRES) = 6.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 6.5 PEAK FLOW RATE (CFS) = 20.96

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.88 FLOW VELOCITY (FEET/SEC.) = 9.02
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 912.00 = 786.00 FEET.

FLOW PROCESS FROM NODE 912.00 TO NODE 913.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 525.00 DOWNSTREAM (FEET) = 470.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 618.00 CHANNEL SLOPE = 0.0890
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.464
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.10 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.60 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 4.00 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 2.70 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 5.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 45.33
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 8.25
AVERAGE FLOW DEPTH (FEET) = 1.35 TRAVEL TIME (MIN.) = 1.25
Tc (MIN.) = 10.34
SUBAREA AREA (ACRES) = 17.10 SUBAREA RUNOFF (CFS) = 48.69
EFFECTIVE AREA (ACRES) = 23.60 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 23.6 PEAK FLOW RATE (CFS) = 67.20

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.57 FLOW VELOCITY (FEET/SEC.) = 9.10
LONGEST FLOWPATH FROM NODE 910.00 TO NODE 913.00 = 1404.00 FEET.

FLOW PROCESS FROM NODE 913.00 TO NODE 902.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
=====

ELEVATION DATA: UPSTREAM (FEET) = 470.00 DOWNSTREAM (FEET) = 459.00

FLOW LENGTH(FEET) = 890.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 28.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 11.33
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 67.20
 PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 11.65
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

 TOTAL NUMBER OF STREAMS = 2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
 TIME OF CONCENTRATION(MIN.) = 11.65
 RAINFALL INTENSITY(INCH/HR) = 3.25
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 23.60
 TOTAL STREAM AREA(ACRES) = 23.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 67.20

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	2.80	16.50	2.553	0.30(0.30)	1.00	1.2	900.00
2	67.20	11.65	3.246	0.30(0.30)	1.00	23.6	910.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 2 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	69.78	11.65	3.246	0.30(0.30)	1.00	24.4	910.00
2	54.20	16.50	2.553	0.30(0.30)	1.00	24.8	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) = 69.78 Tc(MIN.) = 11.65
 EFFECTIVE AREA(ACRES) = 24.45 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 24.8
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 902.00 = 2294.00 FEET.

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.65
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.246
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER

"CHAPARRAL,BROADLEAF"	B	0.20	0.30	1.000	63
COMMERCIAL	B	5.50	0.30	0.100	56
NATURAL FAIR COVER					
"OPEN BRUSH"	B	0.20	0.30	1.000	66
RESIDENTIAL					
".4 DWELLING/ACRE"	B	0.10	0.30	0.900	56
NATURAL FAIR COVER					
"CHAPARRAL,BROADLEAF"	B	0.10	0.30	1.000	63
COMMERCIAL	B	1.00	0.30	0.100	56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30					
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.175					
SUBAREA AREA(ACRES) = 7.10 SUBAREA RUNOFF(CFS) = 20.41					
EFFECTIVE AREA(ACRES) = 31.55 AREA-AVERAGED Fm(INCH/HR) = 0.24					
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.81					
TOTAL AREA(ACRES) = 31.9 PEAK FLOW RATE(CFS) = 85.22					

 FLOW PROCESS FROM NODE 902.00 TO NODE 902.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

 MAINLINE Tc(MIN.) = 11.65
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.246
 SUBAREA LOSS RATE DATA(AMC II):
 DEVELOPMENT TYPE/ SCs SOIL AREA Fp Ap SCs
 LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
 NATURAL FAIR COVER
 "OPEN BRUSH" B 0.20 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 COMMERCIAL B 3.40 0.30 0.100 56
 NATURAL FAIR COVER
 "OPEN BRUSH" B 3.30 0.30 1.000 66
 RESIDENTIAL
 ".4 DWELLING/ACRE" B 0.70 0.30 0.900 56
 SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.712
 SUBAREA AREA(ACRES) = 10.90 SUBAREA RUNOFF(CFS) = 29.75
 EFFECTIVE AREA(ACRES) = 42.45 AREA-AVERAGED Fm(INCH/HR) = 0.24
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.79
 TOTAL AREA(ACRES) = 42.8 PEAK FLOW RATE(CFS) = 114.96

 FLOW PROCESS FROM NODE 902.00 TO NODE 903.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

 ELEVATION DATA: UPSTREAM(FEET) = 459.00 DOWNSTREAM(FEET) = 426.00
 FLOW LENGTH(FEET) = 654.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.38
 ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 114.96
 PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 12.13
 LONGEST FLOWPATH FROM NODE 910.00 TO NODE 903.00 = 2948.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.13
RAINFALL INTENSITY(INCH/HR) = 3.16
AREA-AVERAGED Fm(INCH/HR) = 0.24
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.79
EFFECTIVE STREAM AREA(ACRES) = 42.45
TOTAL STREAM AREA(ACRES) = 42.80
PEAK FLOW RATE(CFS) AT CONFLUENCE = 114.96

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*****
FLOW PROCESS FROM NODE 920.00 TO NODE 921.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH(FEET) = 286.00
ELEVATION DATA: UPSTREAM(FEET) = 860.00 DOWNSTREAM(FEET) = 712.00

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Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 7.737
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.423
SUBAREA Tc AND LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH" B 0.20 0.30 1.000 66 7.74
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66 7.74
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF(CFS) = 3.34
TOTAL AREA(ACRES) = 0.90 PEAK FLOW RATE(CFS) = 3.34

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*****
FLOW PROCESS FROM NODE 921.00 TO NODE 922.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 712.00 DOWNSTREAM(FEET) = 600.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 594.00 CHANNEL SLOPE = 0.1886
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 4.009
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.20 0.30 1.000 65
NATURAL FAIR COVER

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"CHAPARRAL,BROADLEAF" B 1.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 1.40 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 4.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 6.70 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.27
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.53
AVERAGE FLOW DEPTH(FEET) = 0.96 TRAVEL TIME(MIN.) = 1.04
Tc(MIN.) = 8.78
SUBAREA AREA(ACRES) = 13.70 SUBAREA RUNOFF(CFS) = 45.73
EFFECTIVE AREA(ACRES) = 14.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 14.6 PEAK FLOW RATE(CFS) = 48.73

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.21 FLOW VELOCITY(FEET/SEC.) = 11.13
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 922.00 = 880.00 FEET.

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FLOW PROCESS FROM NODE 922.00 TO NODE 923.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 600.00 DOWNSTREAM(FEET) = 550.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 604.00 CHANNEL SLOPE = 0.0828
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.541
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.70 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 1.40 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 5.40 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 59.68
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.60
AVERAGE FLOW DEPTH(FEET) = 1.52 TRAVEL TIME(MIN.) = 1.17
Tc(MIN.) = 9.95
SUBAREA AREA(ACRES) = 7.50 SUBAREA RUNOFF(CFS) = 21.88
EFFECTIVE AREA(ACRES) = 22.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 22.1 PEAK FLOW RATE(CFS) = 64.47

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 8.75
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 923.00 = 1484.00 FEET.

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FLOW PROCESS FROM NODE 923.00 TO NODE 924.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 550.00 DOWNSTREAM(FEET) = 495.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 849.00 CHANNEL SLOPE = 0.0648
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.253

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.60 0.30 1.000 65
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.80 0.30 1.000 65
NATURAL FAIR COVER
"OPEN BRUSH" B 0.80 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 1.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 5.20 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 6.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 84.15
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.55
AVERAGE FLOW DEPTH(FEET) = 1.81 TRAVEL TIME(MIN.) = 1.65
Tc(MIN.) = 11.60
SUBAREA AREA(ACRES) = 14.80 SUBAREA RUNOFF(CFS) = 39.34
EFFECTIVE AREA(ACRES) = 36.90 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 36.9 PEAK FLOW RATE(CFS) = 98.08

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.92 FLOW VELOCITY(FEET/SEC.) = 8.89
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 924.00 = 2333.00 FEET.

FLOW PROCESS FROM NODE 924.00 TO NODE 924.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 11.60
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.253
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 9.70 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 17.00 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 36.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000

SUBAREA AREA(ACRES) = 63.30 SUBAREA RUNOFF(CFS) = 168.25
EFFECTIVE AREA(ACRES) = 100.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 100.2 PEAK FLOW RATE(CFS) = 266.33

FLOW PROCESS FROM NODE 924.00 TO NODE 925.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 495.00 DOWNSTREAM(FEET) = 457.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 607.00 CHANNEL SLOPE = 0.0626
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.104

SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.10 0.30 1.000 63
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.60 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 0.70 0.30 1.000 66
NATURAL FAIR COVER
"WOODLAND,GRASS" B 0.90 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 0.90 0.30 1.000 69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 270.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.30
AVERAGE FLOW DEPTH(FEET) = 2.83 TRAVEL TIME(MIN.) = 0.90
Tc(MIN.) = 12.50
SUBAREA AREA(ACRES) = 3.50 SUBAREA RUNOFF(CFS) = 8.83
EFFECTIVE AREA(ACRES) = 103.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 103.7 PEAK FLOW RATE(CFS) = 266.33
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.81 FLOW VELOCITY(FEET/SEC.) = 11.24
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 925.00 = 2940.00 FEET.

FLOW PROCESS FROM NODE 925.00 TO NODE 925.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

MAINLINE Tc(MIN.) = 12.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.104
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER

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"OPEN BRUSH"      B      3.80   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      4.20   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"   B      5.10   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"      B      7.00   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     12.00   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 32.10   SUBAREA RUNOFF(CFS) = 81.01
EFFECTIVE AREA(ACRES) = 135.80   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 135.8   PEAK FLOW RATE(CFS) = 342.73

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FLOW PROCESS FROM NODE 925.00 TO NODE 926.00 IS CODE = 51
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>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 457.00   DOWNSTREAM(FEET) = 440.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 884.00   CHANNEL SLOPE = 0.0192
CHANNEL BASE(FEET) = 0.00   "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040   MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789

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SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"              B      0.50   0.30   1.000   69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B      0.70   0.30   1.000   63
NATURAL FAIR COVER
"WOODLAND,GRASS"     B      2.30   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"        B      2.40   0.30   1.000   66
NATURAL FAIR COVER
"GRASS"              B      2.50   0.30   1.000   69
NATURAL FAIR COVER
"GRASS"              B      3.20   0.30   1.000   69

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SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 355.72
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.78
AVERAGE FLOW DEPTH(FEET) = 3.90   TRAVEL TIME(MIN.) = 1.89
Tc(MIN.) = 14.39
SUBAREA AREA(ACRES) = 11.60   SUBAREA RUNOFF(CFS) = 25.98
EFFECTIVE AREA(ACRES) = 147.40   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 147.4   PEAK FLOW RATE(CFS) = 342.73
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 3.85   FLOW VELOCITY(FEET/SEC.) = 7.71
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 926.00 = 3824.00 FEET.

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FLOW PROCESS FROM NODE 926.00 TO NODE 926.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 14.39
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.789
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"WOODLAND,GRASS"     B      7.40   0.30   1.000   65
NATURAL FAIR COVER
"OPEN BRUSH"        B     12.40   0.30   1.000   66
NATURAL FAIR COVER
"OPEN BRUSH"        B     28.20   0.30   1.000   66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     31.40   0.30   1.000   63
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF"  B     42.40   0.30   1.000   63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 121.80   SUBAREA RUNOFF(CFS) = 272.82
EFFECTIVE AREA(ACRES) = 269.20   AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 269.2   PEAK FLOW RATE(CFS) = 602.98

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*****
FLOW PROCESS FROM NODE 926.00 TO NODE 903.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
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ELEVATION DATA: UPSTREAM(FEET) = 440.00   DOWNSTREAM(FEET) = 426.00
FLOW LENGTH(FEET) = 1341.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 84.0 INCH PIPE IS 66.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.34
ESTIMATED PIPE DIAMETER(INCH) = 84.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 602.98
PIPE TRAVEL TIME(MIN.) = 1.22   Tc(MIN.) = 15.61
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION(MIN.) = 15.61
RAINFALL INTENSITY(INCH/HR) = 2.63
AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA(ACRES) = 269.20
TOTAL STREAM AREA(ACRES) = 269.20
PEAK FLOW RATE(CFS) AT CONFLUENCE = 602.98

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FLOW PROCESS FROM NODE 930.00 TO NODE 931.00 IS CODE = 21
-----
>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 330.00
ELEVATION DATA: UPSTREAM (FEET) = 715.00 DOWNSTREAM (FEET) = 517.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.954
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.336
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS Tc
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 0.60 0.30 1.000 63 7.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 2.18
TOTAL AREA (ACRES) = 0.60 PEAK FLOW RATE (CFS) = 2.18

*****
FLOW PROCESS FROM NODE 931.00 TO NODE 932.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 517.00 DOWNSTREAM (FEET) = 430.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 443.00 CHANNEL SLOPE = 0.1964
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.956
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE" B 0.10 0.30 0.900 56
COMMERCIAL B 0.40 0.30 0.100 56
NATURAL FAIR COVER
"WOODLAND, GRASS" B 0.30 0.30 1.000 65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B 4.30 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.927
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 10.63
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 7.75
AVERAGE FLOW DEPTH (FEET) = 0.68 TRAVEL TIME (MIN.) = 0.95
Tc (MIN.) = 8.91
SUBAREA AREA (ACRES) = 5.10 SUBAREA RUNOFF (CFS) = 16.88
EFFECTIVE AREA (ACRES) = 5.70 AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.94
TOTAL AREA (ACRES) = 5.7 PEAK FLOW RATE (CFS) = 18.86

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 0.84 FLOW VELOCITY (FEET/SEC.) = 8.86
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 932.00 = 773.00 FEET.

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*****
FLOW PROCESS FROM NODE 932.00 TO NODE 903.00 IS CODE = 31
-----
>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====
ELEVATION DATA: UPSTREAM (FEET) = 430.00 DOWNSTREAM (FEET) = 426.00
FLOW LENGTH (FEET) = 254.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 21.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 8.94
ESTIMATED PIPE DIAMETER (INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 18.86
PIPE TRAVEL TIME (MIN.) = 0.47 Tc (MIN.) = 9.38
LONGEST FLOWPATH FROM NODE 930.00 TO NODE 903.00 = 1027.00 FEET.

*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 1
-----
>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<
=====
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
TIME OF CONCENTRATION (MIN.) = 9.38
RAINFALL INTENSITY (INCH/HR) = 3.77
AREA-AVERAGED Fm (INCH/HR) = 0.28
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.94
EFFECTIVE STREAM AREA (ACRES) = 5.70
TOTAL STREAM AREA (ACRES) = 5.70
PEAK FLOW RATE (CFS) AT CONFLUENCE = 18.86

** CONFLUENCE DATA **
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 114.96 12.13 3.165 0.30 ( 0.24) 0.79 42.4 910.00
2 89.22 17.02 2.507 0.30 ( 0.24) 0.79 42.8 900.00
3 602.98 15.61 2.633 0.30 ( 0.30) 1.00 269.2 920.00
4 18.86 9.38 3.767 0.30 ( 0.28) 0.94 5.7 930.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **
STREAM Q Tc Intensity Fp (Fm) Ap Ae HEADWATER
NUMBER (CFS) (MIN.) (INCH/HR) (INCH/HR) (ACRES) NODE
1 664.62 9.38 3.767 0.30 ( 0.29) 0.96 200.3 930.00
2 706.14 12.13 3.165 0.30 ( 0.29) 0.96 257.4 910.00
3 712.37 15.61 2.633 0.30 ( 0.29) 0.97 317.6 920.00
4 671.73 17.02 2.507 0.30 ( 0.29) 0.97 317.7 900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE (CFS) = 712.37 Tc (MIN.) = 15.61
EFFECTIVE AREA (ACRES) = 317.60 AREA-AVERAGED Fm (INCH/HR) = 0.29
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.97
TOTAL AREA (ACRES) = 317.7
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 903.00 = 5165.00 FEET.

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 903.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 15.61
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.633
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.50   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.10   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       3.00   0.30  0.900  56
COMMERCIAL           B       5.90   0.30  0.100  56
COMMERCIAL           B       7.70   0.30  0.100  56
COMMERCIAL           B      13.60   0.30  0.100  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.237
SUBAREA AREA(ACRES) = 32.80   SUBAREA RUNOFF(CFS) = 75.63
EFFECTIVE AREA(ACRES) = 350.40   AREA-AVERAGED Fm(INCH/HR) = 0.27
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.90
TOTAL AREA(ACRES) = 350.5   PEAK FLOW RATE(CFS) = 744.99

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** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	736.16	9.38	3.767	0.30(0.26)	0.86	233.1	930.00
2	757.51	12.13	3.165	0.30(0.26)	0.88	290.2	910.00
3	744.99	15.61	2.633	0.30(0.27)	0.90	350.4	920.00
4	705.52	17.02	2.507	0.30(0.27)	0.90	350.5	900.00

NEW PEAK FLOW DATA ARE:

```

PEAK FLOW RATE(CFS) = 757.51   Tc(MIN.) = 12.13
AREA-AVERAGED Fm(INCH/HR) = 0.26   AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.88   EFFECTIVE AREA(ACRES) = 290.22

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*****
FLOW PROCESS FROM NODE 903.00 TO NODE 904.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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ELEVATION DATA: UPSTREAM(FEET) = 426.00   DOWNSTREAM(FEET) = 370.00
FLOW LENGTH(FEET) = 896.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 66.0 INCH PIPE IS 51.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 38.15
ESTIMATED PIPE DIAMETER(INCH) = 66.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 757.51
PIPE TRAVEL TIME(MIN.) = 0.39   Tc(MIN.) = 12.52
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 904.00 = 6061.00 FEET.

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 904.00 IS CODE = 81
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>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
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MAINLINE Tc(MIN.) = 12.52
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.099
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/   SCS SOIL   AREA   Fp   Ap   SCS
LAND USE            GROUP   (ACRES) (INCH/HR) (DECIMAL) CN
COMMERCIAL           B       3.80   0.30  0.100  56
COMMERCIAL           B       0.60   0.30  0.100  56
NATURAL FAIR COVER
"GRASS"              B       0.10   0.30  1.000  69
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.40   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       2.20   0.30  0.900  56
RESIDENTIAL
".4 DWELLING/ACRE"   B       0.30   0.30  0.900  56
SUBAREA AVERAGE PVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PVIOUS AREA FRACTION, Ap = 0.527
SUBAREA AREA(ACRES) = 9.40   SUBAREA RUNOFF(CFS) = 24.88
EFFECTIVE AREA(ACRES) = 299.62   AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30   AREA-AVERAGED Ap = 0.87
TOTAL AREA(ACRES) = 359.9   PEAK FLOW RATE(CFS) = 765.36

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*****
FLOW PROCESS FROM NODE 904.00 TO NODE 905.00 IS CODE = 31
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>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
=====

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```

ELEVATION DATA: UPSTREAM(FEET) = 370.00   DOWNSTREAM(FEET) = 330.00
FLOW LENGTH(FEET) = 872.00   MANNING'S N = 0.013
DEPTH OF FLOW IN 69.0 INCH PIPE IS 56.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 33.72
ESTIMATED PIPE DIAMETER(INCH) = 69.00   NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 765.36
PIPE TRAVEL TIME(MIN.) = 0.43   Tc(MIN.) = 12.96
LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

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*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
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>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
=====

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TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 1 ARE:
TIME OF CONCENTRATION(MIN.) = 12.96
RAINFALL INTENSITY(INCH/HR) = 3.03
AREA-AVERAGED Fm(INCH/HR) = 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.87
EFFECTIVE STREAM AREA(ACRES) = 299.62
TOTAL STREAM AREA(ACRES) = 359.90
PEAK FLOW RATE(CFS) AT CONFLUENCE = 765.36

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*****
FLOW PROCESS FROM NODE 940.00 TO NODE 941.00 IS CODE = 21
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>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<

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=====
INITIAL SUBAREA FLOW-LENGTH (FEET) = 304.00
ELEVATION DATA: UPSTREAM (FEET) = 858.00 DOWNSTREAM (FEET) = 675.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 7.692
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 4.441
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF"  B         0.10     0.30     1.000    63   7.69
NATURAL FAIR COVER
"OPEN BRUSH"           B         1.10     0.30     1.000    66   7.69
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 4.47
TOTAL AREA (ACRES) = 1.20 PEAK FLOW RATE (CFS) = 4.47

*****
FLOW PROCESS FROM NODE 941.00 TO NODE 942.00 IS CODE = 51
-----
>>>> COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>> TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
-----
ELEVATION DATA: UPSTREAM (FEET) = 675.00 DOWNSTREAM (FEET) = 405.00
CHANNEL LENGTH THRU SUBAREA (FEET) = 1008.00 CHANNEL SLOPE = 0.2679
CHANNEL BASE (FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH (FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.853
SUBAREA LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS"                 B         0.10     0.30     1.000    69
NATURAL FAIR COVER
"WOODLAND, GRASS"      B         0.80     0.30     1.000    65
NATURAL FAIR COVER
"OPEN BRUSH"           B         1.10     0.30     1.000    66
NATURAL FAIR COVER
"WOODLAND, GRASS"      B         1.50     0.30     1.000    65
NATURAL FAIR COVER
"CHAPARRAL, BROADLEAF" B         3.60     0.30     1.000    63
NATURAL FAIR COVER
"OPEN BRUSH"           B        10.20     0.30     1.000    66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW (CFS) = 32.29
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY (FEET/SEC.) = 11.40
AVERAGE FLOW DEPTH (FEET) = 0.97 TRAVEL TIME (MIN.) = 1.47
Tc (MIN.) = 9.17
SUBAREA AREA (ACRES) = 17.30 SUBAREA RUNOFF (CFS) = 55.32
EFFECTIVE AREA (ACRES) = 18.50 AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA (ACRES) = 18.5 PEAK FLOW RATE (CFS) = 59.15

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH (FEET) = 1.22 FLOW VELOCITY (FEET/SEC.) = 13.34

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LONGEST FLOWPATH FROM NODE 940.00 TO NODE 942.00 = 1312.00 FEET.
*****
FLOW PROCESS FROM NODE 942.00 TO NODE 905.00 IS CODE = 31
-----
>>>> COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<
>>>> USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<
-----
ELEVATION DATA: UPSTREAM (FEET) = 405.00 DOWNSTREAM (FEET) = 330.00
FLOW LENGTH (FEET) = 1041.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 27.0 INCH PIPE IS 17.4 INCHES
PIPE-FLOW VELOCITY (FEET/SEC.) = 21.77
ESTIMATED PIPE DIAMETER (INCH) = 27.00 NUMBER OF PIPES = 1
PIPE-FLOW (CFS) = 59.15
PIPE TRAVEL TIME (MIN.) = 0.80 Tc (MIN.) = 9.96
LONGEST FLOWPATH FROM NODE 940.00 TO NODE 905.00 = 2353.00 FEET.

*****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1
-----
>>>> DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<
-----
TOTAL NUMBER OF STREAMS = 3
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 2 ARE:
TIME OF CONCENTRATION (MIN.) = 9.96
RAINFALL INTENSITY (INCH/HR) = 3.53
AREA-AVERAGED Fm (INCH/HR) = 0.30
AREA-AVERAGED Fp (INCH/HR) = 0.30
AREA-AVERAGED Ap = 1.00
EFFECTIVE STREAM AREA (ACRES) = 18.50
TOTAL STREAM AREA (ACRES) = 18.50
PEAK FLOW RATE (CFS) AT CONFLUENCE = 59.15

*****
FLOW PROCESS FROM NODE 950.00 TO NODE 951.00 IS CODE = 21
-----
>>>> RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<
>> USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
-----
INITIAL SUBAREA FLOW-LENGTH (FEET) = 328.00
ELEVATION DATA: UPSTREAM (FEET) = 1053.00 DOWNSTREAM (FEET) = 990.00

Tc = K * [(LENGTH** 3.00) / (ELEVATION CHANGE)] ** 0.20
SUBAREA ANALYSIS USED MINIMUM Tc (MIN.) = 9.965
* 50 YEAR RAINFALL INTENSITY (INCH/HR) = 3.534
SUBAREA Tc AND LOSS RATE DATA (AMC II):
DEVELOPMENT TYPE/      SCS SOIL  AREA      Fp        Ap      SCS  Tc
LAND USE                GROUP   (ACRES)  (INCH/HR) (DECIMAL) CN (MIN.)
NATURAL FAIR COVER
"OPEN BRUSH"           B         0.40     0.30     1.000    66   9.96
NATURAL FAIR COVER
"OPEN BRUSH"           B         1.00     0.30     1.000    66   9.96
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp (INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA RUNOFF (CFS) = 4.07
TOTAL AREA (ACRES) = 1.40 PEAK FLOW RATE (CFS) = 4.07

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FLOW PROCESS FROM NODE 951.00 TO NODE 952.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 990.00 DOWNSTREAM(FEET) = 950.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 439.00 CHANNEL SLOPE = 0.0911
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.287

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, OPEN BRUSH, GRASS, and CHAPARRAL, BROADLEAF.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 6.50
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 5.10
AVERAGE FLOW DEPTH(FEET) = 0.65 TRAVEL TIME(MIN.) = 1.43
Tc(MIN.) = 11.40
SUBAREA AREA(ACRES) = 1.80 SUBAREA RUNOFF(CFS) = 4.84
EFFECTIVE AREA(ACRES) = 3.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 3.2 PEAK FLOW RATE(CFS) = 8.60

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.72 FLOW VELOCITY(FEET/SEC.) = 5.50
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 952.00 = 767.00 FEET.

FLOW PROCESS FROM NODE 952.00 TO NODE 953.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 950.00 DOWNSTREAM(FEET) = 675.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 810.00 CHANNEL SLOPE = 0.3395
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.098

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, CHAPARRAL, BROADLEAF, GRASS, and OPEN BRUSH.

NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 7.20 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 26.75
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 11.92
AVERAGE FLOW DEPTH(FEET) = 0.86 TRAVEL TIME(MIN.) = 1.13
Tc(MIN.) = 12.53
SUBAREA AREA(ACRES) = 14.40 SUBAREA RUNOFF(CFS) = 36.27
EFFECTIVE AREA(ACRES) = 17.60 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 17.6 PEAK FLOW RATE(CFS) = 44.33

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.04 FLOW VELOCITY(FEET/SEC.) = 13.60
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 953.00 = 1577.00 FEET.

FLOW PROCESS FROM NODE 953.00 TO NODE 954.00 IS CODE = 51

>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<

ELEVATION DATA: UPSTREAM(FEET) = 675.00 DOWNSTREAM(FEET) = 475.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 955.00 CHANNEL SLOPE = 0.2094
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.893

Table with 6 columns: DEVELOPMENT TYPE/LAND USE, SCS SOIL GROUP, AREA (ACRES), Fp (INCH/HR), Ap (DECIMAL), SCS CN. Rows include NATURAL FAIR COVER, GRASS, OPEN BRUSH, and CHAPARRAL, BROADLEAF.

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 75.37
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 12.94
AVERAGE FLOW DEPTH(FEET) = 1.39 TRAVEL TIME(MIN.) = 1.23
Tc(MIN.) = 13.76
SUBAREA AREA(ACRES) = 26.60 SUBAREA RUNOFF(CFS) = 62.09
EFFECTIVE AREA(ACRES) = 44.20 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 44.2 PEAK FLOW RATE(CFS) = 103.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.57 FLOW VELOCITY(FEET/SEC.) = 13.97
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 954.00 = 2532.00 FEET.

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*****
FLOW PROCESS FROM NODE 954.00 TO NODE 955.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 475.00 DOWNSTREAM(FEET) = 410.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 814.00 CHANNEL SLOPE = 0.0799
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.678
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"GRASS" B 0.10 0.30 1.000 69
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.40 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 0.40 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 2.90 0.30 1.000 66
NATURAL FAIR COVER
"OPEN BRUSH" B 5.20 0.30 1.000 66
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 9.50 0.30 1.000 63
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 122.97
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 10.15
AVERAGE FLOW DEPTH(FEET) = 2.01 TRAVEL TIME(MIN.) = 1.34
Tc(MIN.) = 15.10
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 39.60
EFFECTIVE AREA(ACRES) = 62.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 62.7 PEAK FLOW RATE(CFS) = 134.21

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.08 FLOW VELOCITY(FEET/SEC.) = 10.36
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 955.00 = 3346.00 FEET.

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*****
FLOW PROCESS FROM NODE 955.00 TO NODE 956.00 IS CODE = 51
-----
>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<
>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<
=====
ELEVATION DATA: UPSTREAM(FEET) = 410.00 DOWNSTREAM(FEET) = 375.00
CHANNEL LENGTH THRU SUBAREA(FEET) = 643.00 CHANNEL SLOPE = 0.0544
CHANNEL BASE(FEET) = 0.00 "Z" FACTOR = 3.000
MANNING'S FACTOR = 0.040 MAXIMUM DEPTH(FEET) = 30.00
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 0.20 0.30 1.000 63
NATURAL FAIR COVER

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"WOODLAND,GRASS" B 0.50 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 1.20 0.30 1.000 69
NATURAL FAIR COVER
"WOODLAND,GRASS" B 3.60 0.30 1.000 65
NATURAL FAIR COVER
"GRASS" B 3.80 0.30 1.000 69
NATURAL FAIR COVER
"OPEN BRUSH" B 6.10 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) = 149.98
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.26
AVERAGE FLOW DEPTH(FEET) = 2.32 TRAVEL TIME(MIN.) = 1.16
Tc(MIN.) = 16.26
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 31.54
EFFECTIVE AREA(ACRES) = 78.10 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 78.1 PEAK FLOW RATE(CFS) = 159.93

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END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.38 FLOW VELOCITY(FEET/SEC.) = 9.39
LONGEST FLOWPATH FROM NODE 950.00 TO NODE 956.00 = 3989.00 FEET.

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*****
FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.26
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"CHAPARRAL,BROADLEAF" B 14.30 0.30 1.000 63
NATURAL FAIR COVER
"OPEN BRUSH" B 21.60 0.30 1.000 66
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
SUBAREA AREA(ACRES) = 35.90 SUBAREA RUNOFF(CFS) = 73.51
EFFECTIVE AREA(ACRES) = 114.00 AREA-AVERAGED Fm(INCH/HR) = 0.30
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
TOTAL AREA(ACRES) = 114.0 PEAK FLOW RATE(CFS) = 233.44

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*****
FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81
-----
>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<
=====
MAINLINE Tc(MIN.) = 16.26
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.575
SUBAREA LOSS RATE DATA(AMC II):
DEVELOPMENT TYPE/ SCS SOIL AREA Fp Ap SCS
LAND USE GROUP (ACRES) (INCH/HR) (DECIMAL) CN
NATURAL FAIR COVER
"OPEN BRUSH" B 0.30 0.30 1.000 66
NATURAL FAIR COVER

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"OPEN BRUSH" B 0.30 0.30 1.000 66
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 0.60 0.30 1.000 63
 NATURAL FAIR COVER
 "WOODLAND,GRASS" B 2.30 0.30 1.000 65
 NATURAL FAIR COVER
 "CHAPARRAL,BROADLEAF" B 3.20 0.30 1.000 63
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 1.000
 SUBAREA AREA(ACRES) = 6.70 SUBAREA RUNOFF(CFS) = 13.72
 EFFECTIVE AREA(ACRES) = 120.70 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 1.00
 TOTAL AREA(ACRES) = 120.7 PEAK FLOW RATE(CFS) = 247.16

 FLOW PROCESS FROM NODE 956.00 TO NODE 905.00 IS CODE = 31

>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<

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ELEVATION DATA: UPSTREAM(FEET) = 375.00 DOWNSTREAM(FEET) = 330.00
 FLOW LENGTH(FEET) = 1304.00 MANNING'S N = 0.013
 DEPTH OF FLOW IN 48.0 INCH PIPE IS 38.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) = 22.96
 ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
 PIPE-FLOW(CFS) = 247.16
 PIPE TRAVEL TIME(MIN.) = 0.95 Tc(MIN.) = 17.20
 LONGEST FLOWPATH FROM NODE 950.00 TO NODE 905.00 = 5293.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 1

>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<

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TOTAL NUMBER OF STREAMS = 3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM 3 ARE:
 TIME OF CONCENTRATION(MIN.) = 17.20
 RAINFALL INTENSITY(INCH/HR) = 2.49
 AREA-AVERAGED Fm(INCH/HR) = 0.30
 AREA-AVERAGED Fp(INCH/HR) = 0.30
 AREA-AVERAGED Ap = 1.00
 EFFECTIVE STREAM AREA(ACRES) = 120.70
 TOTAL STREAM AREA(ACRES) = 120.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE = 247.16

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	736.16	10.20	3.486	0.30(0.25)	0.85	242.5	930.00
1	765.36	12.96	3.028	0.30(0.26)	0.87	299.6	910.00
1	754.63	16.43	2.560	0.30(0.27)	0.89	359.8	920.00
1	714.02	17.85	2.433	0.30(0.27)	0.89	359.9	900.00
2	59.15	9.96	3.535	0.30(0.30)	1.00	18.5	940.00
3	247.16	17.20	2.491	0.30(0.30)	1.00	120.7	950.00

RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR 3 STREAMS.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1000.12	9.96	3.535	0.30(0.27)	0.89	325.2	940.00
2	1007.61	10.20	3.486	0.30(0.27)	0.89	332.6	930.00
3	1046.98	12.96	3.028	0.30(0.27)	0.90	409.0	910.00
4	1039.43	16.43	2.560	0.30(0.28)	0.92	493.6	920.00
5	1019.77	17.20	2.491	0.30(0.28)	0.92	499.1	950.00
6	993.71	17.85	2.433	0.30(0.28)	0.92	499.1	900.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:

PEAK FLOW RATE(CFS) = 1046.98 Tc(MIN.) = 12.96
 EFFECTIVE AREA(ACRES) = 409.03 AREA-AVERAGED Fm(INCH/HR) = 0.27
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.90
 TOTAL AREA(ACRES) = 499.1
 LONGEST FLOWPATH FROM NODE 920.00 TO NODE 905.00 = 6933.00 FEET.

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

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MAINLINE Tc(MIN.) = 12.96
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.028
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	12.30	0.30	0.100	56
COMMERCIAL	B	26.80	0.30	0.100	56
COMMERCIAL	B	2.00	0.30	0.100	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.70	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	0.80	0.30	0.900	56
RESIDENTIAL					
" .4 DWELLING/ACRE"	B	2.10	0.30	0.900	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.196
 SUBAREA AREA(ACRES) = 46.70 SUBAREA RUNOFF(CFS) = 124.78
 EFFECTIVE AREA(ACRES) = 455.73 AREA-AVERAGED Fm(INCH/HR) = 0.25
 AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.83
 TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 1139.35

 FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<

=====

MAINLINE Tc(MIN.) = 12.96
 * 50 YEAR RAINFALL INTENSITY(INCH/HR) = 3.028
 SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	8.00	0.30	0.100	56

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.100
 SUBAREA AREA(ACRES) = 8.00 SUBAREA RUNOFF(CFS) = 21.58

EFFECTIVE AREA (ACRES) = 463.73 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.82
 TOTAL AREA (ACRES) = 553.8 PEAK FLOW RATE (CFS) = 1160.93

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 END OF STUDY SUMMARY:

TOTAL AREA (ACRES) = 553.8 TC (MIN.) = 12.96
 EFFECTIVE AREA (ACRES) = 463.73 AREA-AVERAGED Fm (INCH/HR) = 0.25
 AREA-AVERAGED Fp (INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.820
 PEAK FLOW RATE (CFS) = 1160.93

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1127.73	9.96	3.535	0.30 (0.24)	0.79	379.9	940.00
2	1132.56	10.20	3.486	0.30 (0.24)	0.79	387.3	930.00
3	1160.93	12.96	3.028	0.30 (0.25)	0.82	463.7	910.00
4	1137.62	16.43	2.560	0.30 (0.25)	0.85	548.3	920.00
5	1114.54	17.20	2.491	0.30 (0.25)	0.85	553.8	950.00
6	1085.95	17.85	2.433	0.30 (0.25)	0.85	553.8	900.00

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 END OF RATIONAL METHOD ANALYSIS