```
******************************************************************************
            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 ROMP 2018                                         *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 100-YR EV AUGUST 2018 CCHIU                                          *
 ***********************************************************************

  FILE NAME: PA3A00EV.DAT
  TIME/DATE OF STUDY: 15:29 08/14/2018
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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
```



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  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.413
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.372
  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        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) =      3.04
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      3.04

******************************************************************************
  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) =  3.158
  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        0.90      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) =       8.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.56
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =   10.57
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =   10.82
  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) =      13.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =   6.30
  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
```

OA-1

OA-2

```
 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) =      16.39
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   10.98
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.45
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.31
 STREET FLOW TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =   11.25
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
 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        1.10      0.30     0.900    56
 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 =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.47
 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) =      18.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.60
 FLOW VELOCITY(FEET/SEC.) =  6.66   DEPTH*VELOCITY(FT*FT/SEC.) =   2.46
 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) =      30.80
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.46
```

A-1


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   HALFSTREET FLOOD WIDTH(FEET) =   16.68
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.75
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.65
 STREET FLOW TRAVEL TIME(MIN.) =   1.43   Tc(MIN.) =   12.68
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.848
 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   24.41
 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) =      41.67

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.87
 FLOW VELOCITY(FEET/SEC.) =  6.18   DEPTH*VELOCITY(FT*FT/SEC.) =   3.09
 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  18.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.32
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.67
 PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   14.38
 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.) =   14.38
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.653
 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
```

A-2

A-3

```
 SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   12.99
 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) =      51.63

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.38
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.653                  A-4
 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) =   20.98
 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) =      72.61

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.38
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.653                  A-4
 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) =    4.25
 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) =      76.86

****************************************************************************
 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  36.0 INCH PIPE IS  25.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.57
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 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      76.86
 PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   15.30
 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.) =   15.30
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562                  A-5
 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) =   49.07
 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) =     123.15

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.30
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562                  A-6
 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) =   55.39
 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) =     178.54

****************************************************************************
 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  34.9 INCHES
```

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 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.26
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     178.54
 PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   16.03
 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.) =   16.03
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.494
 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        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) =   28.15
 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) =     201.85

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.03
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.494
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        7.20      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) =   46.07
 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) =     247.92

****************************************************************************
 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
```

A-8

A-7


```
 DEPTH OF FLOW IN  69.0 INCH PIPE IS  53.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.50
 ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     247.92
 PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   17.39
 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.) =   17.39
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.383
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        3.50      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) =   17.27
 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) =     253.79

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.39
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.383
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        0.40      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) =   19.02
 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) =     272.81

****************************************************************************
 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:
```

A-18

A-9

```
  TIME OF CONCENTRATION(MIN.) =   17.39
  RAINFALL INTENSITY(INCH/HR) =   2.38
  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 =     272.81

****************************************************************************
  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) =  4.610
  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        0.40      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) =     11.80
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     11.80

****************************************************************************
  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) =      18.76
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.54
```

A-10


```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.87
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.27
  STREET FLOW TRAVEL TIME(MIN.) =   1.47   Tc(MIN.) =    6.89
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.025
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        2.30      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) =   13.89
  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) =      24.11

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.95
  FLOW VELOCITY(FEET/SEC.) =  6.25   DEPTH*VELOCITY(FT*FT/SEC.) =   2.57
  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) =      37.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.52
    HALFSTREET FLOOD WIDTH(FEET) =   19.80
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.10
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.63
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =    8.16
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.657
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        5.00      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.20      0.30      0.900    56
```

A-11

A-12

```
  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) =   27.21
  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) =      49.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.56   HALFSTREET FLOOD WIDTH(FEET) =  21.99
  FLOW VELOCITY(FEET/SEC.) =  5.43   DEPTH*VELOCITY(FT*FT/SEC.) =   3.02
  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  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.22
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.03
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    8.98
  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.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        1.60      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) =    8.68
  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) =      55.03

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
```

A-13

A-14

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   54.59
  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) =     109.62

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   28.29
  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) =     137.91
```

A-15

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.463
  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) =   15.94
  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) =     153.85
```

OA-3

```
****************************************************************************
  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  32.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.37
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     153.85
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    9.85
  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.) =    9.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.286
  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) =   60.55
  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) =     206.19

****************************************************************************
  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  33.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.16
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     206.19
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.59
  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<<<<<
```

A-16


```
============================================================================
  MAINLINE Tc(MIN.) =   10.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.155
  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) =   43.87
  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) =     241.53

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.155
  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) =    9.15
  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) =     250.68

****************************************************************************
  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.) =   10.59
  RAINFALL INTENSITY(INCH/HR) =   3.15
  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 =     250.68
```

A-17

A-17

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      272.81   17.39    2.383  0.30( 0.07) 0.22     130.8     100.00
     2      250.68   10.59    3.155  0.30( 0.12) 0.40      91.8     110.00

 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      472.19   10.59    3.155  0.30( 0.09) 0.32     171.5     110.00
     2      459.72   17.39    2.383  0.30( 0.09) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     472.19    Tc(MIN.) =    10.59
 EFFECTIVE AREA(ACRES) =     171.47   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  81.0 INCH PIPE IS  64.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.45
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     472.19
 PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   11.56
 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.) =   11.56
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.002
 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) =   12.57
 EFFECTIVE AREA(ACRES) =    176.17   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) =     472.19
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

A-19


```
****************************************************************************
 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.) =   11.56
 RAINFALL INTENSITY(INCH/HR) =   3.00
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     176.17
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     472.19

****************************************************************************
 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) =  4.027
 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) =     21.83
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     21.83

****************************************************************************
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.027
 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        0.20      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

A-20

A-20

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.68
  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) =      22.51

****************************************************************************
  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  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.32
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.51
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.57
  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.) =    7.57
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.816
  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        5.40      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) =   30.21
  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) =      51.50

****************************************************************************
  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  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.50
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =    8.93
```

A-21


```
  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.) =    8.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.474
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   79.93
  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) =     126.66

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.93
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.474
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      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) =   32.48
  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) =     159.14

****************************************************************************
  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)<<<<<
```

A-22

A-22

```
================================================================================
  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  40.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.60
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     159.14
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    9.23
  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.) =    9.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.411
  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
  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) =   14.74
  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) =     170.86

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.411
  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        0.20      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) =     171.46

****************************************************************************
  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)<<<<<
============================================================================
```

A-23

A-23


```
  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) =     171.46
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   10.12
  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.) =   10.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.237
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   21.01
  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) =     183.37

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.237
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.90      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) =   37.68
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
```

A-25

A-25.1

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  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     221.04

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.237
  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       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) =   28.06
  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) =     249.10

****************************************************************************
  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  37.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.85
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     249.10
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   10.51
  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.) =   10.51
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.168
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   50.50
  EFFECTIVE AREA(ACRES) =    108.10   AREA-AVERAGED Fm(INCH/HR) =  0.15
```

A-25.1

A-26


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  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      108.1       PEAK FLOW RATE(CFS) =     294.03

****************************************************************************
  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  43.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.12
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     294.03
  PIPE TRAVEL TIME(MIN.) =   0.53    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) =  3.081
  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
  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) =   54.90
  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) =     340.48

****************************************************************************
  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) =  3.081
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      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
```

A-27

A-27

```
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    7.36
  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) =     347.84

****************************************************************************
  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) =  3.081
  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        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) =   49.30
  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) =     397.14

****************************************************************************
  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  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.25
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     397.14
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   11.43
  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.) =   11.43
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        2.20      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.40      0.30      0.900    56
```

A-28

A-29


```
  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) =    6.91
  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) =     397.14
  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.) =   11.43
  RAINFALL INTENSITY(INCH/HR) =   3.02
  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 =     397.14

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      472.19   11.56    3.002  0.30( 0.09) 0.31     176.2     110.00
      1      459.72   18.36    2.310  0.30( 0.09) 0.29     227.3     100.00
      2      397.14   11.43    3.020  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      867.18   11.43    3.020  0.30( 0.11) 0.37     326.4     120.00
      2      866.77   11.56    3.002  0.30( 0.11) 0.36     328.3     110.00
      3      759.36   18.36    2.310  0.30( 0.10) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     867.18    Tc(MIN.) =    11.43
  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  75.7 INCHES
```

PIPE-FLOW VELOCITY(FEET/SEC.) = 21.09
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 867.18
PIPE TRAVEL TIME(MIN.) = 1.18 Tc(MIN.) = 12.61
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.) = 12.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.857
A-30
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) = 16.52
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) = 867.18
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.) = 12.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.857
A-31
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.50	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) = 11.65
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) = 867.18
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.) = 12.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.857
A-31
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) = 33.80
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) = 868.93

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 12.61
* 25 YEAR RAINFALL INTENSITY(INCH/HR) = 2.857
A-31
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) = 51.56
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) = 920.49

****

```
 FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.61
 *  25 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
 "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) =   18.30
 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) =     938.79

****************************************************************************
 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  67.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  28.49
 ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     938.79
 PIPE TRAVEL TIME(MIN.) =   1.04    Tc(MIN.) =   13.66
 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.) =   13.66
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.731
 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
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A-31

A-32


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 SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   16.08
 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) =     938.79
 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.) =   13.66
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.731
 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) =   18.14
 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) =     938.79
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.392
 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        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
```

A-32

0A-4

```
  SUBAREA RUNOFF(CFS) =      5.29
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      5.29

****************************************************************************
  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) =  3.184
  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        4.90      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) =      14.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.35
  AVERAGE FLOW DEPTH(FEET) =   0.88   TRAVEL TIME(MIN.) =   1.10
  Tc(MIN.) =   10.42
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   18.95
  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) =      23.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.05   FLOW VELOCITY(FEET/SEC.) =   7.22
  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  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.48
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.88
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   11.53
  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.) =   11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.006
```

0A-5

0A-6

```
  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        5.10      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) =   22.16
  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) =      44.56

****************************************************************************
  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  34.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.56
  PIPE TRAVEL TIME(MIN.) =   2.59    Tc(MIN.) =   14.12
  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.) =   14.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.681
  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        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "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) =   28.28
  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) =      67.49
```

0A-7

```
****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.12
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.681
  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) =     0.43
  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) =      67.92

****************************************************************************
  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  38.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.99
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.92
  PIPE TRAVEL TIME(MIN.) =   2.53    Tc(MIN.) =   16.65
  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.) =   16.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.442
  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) =   12.53
  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) =      73.63
```

OA-7

OA-8


```
****************************************************************************
  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  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.85
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.63
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   17.54
  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.) =   17.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.371
  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) =   24.41
  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) =      95.60

****************************************************************************
  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  25.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.02
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.60
  PIPE TRAVEL TIME(MIN.) =   5.73    Tc(MIN.) =   23.28
```

OA-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 =  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       95.60   23.28    2.020  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      938.79   13.66    2.731  0.30( 0.11) 0.37     394.6     120.00
     2      938.06   13.79    2.717  0.30( 0.11) 0.37     396.5     110.00
     3      828.05   20.64    2.162  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     1018.09   13.66    2.731  0.30( 0.13) 0.42     424.7     120.00
     2     1017.63   13.79    2.717  0.30( 0.13) 0.42     426.9     110.00
     3      919.83   20.64    2.162  0.30( 0.12) 0.41     493.1     100.00
     4      866.36   23.28    2.020  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) =     1018.09  Tc(MIN.) =   13.660
 EFFECTIVE AREA(ACRES) =    424.66  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.) =   13.66
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.731
 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
```

A-33


```
 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) =   19.54
 EFFECTIVE AREA(ACRES) =    433.56   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) =    1018.09
 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.) =   13.66
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.731
 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) =    5.30
 EFFECTIVE AREA(ACRES) =    435.96   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) =    1020.74
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.66
 EFFECTIVE AREA(ACRES) =    435.96  AREA-AVERAGED Fm(INCH/HR)=  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
 PEAK FLOW RATE(CFS)   =    1020.74

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1     1020.74   13.66    2.731  0.30( 0.13) 0.43     436.0     120.00
     2     1020.32   13.79    2.717  0.30( 0.13) 0.43     438.2     110.00
     3      923.35   20.64    2.162  0.30( 0.13) 0.43     504.4     100.00
     4      867.79   23.28    2.020  0.30( 0.13) 0.43     510.2     150.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

A-33

```
**************************************************************************
            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 ROMP 2018                                        *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 2-YR EV AUGUST 2018 CCHIU                                           *
 **********************************************************************

  FILE NAME: PA3A02EV.DAT
  TIME/DATE OF STUDY: 12:06 08/15/2018
==========================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.123
  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"                -        1.10      0.60     1.000     0    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      0.52

**************************************************************************
  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) =  1.005
  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     1.000     -
  USER-DEFINED                -        2.60      0.60     1.000     -
  USER-DEFINED                -        0.70      0.60     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   1.84
  Tc(MIN.) =   11.25
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    1.57
  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) =       1.97

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

OA-1

OA-2

```
 DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   3.92
 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) =       2.60
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.20
   HALFSTREET FLOOD WIDTH(FEET) =    2.00
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.12
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
 STREET FLOW TRAVEL TIME(MIN.) =   0.72   Tc(MIN.) =   11.97
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.973
 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     0.900     -
 USER-DEFINED               -        1.00      0.60     0.100     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    1.25
 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) =       3.07

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.22   HALFSTREET FLOOD WIDTH(FEET) =   3.34
 FLOW VELOCITY(FEET/SEC.) =  5.23   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
 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
```

A-1


```
 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) =       6.24
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.31
   HALFSTREET FLOOD WIDTH(FEET) =    8.03
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.05
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.24
 STREET FLOW TRAVEL TIME(MIN.) =   2.03   Tc(MIN.) =   14.00
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.884
 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               -        0.30      0.60     0.900     -
 USER-DEFINED               -        6.60      0.60     0.100     -
 USER-DEFINED               -        1.80      0.60     0.900     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =    6.36
 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) =       8.83

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.59
 FLOW VELOCITY(FEET/SEC.) =  4.35   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
 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   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.85
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.83
 PIPE TRAVEL TIME(MIN.) =   2.46    Tc(MIN.) =   16.47
 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.) =   16.47
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.805
```

A-2

A-3

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) = 3.28
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) = 10.89

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805

A-4

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) = 4.68
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) = 15.57

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.47
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.805

A-4

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) = 1.21
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) = 16.78

****
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 13.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.02
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 16.78
PIPE TRAVEL TIME(MIN.) = 1.34 Tc(MIN.) = 17.80
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.) = 17.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.773

A-5

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) = 13.56
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) = 29.37

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.80
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.773

A-6

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) = 15.25
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) = 44.61

****
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  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.61
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   18.84
  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.) =   18.84
  *   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               -        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) =    7.82
  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) =      50.66

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.84
  *   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               -        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) =   12.37
  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) =      63.03

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  31
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A-8

A-7


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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  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.22
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.03
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   20.73
  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.) =   20.73
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.707
  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) =    4.23
  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) =      63.07

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.73
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.707
  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) =    4.81
  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) =      67.88

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
```

A-18

A-9

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.73
  RAINFALL INTENSITY(INCH/HR) =   0.71
  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 =      67.88

****************************************************************************
  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) =  1.555
  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     0    8.68
  COMMERCIAL                  -        0.30      0.60      0.100     0    5.42
  PUBLIC PARK                 -        1.30      0.60      0.850     0    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.00      0.60      0.900     0    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =      2.91
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      2.91

****************************************************************************
  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
```

A-10


```
    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.55
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    7.31
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.351
  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) =    4.27
  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) =       6.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   7.53
  FLOW VELOCITY(FEET/SEC.) =  4.73   DEPTH*VELOCITY(FT*FT/SEC.) =   1.40
  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) =      10.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.45
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    9.02
*   2 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                -        5.00      0.60      0.100     -
```

A-11

A-12

```
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.335
  SUBAREA AREA(ACRES) =    8.50      SUBAREA RUNOFF(CFS) =    7.38
  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) =      12.85

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.70
  FLOW VELOCITY(FEET/SEC.) =  3.93   DEPTH*VELOCITY(FT*FT/SEC.) =   1.53
  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  11.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.48
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.85
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   10.14
  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.) =   10.14
  *   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                -        1.60      0.60      0.100      -
  USER-DEFINED                -        0.20      0.60      0.850      -
  USER-DEFINED                -        1.10      0.60      0.900      -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =    2.90      SUBAREA RUNOFF(CFS) =    2.04
  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) =      13.34

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
  SUBAREA LOSS RATE DATA(AMC  II):
```

A-13


```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.313
  SUBAREA AREA(ACRES) =   18.00      SUBAREA RUNOFF(CFS) =   14.04
  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) =      27.38

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
  SUBAREA LOSS RATE DATA(AMC  II):
```

A-14

A-15

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.515
  SUBAREA AREA(ACRES) =    9.50      SUBAREA RUNOFF(CFS) =    6.37
  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) =      33.75

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.14
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.054
  SUBAREA LOSS RATE DATA(AMC  II):
```

0A-3

```
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.30      0.60      1.000      -
  USER-DEFINED                -        0.30      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) =    5.60      SUBAREA RUNOFF(CFS) =    2.29
  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) =      36.04

****************************************************************************
  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  24.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.37
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.04
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   11.41
  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.) =   11.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.998
  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) =   16.27
  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) =      49.72

****************************************************************************
  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  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.72
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   12.43
  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.) =   12.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.953
  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     -
```

A-16

A-17


```
  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) =    9.66
  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) =      56.45

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.43
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.953
  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) =    2.40
  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) =      58.85

****************************************************************************
  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.) =   12.43
  RAINFALL INTENSITY(INCH/HR) =   0.95
  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 =      58.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       67.88   20.73    0.707  0.60( 0.13) 0.22     130.8     100.00
      2       58.85   12.43    0.953  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1      116.93   12.43    0.953  0.60( 0.19) 0.32     170.2     110.00
     2      106.39   20.73    0.707  0.60( 0.18) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     116.93    Tc(MIN.) =    12.43
 EFFECTIVE AREA(ACRES) =     170.24   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  48.0 INCH PIPE IS  38.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.90
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     116.93
 PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   13.81
 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.) =   13.81
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.893
 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                -        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) =    3.52
 EFFECTIVE AREA(ACRES) =    174.94   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) =     116.93
 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.) =   13.81
 RAINFALL INTENSITY(INCH/HR) =   0.89
 AREA-AVERAGED Fm(INCH/HR) =  0.19
```

A-19


```
 AREA-AVERAGED Fp(INCH/HR) =  0.60
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     174.94
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     116.93

****************************************************************************
 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) =  1.397
 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                  -        0.50      0.60     0.100     0    6.88
 PUBLIC PARK                 -        0.20      0.60     0.850     0   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        -        2.70      0.60     0.200     0    7.33
 RESIDENTIAL
 ".4 DWELLING/ACRE"          -        1.40      0.60     0.900     0   11.02
 PUBLIC PARK                 -        0.10      0.60     0.850     0   10.93
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"        -        1.30      0.60     0.200     0    7.33
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
 SUBAREA RUNOFF(CFS) =      6.52
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =      6.52

****************************************************************************
 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) =  1.397
 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     0.900     -
 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) =    0.15
 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) =       6.67

****************************************************************************
 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)<<<<<
```

A-20

A-20

```
================================================================================
  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   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.67
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    7.80
  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.) =    7.80
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.298
  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) =    8.55
  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) =      14.65

****************************************************************************
  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  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.42
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =    9.62
  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.) =    9.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.101
  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      0.60     0.200     -
```

A-21

A-22


```
  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) =   19.37
  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) =      31.28

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.62
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.101
  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) =    7.08
  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) =      38.36

****************************************************************************
  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  33.0 INCH PIPE IS  22.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.36
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.04
  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.) =   10.04
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.058
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

A-23

LAND USE	GROUP	(ACRES)	(INCH/HR)	(DECIMAL)	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) = 4.06
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) = 40.39

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 10.04
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.058

A-23

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) = 0.17
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) = 40.56

****
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 24.0 INCH PIPE IS 17.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 16.48
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 40.56
PIPE TRAVEL TIME(MIN.) = 1.29 Tc(MIN.) = 11.32
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.) = 11.32
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002

A-25

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	-	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) = 4.60
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) = 42.18

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 11.32
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002

A-25.1

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) = 8.37
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) = 50.55

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 11.32
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 1.002

A-25.1

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) = 5.89
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) = 56.45

****
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  27.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.28
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.45
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   11.90
  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.) =   11.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.976
  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) =   12.25
  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) =      66.65

****************************************************************************
  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  33.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.96
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      66.65
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   12.68
  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.) =   12.68
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.942
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

A-26


```
  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) =   13.96
  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) =      77.27

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.68
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.942
  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) =    1.57
  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) =      78.84

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.68
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.942
  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) =   13.09
  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) =      91.93

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

A-27

A-27

A-28

```
------------------------------------------------------------------------------
  >>>>>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  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.97
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.93
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   13.24
  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.) =   13.24
  *   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               -        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) =    1.83
  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) =      91.93
  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.) =   13.24
  RAINFALL INTENSITY(INCH/HR) =   0.92
  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 =      91.93

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      116.93   13.81    0.893  0.60( 0.19) 0.31     174.9     110.00
      1      106.39   22.12    0.682  0.60( 0.17) 0.29     227.3     100.00
      2       91.93   13.24    0.917  0.60( 0.26) 0.43     152.1     120.00

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
```

A-29


```
  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      208.03   13.24    0.917  0.60( 0.22) 0.37     319.9     120.00
      2      205.41   13.81    0.893  0.60( 0.22) 0.37     327.0     110.00
      3      165.55   22.12    0.682  0.60( 0.21) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     208.03    Tc(MIN.) =    13.24
  EFFECTIVE AREA(ACRES) =     319.88   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  57.0 INCH PIPE IS  41.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.06
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     208.03
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   14.89
  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.) =   14.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.845
  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) =    3.25
  EFFECTIVE AREA(ACRES) =    326.68   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) =     208.03
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
------------------------------------------------------------------------------
```

A-30

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.845
  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      0.100     -
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.344
  SUBAREA AREA(ACRES) =    4.70      SUBAREA RUNOFF(CFS) =    2.70
  EFFECTIVE AREA(ACRES) =    331.38   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) =     208.03
  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.) =   14.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.845
  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      0.400     -
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.386
  SUBAREA AREA(ACRES) =   13.70      SUBAREA RUNOFF(CFS) =    7.56
  EFFECTIVE AREA(ACRES) =    345.08   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) =     208.03
  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.) =   14.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.845
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        4.40      0.60      0.500     -
  USER-DEFINED                -        0.70      0.60      0.400     -
  USER-DEFINED                -        5.00      0.60      0.100     -
```

A-31

A-31

A-31


```
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   20.60      SUBAREA RUNOFF(CFS) =   12.84
  EFFECTIVE AREA(ACRES) =    365.68   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) =     208.03
  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.) =   14.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.845
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.30      0.60      0.600     -
  USER-DEFINED                -        3.90      0.60      0.500     -
  USER-DEFINED                -        2.30      0.60      0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.487
  SUBAREA AREA(ACRES) =    7.50      SUBAREA RUNOFF(CFS) =    3.73
  EFFECTIVE AREA(ACRES) =    373.18   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) =     209.96

****************************************************************************
  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  48.0 INCH PIPE IS  38.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.61
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     209.96
  PIPE TRAVEL TIME(MIN.) =   1.52    Tc(MIN.) =   16.41
  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.) =   16.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.806
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        1.30      0.60      0.100     -
  USER-DEFINED                -        1.20      0.60      0.900     -
```

A-31

A-32

```
  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) =     2.82
  EFFECTIVE AREA(ACRES) =    380.18   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) =     209.96
  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.) =   16.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.806
  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) =     3.18
  EFFECTIVE AREA(ACRES) =    388.08   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      447.6       PEAK FLOW RATE(CFS) =     209.96
  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
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.134
  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"                -        1.50      0.60     1.000     0    9.31
  NATURAL FAIR COVER
```

A-32

0A-4


```
  "WOODLAND,GRASS"            -        0.40      0.60     1.000     0    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  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
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.012
  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) =      2.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.97
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   1.77
  Tc(MIN.) =   11.08
  SUBAREA AREA(ACRES) =     7.30      SUBAREA RUNOFF(CFS) =     2.71
  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) =      3.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.51   FLOW VELOCITY(FEET/SEC.) =   4.44
  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
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      3.42
  PIPE TRAVEL TIME(MIN.) =   1.77    Tc(MIN.) =   12.85
  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<<<<<
============================================================================
```

0A-5

MAINLINE Tc(MIN.) = 12.85
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.934

OA-6

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) = 2.74
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) = 5.51

****
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 21.0 INCH PIPE IS 16.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 2.67
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.51
PIPE TRAVEL TIME(MIN.) = 4.44 Tc(MIN.) = 17.29
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.) = 17.29
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.785

OA-7

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) = 2.20
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) = 5.51
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

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

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

MAINLINE Tc(MIN.) = 17.29
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.785

OA-7

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) = 0.03
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) = 5.51
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****
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 21.0 INCH PIPE IS 14.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 3.24
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 5.51
PIPE TRAVEL TIME(MIN.) = 4.68 Tc(MIN.) = 21.98
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.) = 21.98
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.684

OA-8

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) = 0.49
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) = 5.51
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   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.99
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.51
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   23.64
  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.) =   23.64
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.655
  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     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) =    0.64
  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) =       5.51
  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   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.51
  PIPE TRAVEL TIME(MIN.) =  11.59    Tc(MIN.) =   35.22
  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
```

0A-9


```
      1       5.51   35.22    0.518  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      209.96   16.41    0.806  0.60( 0.22) 0.37     388.1     120.00
      2      208.81   16.98    0.792  0.60( 0.22) 0.37     395.2     110.00
      3      172.10   25.47    0.623  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      213.95   16.41    0.806  0.60( 0.25) 0.41     412.0     120.00
      2      212.87   16.98    0.792  0.60( 0.25) 0.41     420.0     110.00
      3      176.90   25.47    0.623  0.60( 0.24) 0.40     484.7     100.00
      4      145.66   35.22    0.518  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) =      213.95  Tc(MIN.) =   16.412
  EFFECTIVE AREA(ACRES) =    411.98  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.) =   16.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.806
  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               -        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) =    1.79
  EFFECTIVE AREA(ACRES) =    420.88   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) =     213.95
  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.) =   16.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.806
```

A-33

A-33

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) = 0.55
EFFECTIVE AREA(ACRES) = 423.28 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) = 213.95
NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 510.2 TC(MIN.) = 16.41
EFFECTIVE AREA(ACRES) = 423.28 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.426
PEAK FLOW RATE(CFS) = 213.95

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	213.95	16.41	0.806	0.60(0.26)	0.43	423.3	120.00
2	212.87	16.98	0.792	0.60(0.25)	0.42	431.3	110.00
3	176.90	25.47	0.623	0.60(0.25)	0.42	496.0	100.00
4	145.66	35.22	0.518	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 ROMP 2018                                        *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 5-YR EV AUGUST 2018 CCHIU                                           *
 **********************************************************************

  FILE NAME: PA3A05EV.DAT
  TIME/DATE OF STUDY: 10:39 08/15/2018
==========================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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<<
==========================================================================
  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) =  1.589
  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"                -        1.10      0.50     1.000    75    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.08

**************************************************************************
  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) =  1.453
  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      0.50     1.000     -
  USER-DEFINED                -        2.60      0.50     1.000     -
  USER-DEFINED                -        0.70      0.50     0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.983
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.26
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =   10.92
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    3.63
  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) =       4.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
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OA-1

OA-2

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 DEPTH(FEET) =  0.57   FLOW VELOCITY(FEET/SEC.) =   4.74
 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) =       5.66
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.27
   HALFSTREET FLOOD WIDTH(FEET) =    6.16
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.31
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
 STREET FLOW TRAVEL TIME(MIN.) =   0.83   Tc(MIN.) =   11.75
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.402
 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     0.900     -
 USER-DEFINED               -        1.00      0.50     0.100     -
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    2.16
 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) =       6.49

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.78
 FLOW VELOCITY(FEET/SEC.) =  5.37   DEPTH*VELOCITY(FT*FT/SEC.) =   1.52
 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
```

A-1


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 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) =      11.58
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   10.90
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.61
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.65
 STREET FLOW TRAVEL TIME(MIN.) =   1.78   Tc(MIN.) =   13.53
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.291
 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     0.100     -
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   10.19
 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) =      15.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.62
 FLOW VELOCITY(FEET/SEC.) =  4.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.91
 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  18.0 INCH PIPE IS  13.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.12
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.94
 PIPE TRAVEL TIME(MIN.) =   2.18    Tc(MIN.) =   15.71
 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.) =   15.71
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.174
 SUBAREA LOSS RATE DATA(AMC  II):
```

A-2

A-3

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	-	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) = 5.28
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) = 19.41

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 15.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

A-4

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	-	0.30	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) = 8.07
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) = 27.48

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 15.71
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.174

A-4

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	0.50	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) = 1.82
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) = 29.30

****
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 24.0 INCH PIPE IS 18.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.29
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 29.30
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 16.90
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.) = 16.90
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132

A-5

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	0.50	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) = 20.78
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) = 48.78

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.90
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.132

A-6

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	0.50	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) = 23.41
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) = 72.20

****
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 33.0 INCH PIPE IS 26.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 14.36
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 72.20
PIPE TRAVEL TIME(MIN.) = 0.94 Tc(MIN.) = 17.84
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.) = 17.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.098

A-8

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	-	6.70	0.50	0.100	-
USER-DEFINED	-	0.10	0.50	0.850	-
USER-DEFINED	-	2.50	0.50	0.100	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.106
SUBAREA AREA(ACRES) = 12.70 SUBAREA RUNOFF(CFS) = 11.94
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) = 81.72

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

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

MAINLINE Tc(MIN.) = 17.84
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.098

A-7

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	7.20	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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.150
SUBAREA AREA(ACRES) = 20.90 SUBAREA RUNOFF(CFS) = 19.24
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) = 100.96

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 51.0 INCH PIPE IS 36.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.30
ESTIMATED PIPE DIAMETER(INCH) = 51.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 100.96
PIPE TRAVEL TIME(MIN.) = 1.67 Tc(MIN.) = 19.51
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.) = 19.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038

A-18

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	0.50	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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.235
SUBAREA AREA(ACRES) = 8.30 SUBAREA RUNOFF(CFS) = 6.87
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) = 101.68

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

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

MAINLINE Tc(MIN.) = 19.51
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.038

A-9

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	-	5.50	0.50	0.200	-
USER-DEFINED	-	3.20	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) = 9.10 SUBAREA RUNOFF(CFS) = 7.68
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) = 109.36

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.) =   19.51
  RAINFALL INTENSITY(INCH/HR) =   1.04
  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 =     109.36

****************************************************************************
  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) =  2.124
  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      0.50     0.900    75    8.68
  COMMERCIAL                  -        0.30      0.50     0.100    75    5.42
  PUBLIC PARK                 -        1.30      0.50     0.850    75    8.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.00      0.50     0.900    75    8.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.798
  SUBAREA RUNOFF(CFS) =      4.66
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      4.66

****************************************************************************
  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) =       7.77
```

A-10


```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.22
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    7.18
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.887
  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      0.50     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.223
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =    6.23
  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) =      10.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.47
  FLOW VELOCITY(FEET/SEC.) =  5.15   DEPTH*VELOCITY(FT*FT/SEC.) =   1.71
  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) =      16.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.56   Tc(MIN.) =    8.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.678
  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      0.50     0.100     -
  USER-DEFINED                -        2.20      0.50     0.900     -
```

A-11

A-12

```
  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) =   11.56
  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) =      20.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  4.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  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  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.74
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.51
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =    9.74
  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.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.545
  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) =    3.44
  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) =      22.09

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.545
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

A-13


```
       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) =   22.49
  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) =      44.58

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.545
  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) =   11.01
  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) =      55.59

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.545
  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) =    5.26
  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) =      60.85

****************************************************************************
  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)<<<<<
============================================================================
```

A-14

A-15

0A-3

```
 ELEVATION DATA: UPSTREAM(FEET) =   565.00  DOWNSTREAM(FEET) =   535.00
 FLOW LENGTH(FEET) =  1017.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.43
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      60.85
 PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =   10.84
 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.) =   10.84
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.458
 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               -       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) =   25.33
 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) =      82.18

****************************************************************************
 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  30.0 INCH PIPE IS  23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.08
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      82.18
 PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   11.76
 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.) =   11.76
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.401
 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     0.100     -
 USER-DEFINED               -        1.40      0.50     0.850     -
```

A-16

A-17


```
 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) =   16.89
 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) =      95.35

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.76
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.401
 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      0.50     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) =    3.80
 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) =      99.14

****************************************************************************
 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.) =   11.76
 RAINFALL INTENSITY(INCH/HR) =   1.40
 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 =      99.14

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1      109.36   19.51    1.038  0.50( 0.11) 0.22     130.8     100.00
     2       99.14   11.76    1.401  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
    1      190.85   11.76    1.401  0.50( 0.16) 0.32     170.7      110.00
    2      178.51   19.51    1.038  0.50( 0.15) 0.29     222.6      100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     190.85    Tc(MIN.) =    11.76
  EFFECTIVE AREA(ACRES) =     170.66   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  60.0 INCH PIPE IS  43.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.51
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     190.85
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   12.96
  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.) =   12.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.326
  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     0.100     -
  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) =    5.40
  EFFECTIVE AREA(ACRES) =    175.36   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) =     190.85
  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.) =   12.96
  RAINFALL INTENSITY(INCH/HR) =   1.33
  AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.50
```

A-19


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  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =     175.36
  TOTAL STREAM AREA(ACRES) =     227.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     190.85

****************************************************************************
  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) =  1.928
  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                  -        0.50      0.50     0.100    75    6.88
  PUBLIC PARK                 -        0.20      0.50     0.850    75   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        -        2.70      0.50     0.200    75    7.33
  RESIDENTIAL
  ".4 DWELLING/ACRE"          -        1.40      0.50     0.900    75   11.02
  PUBLIC PARK                 -        0.10      0.50     0.850    75   10.93
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        -        1.30      0.50     0.200    75    7.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.381
  SUBAREA RUNOFF(CFS) =      9.69
  TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =      9.69

****************************************************************************
  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) =  1.928
  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     0.900     -
  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) =    0.27
  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) =       9.96

****************************************************************************
  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)<<<<<
============================================================================
```

A-20

A-20

```
 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  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.44
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       9.96
 PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    7.72
 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.) =    7.72
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.816
 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      0.50     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) =   13.14
 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) =      22.45

****************************************************************************
 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  15.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.45
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.45
 PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =    9.36
 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.) =    9.36
 *   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               -        7.60      0.50     0.200     -
 USER-DEFINED               -        1.40      0.50     0.100     -
 USER-DEFINED               -        2.30      0.50     0.200     -
```

A-21

A-22


```
 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) =   32.44
 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) =      51.82

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.36
 *   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               -        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) =   12.62
 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) =      64.43

****************************************************************************
 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  39.0 INCH PIPE IS  28.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.09
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.43
 PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    9.73
 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.) =    9.73
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.546
 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     0.200     -
```

A-22

A-23

```
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.231
  SUBAREA AREA(ACRES) =    4.90      SUBAREA RUNOFF(CFS) =    6.31
  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) =      68.39

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.73
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.546
  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     0.200     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.26
  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) =      68.65

****************************************************************************
  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  30.0 INCH PIPE IS  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.65
  PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   10.85
  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.) =   10.85
  *   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               -        0.50      0.50     0.200     -
  USER-DEFINED               -        1.20      0.50     0.100     -
  USER-DEFINED               -        1.20      0.50     0.900     -
```

A-23

A-25


```
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.550
  SUBAREA AREA(ACRES) =    7.60      SUBAREA RUNOFF(CFS) =    8.09
  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) =      72.07

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.85
  *   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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.530
  SUBAREA AREA(ACRES) =   13.60      SUBAREA RUNOFF(CFS) =   14.60
  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) =      86.66

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.85
  *   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               -       10.20      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) =   10.20      SUBAREA RUNOFF(CFS) =   10.62
  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) =      97.29

****************************************************************************
  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
```

A-25.1

A-25.1

FLOW LENGTH(FEET) = 562.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 36.0 INCH PIPE IS 24.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.20
ESTIMATED PIPE DIAMETER(INCH) = 36.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 97.29
PIPE TRAVEL TIME(MIN.) = 0.49 Tc(MIN.) = 11.34
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.) = 11.34
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.427
SUBAREA LOSS RATE DATA(AMC II):

A-26

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.395
SUBAREA AREA(ACRES) = 18.40 SUBAREA RUNOFF(CFS) = 20.36
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) = 115.21

****
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 42.0 INCH PIPE IS 31.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.11
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 115.21
PIPE TRAVEL TIME(MIN.) = 0.67 Tc(MIN.) = 12.01
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.) = 12.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.386
SUBAREA LOSS RATE DATA(AMC II):

A-27

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.303
SUBAREA AREA(ACRES) = 20.40 SUBAREA RUNOFF(CFS) = 22.66
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) = 133.83

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 12.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.386
SUBAREA LOSS RATE DATA(AMC II):

A-27

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.530
SUBAREA AREA(ACRES) = 2.80 SUBAREA RUNOFF(CFS) = 2.82
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) = 136.65

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 12.01
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.386
SUBAREA LOSS RATE DATA(AMC II):

A-28

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.50
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.238
SUBAREA AREA(ACRES) = 18.20 SUBAREA RUNOFF(CFS) = 20.75
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) = 157.40

****
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  39.0 INCH PIPE IS  27.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     157.40
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   12.50
  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.) =   12.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.355
  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) =    2.91
  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) =     157.40
  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.) =   12.50
  RAINFALL INTENSITY(INCH/HR) =   1.35
  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 =     157.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      190.85   12.96    1.326  0.50( 0.16) 0.31     175.4     110.00
      1      178.51   20.74    1.002  0.50( 0.14) 0.29     227.3     100.00
      2      157.40   12.50    1.355  0.50( 0.21) 0.43     152.1     120.00

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

A-29


```
  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      345.96   12.50    1.355  0.50( 0.18) 0.37     321.2     120.00
      2      344.31   12.96    1.326  0.50( 0.18) 0.37     327.5     110.00
      3      287.25   20.74    1.002  0.50( 0.17) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     345.96    Tc(MIN.) =    12.50
  EFFECTIVE AREA(ACRES) =     321.24   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  66.0 INCH PIPE IS  53.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.78
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     345.96
  PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   13.98
  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.) =   13.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.263
  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) =    6.13
  EFFECTIVE AREA(ACRES) =    328.04   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) =     345.96
  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<<<<<
============================================================================
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A-30

MAINLINE Tc(MIN.) = 13.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.263 A-31
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) = 4.62
EFFECTIVE AREA(ACRES) = 332.74 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) = 345.96
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.) = 13.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.263 A-31
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) = 13.19
EFFECTIVE AREA(ACRES) = 346.44 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) = 345.96
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.) = 13.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.263 A-31
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) = 21.07
EFFECTIVE AREA(ACRES) = 367.04 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) = 357.19

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 13.98
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.263 A-31
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) = 6.88
EFFECTIVE AREA(ACRES) = 374.54 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) = 364.07

****
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 60.0 INCH PIPE IS 45.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 22.68
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 364.07
PIPE TRAVEL TIME(MIN.) = 1.31 Tc(MIN.) = 15.30
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.) = 15.30
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.189 A-32
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) =     5.61
  EFFECTIVE AREA(ACRES) =    381.54   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =      439.7       PEAK FLOW RATE(CFS) =     364.07
  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.) =   15.30
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.189
  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     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 =  0.599
  SUBAREA AREA(ACRES) =     7.90      SUBAREA RUNOFF(CFS) =     6.33
  EFFECTIVE AREA(ACRES) =    389.44   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) =     364.07
  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) =  1.602
  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"                -        1.50      0.50     1.000    75    9.31
  NATURAL FAIR COVER
  "WOODLAND,GRASS"            -        0.40      0.50     1.000    75    9.31
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
```

A-32

0A-4


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  SUBAREA RUNOFF(CFS) =      1.88
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      1.88

****************************************************************************
  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
  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      0.50     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) =       5.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.93
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.42
  Tc(MIN.) =   10.74
  SUBAREA AREA(ACRES) =     7.30      SUBAREA RUNOFF(CFS) =     6.33
  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) =       7.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   5.48
  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  18.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.70
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.98
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   12.20
  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.) =   12.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.374
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

0A-5

OA-6

```
     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) =    7.15
  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) =      14.38

****************************************************************************
  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  30.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.39
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.38
  PIPE TRAVEL TIME(MIN.) =   3.50    Tc(MIN.) =   15.70
  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.) =   15.70
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.175
  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) =    8.02
  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) =      19.13

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.70
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.175
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

OA-7

OA-7


```
  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) =    0.12
  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) =      19.25

****************************************************************************
  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  33.0 INCH PIPE IS  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.25
  PIPE TRAVEL TIME(MIN.) =   3.43    Tc(MIN.) =   19.13
  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.) =   19.13
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.051
  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) =    3.22
  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) =      19.25
  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
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.79
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.25
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   20.36
```

OA-8

```
 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.) =   20.36
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.011
 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      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) =    6.03
 EFFECTIVE AREA(ACRES) =     51.30   AREA-AVERAGED Fm(INCH/HR) =  0.50
 AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  1.00
 TOTAL AREA(ACRES) =       51.3       PEAK FLOW RATE(CFS) =      23.60

****************************************************************************
 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  21.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.65
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      23.60
 PIPE TRAVEL TIME(MIN.) =   8.16    Tc(MIN.) =   28.52
 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       23.60   28.52    0.851  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      364.07   15.30    1.189  0.50( 0.19) 0.37     389.4     120.00
     2      360.51   15.76    1.173  0.50( 0.19) 0.37     395.7     110.00
     3      308.35   23.64    0.933  0.50( 0.18) 0.36     447.6     100.00
```

0A-9


```
 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      387.68   15.30    1.189  0.50( 0.21) 0.42     417.0     120.00
     2      384.11   15.76    1.173  0.50( 0.21) 0.42     424.0     110.00
     3      331.96   23.64    0.933  0.50( 0.21) 0.41     490.1     100.00
     4      298.47   28.52    0.851  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) =      387.68  Tc(MIN.) =   15.297
 EFFECTIVE AREA(ACRES) =    416.95  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.) =   15.30
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.189
 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                -        1.30      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) =    5.64
 EFFECTIVE AREA(ACRES) =    425.85   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) =     387.68
 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.) =   15.30
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.189
 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      0.850     -
 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
```

A-33

A-33

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.919
  SUBAREA AREA(ACRES) =    2.40      SUBAREA RUNOFF(CFS) =    1.58
  EFFECTIVE AREA(ACRES) =    428.25   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) =     387.68
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     15.30
  EFFECTIVE AREA(ACRES) =    428.25  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.430
  PEAK FLOW RATE(CFS)   =     387.68

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      387.68   15.30    1.189  0.50( 0.22) 0.43     428.3     120.00
      2      384.11   15.76    1.173  0.50( 0.21) 0.43     435.3     110.00
      3      331.96   23.64    0.933  0.50( 0.21) 0.42     501.4     100.00
      4      298.47   28.52    0.851  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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             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 ROMP 2018                                           *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 10-YR EV AUGUST 2018 CCHIU                                             *
 ************************************************************************

  FILE NAME: PA3A10EV.DAT
  TIME/DATE OF STUDY: 12:00 08/15/2018
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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<<
==============================================================================
  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) =  2.232
  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        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) =      1.91
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      1.91

******************************************************************************
  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) =  2.075
  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        0.90      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) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.93
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.30
  Tc(MIN.) =   10.72
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    6.73
  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) =       8.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.57
  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
```

OA-1

OA-2

```
 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) =      10.23
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    8.72
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.86
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.87
 STREET FLOW TRAVEL TIME(MIN.) =   0.75   Tc(MIN.) =   11.47
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.998
 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        1.10      0.30     0.900    56
 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 =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    3.48
 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) =      11.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.28
 FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.98
 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) =      19.43
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.41
```

A-1


```
   HALFSTREET FLOOD WIDTH(FEET) =   13.71
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.19
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.11
 STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =   13.05
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.858
 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   15.67
 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) =      26.33

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.59
 FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   2.46
 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  14.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.87
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.33
 PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   14.94
 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.) =   14.94
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.722
 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
```

A-2

A-3

```
 SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =    8.29
 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) =      32.52

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.94
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.722                  A-4
 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) =   13.26
 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) =      45.79

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.94
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.722                  A-4
 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) =    2.74
 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) =      48.53

****************************************************************************
 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  21.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.96
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      48.53
 PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   15.97
 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.) =   15.97
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658                  A-5
 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) =   31.51
 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) =      78.10

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.97
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.658                  A-6
 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) =   35.56
 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) =     113.66

****************************************************************************
 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  39.0 INCH PIPE IS  31.0 INCHES
```

PIPE-FLOW VELOCITY(FEET/SEC.) = 16.06
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 113.66
PIPE TRAVEL TIME(MIN.) = 0.84 Tc(MIN.) = 16.81
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.) = 16.81
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.611
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) = 18.05
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) = 128.34

A-8

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 16.81
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.611
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) = 29.46
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) = 157.80

A-7

****
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 43.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.38
ESTIMATED PIPE DIAMETER(INCH) = 60.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 157.80
PIPE TRAVEL TIME(MIN.) = 1.50 Tc(MIN.) = 18.31
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.) = 18.31
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.536
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) = 10.95
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) = 161.04

A-18

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 18.31
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.536
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) = 12.09
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) = 173.13

A-9

****
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.) =   18.31
  RAINFALL INTENSITY(INCH/HR) =   1.54
  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 =     173.13

****************************************************************************
  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) =  3.045
  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        0.40      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) =      7.57
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      7.57

****************************************************************************
  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) =      12.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
```

A-10


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    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.02
  *   5 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
  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) =    9.01
  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) =      15.47

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.45
  FLOW VELOCITY(FEET/SEC.) =  5.67   DEPTH*VELOCITY(FT*FT/SEC.) =   2.08
  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) =      24.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.59
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.10
  STREET FLOW TRAVEL TIME(MIN.) =   1.41   Tc(MIN.) =    8.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.375
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        5.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.20      0.30     0.900    56
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A-11

A-12

```
  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) =   17.40
  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) =      31.27

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.40
  FLOW VELOCITY(FEET/SEC.) =  4.86   DEPTH*VELOCITY(FT*FT/SEC.) =   2.39
  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  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.97
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.27
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =    9.33
  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.) =    9.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.60      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) =    5.50
  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) =      34.94

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
```

A-13

A-14

```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   34.82
  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) =      69.76

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   17.86
  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) =      87.61

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.243
  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) =    9.79
  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) =      97.41
```

A-15

OA-3

```
****************************************************************************
  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  36.0 INCH PIPE IS  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.39
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.41
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   10.31
  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.) =   10.31
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.121
  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) =   38.65
  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) =     130.42

A-16

****************************************************************************
  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  36.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.62
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     130.42
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   11.12
  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.) =   11.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.032
  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) =   27.51
  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) =     152.13

A-17

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.032
  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) =    5.82
  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) =     157.95

A-17

****************************************************************************
  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.) =   11.12
  RAINFALL INTENSITY(INCH/HR) =   2.03
  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 =     157.95
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1      173.13   18.31    1.536  0.30( 0.07) 0.22      130.8      100.00
     2      157.95   11.12    2.032  0.30( 0.12) 0.40       91.8      110.00

 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      298.64   11.12    2.032  0.30( 0.09) 0.32      171.3      110.00
     2      290.07   18.31    1.536  0.30( 0.09) 0.29      222.6      100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     298.64    Tc(MIN.) =    11.12
 EFFECTIVE AREA(ACRES) =     171.27   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  69.0 INCH PIPE IS  53.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.86
 ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     298.64
 PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   12.21
 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.) =   12.21
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.929
 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) =    8.03
 EFFECTIVE AREA(ACRES) =    175.97   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) =     298.64
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

A-19


```
****************************************************************************
 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.) =   12.21
 RAINFALL INTENSITY(INCH/HR) =   1.93
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     175.97
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     298.64

****************************************************************************
 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) =  2.662
 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) =     14.22
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     14.22

****************************************************************************
 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) =  2.662
 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        0.20      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

A-20

A-20

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.43
  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) =      14.65

****************************************************************************
  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  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.65
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    7.64
  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.) =    7.64
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.510
  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        5.40      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) =   19.52
  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) =      33.29

****************************************************************************
  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  27.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.47
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.29
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    9.14
```

A-21


```
  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.) =    9.14
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   51.01
  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) =      80.94

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.14
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.270
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      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) =   20.56
  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) =     101.51

****************************************************************************
  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)<<<<<
```

A-22

A-22

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.20
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     101.51
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    9.47
  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.) =    9.47
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.225
  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
  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) =    9.51
  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) =     108.87

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.47
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.225
  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        0.20      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) =    0.39
  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) =     109.26

****************************************************************************
  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)<<<<<
============================================================================
```

A-23

A-23


```
  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  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.28
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     109.26
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   10.46
  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.) =   10.46
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.103
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   13.26
  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) =     116.14

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.46
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.103
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.90      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) =   23.80
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
```

A-25

A-25.1

```
 TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     139.94

****************************************************************************
 FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.46                                        A-25.1
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.103
 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       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) =   17.66
 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) =     157.60

****************************************************************************
 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  42.0 INCH PIPE IS  29.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.54
 ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     157.60
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.90
 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.) =   10.90
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.056             A-26
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   32.08
 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) =     185.84

****************************************************************************
 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  51.0 INCH PIPE IS  36.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.10
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     185.84
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   11.49
 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.) =   11.49
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996             A-27
 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
 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) =   34.97
 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) =     214.95

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.49
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996             A-27
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      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
```

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  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    4.63
  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) =     219.58

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.49
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.996
  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        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) =   31.52
  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) =     251.10

****************************************************************************
  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  45.0 INCH PIPE IS  34.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.75
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     251.10
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   11.93
  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.) =   11.93
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.954
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        2.20      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.40      0.30      0.900    56
```

A-28

A-29


```
  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) =    4.41
  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) =     251.10
  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.) =   11.93
  RAINFALL INTENSITY(INCH/HR) =   1.95
  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 =     251.10

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      298.64   12.21    1.929  0.30( 0.09) 0.31     176.0     110.00
      1      290.07   19.40    1.487  0.30( 0.09) 0.29     227.3     100.00
      2      251.10   11.93    1.954  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      546.99   11.93    1.954  0.30( 0.11) 0.37     324.1     120.00
      2      546.35   12.21    1.929  0.30( 0.11) 0.36     328.1     110.00
      3      476.98   19.40    1.487  0.30( 0.10) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     546.99    Tc(MIN.) =    11.93
  EFFECTIVE AREA(ACRES) =     324.14   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.

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  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  81.0 INCH PIPE IS  60.4 INCHES
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PIPE-FLOW VELOCITY(FEET/SEC.) = 19.11
ESTIMATED PIPE DIAMETER(INCH) = 81.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 546.99
PIPE TRAVEL TIME(MIN.) = 1.30 Tc(MIN.) = 13.24
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.) = 13.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843 **A-30**
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) = 10.32
EFFECTIVE AREA(ACRES) = 330.94 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) = 546.99
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.) = 13.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843 **A-31**
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.50	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) = 7.36
EFFECTIVE AREA(ACRES) = 335.64 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) = 546.99
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.) = 13.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843 **A-31**
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) = 21.30
EFFECTIVE AREA(ACRES) = 349.34 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) = 546.99
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.) = 13.24
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.843 **A-31**
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) = 32.76
EFFECTIVE AREA(ACRES) = 369.94 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) = 577.40

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  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.843
  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) =   11.45
  EFFECTIVE AREA(ACRES) =    377.44   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) =     588.85

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  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  72.0 INCH PIPE IS  54.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.60
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     588.85
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   14.40
  LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    9651.00 FEET.

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  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.40
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.758
  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
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A-31

A-32


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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =    9.94
  EFFECTIVE AREA(ACRES) =    384.44   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) =     588.85
  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.) =   14.40
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.758
  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) =   11.22
  EFFECTIVE AREA(ACRES) =    392.34   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) =     588.85
  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
----------------------------------------------------------------------------
  >>>>>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
----------------------------------------------------------------------------
  >>>>>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) =  2.246
  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        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
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0A-4

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.33
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      3.33

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  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.094
  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        4.90      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) =       9.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.69
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   1.23
  Tc(MIN.) =   10.55
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   11.79
  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) =      14.86

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.88   FLOW VELOCITY(FEET/SEC.) =   6.39
  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  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.86
  PIPE TRAVEL TIME(MIN.) =   1.24    Tc(MIN.) =   11.78
  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.) =   11.78
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OA-5


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  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.967
  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        5.10      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) =   13.66
  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) =      27.46

****************************************************************************
  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  39.0 INCH PIPE IS  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.02
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.46
  PIPE TRAVEL TIME(MIN.) =   2.94    Tc(MIN.) =   14.73
  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.) =   14.73
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.736
  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        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "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) =   17.05
  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) =      40.70
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OA-6

OA-7

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****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.73
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.736
  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) =    0.26
  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) =      40.96

****************************************************************************
  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  42.0 INCH PIPE IS  31.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.27
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.96
  PIPE TRAVEL TIME(MIN.) =   2.88    Tc(MIN.) =   17.61
  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.) =   17.61
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.570
  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) =    7.43
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
```

0A-7

0A-8


```
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      43.66

****************************************************************************
  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  27.0 INCH PIPE IS  21.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.00
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.66
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   18.63
  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.) =   18.63
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.521
  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) =   14.40
  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) =      56.38

****************************************************************************
  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  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.84
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.38
```

0A-9

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  PIPE TRAVEL TIME(MIN.) =   6.52    Tc(MIN.) =   25.15
  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       56.38   25.15    1.285  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      588.85   14.40    1.758  0.30( 0.11) 0.37     392.3     120.00
      2      587.83   14.67    1.739  0.30( 0.11) 0.37     396.3     110.00
      3      516.82   21.96    1.387  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      636.63   14.40    1.758  0.30( 0.13) 0.42     421.7     120.00
      2      635.90   14.67    1.739  0.30( 0.13) 0.42     426.2     110.00
      3      571.14   21.96    1.387  0.30( 0.12) 0.41     492.4     100.00
      4      532.11   25.15    1.285  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) =      636.63  Tc(MIN.) =   14.400
  EFFECTIVE AREA(ACRES) =    421.71  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.) =   14.40
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.758
  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
```

A-33


```
  "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) =   11.75
  EFFECTIVE AREA(ACRES) =    430.61   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) =     636.63
  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.) =   14.40
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.758
  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) =    3.20
  EFFECTIVE AREA(ACRES) =    433.01   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) =     636.63
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     14.40
  EFFECTIVE AREA(ACRES) =    433.01  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     636.63

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      636.63   14.40    1.758  0.30( 0.13) 0.43     433.0     120.00
      2      635.90   14.67    1.739  0.30( 0.13) 0.43     437.5     110.00
      3      571.14   21.96    1.387  0.30( 0.13) 0.43     503.7     100.00
      4      532.11   25.15    1.285  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 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 ROMP 2018                                         *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 25-YR EV AUGUST 2018 CCHIU                                           *
 ***********************************************************************

  FILE NAME: PA3A25EV.DAT
  TIME/DATE OF STUDY: 11:59 08/15/2018
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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<<
==============================================================================
  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) =  2.825
  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        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) =      2.50
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.50

******************************************************************************
  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) =  2.636
  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        0.90      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) =       6.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.32
  AVERAGE FLOW DEPTH(FEET) =   0.66   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =   10.62
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    8.85
  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) =      11.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.79   FLOW VELOCITY(FEET/SEC.) =   5.98
  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
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OA-1

OA-2

```
 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) =      13.42
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =    9.97
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.20
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.11
 STREET FLOW TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =   11.33
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.541
 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        1.10      0.30     0.900    56
 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 =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    4.51
 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) =      15.21

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.59
 FLOW VELOCITY(FEET/SEC.) =  6.37   DEPTH*VELOCITY(FT*FT/SEC.) =   2.24
 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) =      25.29
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.44
```

A-1


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   HALFSTREET FLOOD WIDTH(FEET) =   15.35
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.50
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.40
 STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =   12.83
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.366
 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   20.15
 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) =      34.20

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.38
 FLOW VELOCITY(FEET/SEC.) =  5.91   DEPTH*VELOCITY(FT*FT/SEC.) =   2.80
 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  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.47
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.20
 PIPE TRAVEL TIME(MIN.) =   1.80    Tc(MIN.) =   14.63
 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.) =   14.63
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.195
 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
```

A-2

A-3

```
 SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   10.67
 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) =      42.22

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.195                  A-4
 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) =   17.18
 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) =      59.40

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.63
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.195                  A-4
 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) =    3.51
 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) =      62.91

****************************************************************************
 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  23.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.82
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      62.91
 PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   15.60
 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.) =   15.60
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.115                  A-5
 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) =   40.39
 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) =     100.89

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.60
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.115                  A-6
 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) =   45.59
 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) =     146.48

****************************************************************************
 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  45.0 INCH PIPE IS  32.0 INCHES
```

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 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.42
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     146.48
 PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   16.37
 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.) =   16.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.057
 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        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) =   23.15
 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) =     165.48

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.37
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.057
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        7.20      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) =   37.85
 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) =     203.33

****************************************************************************
 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
```

A-8

A-7


```
 DEPTH OF FLOW IN  63.0 INCH PIPE IS  50.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.85
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     203.33
 PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   17.80
 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.) =   17.80
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.961
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        3.50      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) =   14.12
 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) =     207.59

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.80
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.961
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 APARTMENTS                 B        0.40      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) =   15.57
 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) =     223.16

****************************************************************************
 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:
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A-18

A-9

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  TIME OF CONCENTRATION(MIN.) =   17.80
  RAINFALL INTENSITY(INCH/HR) =   1.96
  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 =     223.16

****************************************************************************
  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) =  3.877
  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        0.40      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) =      9.82
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =      9.82

****************************************************************************
  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) =      15.62
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.52
```

A-10


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    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.66
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.09
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    6.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.364
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        2.30      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) =   11.57
  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) =      20.01

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.85
  FLOW VELOCITY(FEET/SEC.) =  6.00   DEPTH*VELOCITY(FT*FT/SEC.) =   2.35
  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) =      31.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.40
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.39
  STREET FLOW TRAVEL TIME(MIN.) =   1.33   Tc(MIN.) =    8.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.042
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        5.00      0.30     0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"          B        2.20      0.30     0.900    56
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A-11

A-12

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  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) =   22.50
  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) =      40.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.43
  FLOW VELOCITY(FEET/SEC.) =  5.17   DEPTH*VELOCITY(FT*FT/SEC.) =   2.72
  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  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.91
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.51
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    9.11
  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.) =    9.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.878
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.60      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) =    7.15
  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) =      45.39

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.878
```

A-13


```
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   45.10
  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) =      90.49

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.878
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   23.29
  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) =     113.78

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.11
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.878
  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) =   12.99
  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) =     126.77
```

A-14

A-15

OA-3

```
****************************************************************************
  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  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.44
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     126.77
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.03
  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.) =   10.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.724
  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) =   49.98
  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) =     169.62

A-16

****************************************************************************
  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  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.95
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     169.62
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =   10.81
  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.) =   10.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.610
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =   35.94
  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) =     198.18

A-17

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.81
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.610
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =    7.54
  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) =     205.72

A-17

****************************************************************************
  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.) =   10.81
  RAINFALL INTENSITY(INCH/HR) =   2.61
  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 =     205.72
```

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1      223.16   17.80    1.961  0.30( 0.07) 0.22      130.8      100.00
     2      205.72   10.81    2.610  0.30( 0.12) 0.40       91.8      110.00

 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      387.57   10.81    2.610  0.30( 0.09) 0.32      171.2      110.00
     2      375.22   17.80    1.961  0.30( 0.09) 0.29      222.6      100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     387.57    Tc(MIN.) =    10.81
 EFFECTIVE AREA(ACRES) =     171.19   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  60.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.68
 ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     387.57
 PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   11.83
 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.) =   11.83
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.479
 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) =   10.36
 EFFECTIVE AREA(ACRES) =    175.89   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) =     387.57
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

A-19


```
****************************************************************************
 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.) =   11.83
 RAINFALL INTENSITY(INCH/HR) =   2.48
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     175.89
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     387.57

****************************************************************************
 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) =  3.381
 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) =     18.23
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     18.23

****************************************************************************
 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) =  3.381
 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        0.20      0.30      0.900    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

A-20

A-20

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.56
  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) =      18.79

****************************************************************************
  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  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.72
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.79
  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) =  3.192
  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        5.40      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) =   25.10
  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) =      42.80

****************************************************************************
  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  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.24
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.80
  PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =    9.01
```

A-21


```
  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.) =    9.01
  *  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        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) =   66.07
  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) =     104.75

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.01
  *  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
  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) =   26.77
  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) =     131.52

****************************************************************************
  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)<<<<<
```

A-22

A-22

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.00  DOWNSTREAM(FEET) =   604.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  36.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.06
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     131.52
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.32
  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.) =    9.32
*  10 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
  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) =   12.23
  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) =     141.11

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.32
*  10 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
  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) =    0.50
  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) =     141.61

****************************************************************************
  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)<<<<<
============================================================================
```

A-23

A-23


```
  ELEVATION DATA: UPSTREAM(FEET) =   604.00  DOWNSTREAM(FEET) =   546.00
  FLOW LENGTH(FEET) =  1271.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.63
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     141.61
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =   10.25
  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.) =   10.25
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   17.27
  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) =     150.92

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.25
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        1.90      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) =   30.98
  EFFECTIVE AREA(ACRES) =     79.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.49
```

A-25

A-25.1

```
  TOTAL AREA(ACRES) =       79.5       PEAK FLOW RATE(CFS) =     181.90

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.25
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.690
  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       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) =   23.04
  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) =     204.95

****************************************************************************
  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  34.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.79
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     204.95
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.66
  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.) =   10.66
  *  10 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
  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) =   41.59
  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) =     241.70

****************************************************************************
  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  54.0 INCH PIPE IS  42.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.98
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     241.70
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   11.23
  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.) =   11.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.554
  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
  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) =   45.22
  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) =     279.49

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.554
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.20      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) =    6.03
  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) =     285.53

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.23
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.554
  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        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) =   40.66
  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) =     326.19

****************************************************************************
  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  51.0 INCH PIPE IS  36.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.90
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     326.19
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   11.64
  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.) =   11.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        2.20      0.30      0.100    56
  RESIDENTIAL
  ".4 DWELLING/ACRE"        B        0.40      0.30      0.900    56
```

A-28

A-29


```
  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) =    5.70
  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) =     326.19
  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.) =   11.64
  RAINFALL INTENSITY(INCH/HR) =   2.50
  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 =     326.19

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      387.57   11.83    2.479  0.30( 0.09) 0.31     175.9     110.00
      1      375.22   18.83    1.899  0.30( 0.09) 0.29     227.3     100.00
      2      326.19   11.64    2.501  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      711.27   11.64    2.501  0.30( 0.11) 0.37     325.2     120.00
      2      710.63   11.83    2.479  0.30( 0.11) 0.36     328.0     110.00
      3      618.61   18.83    1.899  0.30( 0.10) 0.34     379.4     100.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     711.27    Tc(MIN.) =    11.64
  EFFECTIVE AREA(ACRES) =     325.21   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  87.0 INCH PIPE IS  69.3 INCHES
```

PIPE-FLOW VELOCITY(FEET/SEC.) = 20.16
ESTIMATED PIPE DIAMETER(INCH) = 87.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 711.27
PIPE TRAVEL TIME(MIN.) = 1.23 Tc(MIN.) = 12.88
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.) = 12.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361 **A-30**
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) = 13.49
EFFECTIVE AREA(ACRES) = 332.01 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) = 711.27
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.) = 12.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361 **A-31**
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.50	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) = 9.55
EFFECTIVE AREA(ACRES) = 336.71 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) = 711.27
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.) = 12.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361 **A-31**
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) = 27.68
EFFECTIVE AREA(ACRES) = 350.41 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) = 711.27
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.) = 12.88
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.361 **A-31**
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) = 42.36
EFFECTIVE AREA(ACRES) = 371.01 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) = 752.04

```
****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.88
  *  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
  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) =   14.95
  EFFECTIVE AREA(ACRES) =    378.51   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) =     766.99

****************************************************************************
  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  78.0 INCH PIPE IS  62.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.11
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     766.99
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =   13.97
  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.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  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
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A-31

A-32


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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.598
  SUBAREA AREA(ACRES) =    7.00      SUBAREA RUNOFF(CFS) =   13.06
  EFFECTIVE AREA(ACRES) =    385.51   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) =     766.99
  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.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  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) =   14.74
  EFFECTIVE AREA(ACRES) =    393.41   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) =     766.99
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.843
  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        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
```

A-32

0A-4

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  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) =  2.659
  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        4.90      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) =      12.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.10
  AVERAGE FLOW DEPTH(FEET) =   0.81   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =   10.46
  SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   15.50
  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) =      19.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   6.87
  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  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.53
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   11.62
  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.) =   11.62
```

0A-5


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  *  10 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
  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) =   18.05
  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) =      36.30

****************************************************************************
  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  45.0 INCH PIPE IS  31.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.37
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.30
  PIPE TRAVEL TIME(MIN.) =   2.71    Tc(MIN.) =   14.33
  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.) =   14.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  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        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "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) =   22.81
  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) =      54.44
```

0A-6

0A-7

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****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.33
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.220
  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) =    0.35
  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) =      54.79

****************************************************************************
  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  48.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.71
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.79
  PIPE TRAVEL TIME(MIN.) =   2.65    Tc(MIN.) =   16.99
  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.) =   16.99
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.014
  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) =   10.03
  EFFECTIVE AREA(ACRES) =     38.20   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  1.00
```

OA-7

OA-8


```
  TOTAL AREA(ACRES) =       38.2       PEAK FLOW RATE(CFS) =      58.94

****************************************************************************
  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  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.96
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.94
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   17.94
  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.) =   17.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.953
  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) =   19.48
  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) =      76.30

****************************************************************************
  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  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.02
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.30
```

OA-9

```
  PIPE TRAVEL TIME(MIN.) =   6.07    Tc(MIN.) =   24.00
  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       76.30   24.00    1.652  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      766.99   13.97    2.253  0.30( 0.11) 0.37     393.4     120.00
      2      766.00   14.16    2.236  0.30( 0.11) 0.37     396.2     110.00
      3      671.89   21.22    1.773  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      831.13   13.97    2.253  0.30( 0.13) 0.42     423.3     120.00
      2      830.43   14.16    2.236  0.30( 0.13) 0.42     426.5     110.00
      3      745.38   21.22    1.773  0.30( 0.12) 0.41     493.0     100.00
      4      699.51   24.00    1.652  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) =      831.13  Tc(MIN.) =   13.973
  EFFECTIVE AREA(ACRES) =    423.27  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.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  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
```

A-33


```
  "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) =   15.71
  EFFECTIVE AREA(ACRES) =    432.17   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) =     831.13
  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.) =   13.97
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.253
  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) =    4.27
  EFFECTIVE AREA(ACRES) =    434.57   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) =     831.13
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.97
  EFFECTIVE AREA(ACRES) =    434.57  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     831.13

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      831.13   13.97    2.253  0.30( 0.13) 0.43     434.6     120.00
      2      830.43   14.16    2.236  0.30( 0.13) 0.43     437.8     110.00
      3      746.53   21.22    1.773  0.30( 0.13) 0.43     504.3     100.00
      4      699.51   24.00    1.652  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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             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 ROMP 2018                                        *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 50-YR EV AUGUST 2018 CCHIU                                          *
 **********************************************************************

  FILE NAME: PA3A50EV.DAT
  TIME/DATE OF STUDY: 11:59 08/15/2018
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.178
  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        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) =      2.85
  TOTAL AREA(ACRES) =      1.10   PEAK FLOW RATE(CFS) =      2.85

**************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.937
  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        0.90      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) =       7.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.47
  AVERAGE FLOW DEPTH(FEET) =   0.69   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   10.59
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    9.99
  EFFECTIVE AREA(ACRES) =      5.30     AREA-AVERAGED Fm(INCH/HR) =   0.30
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.99
```

OA-1

OA-2

```
 TOTAL AREA(ACRES) =        5.3         PEAK FLOW RATE(CFS) =      12.60

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   6.14
 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) =      15.15
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.35
   HALFSTREET FLOOD WIDTH(FEET) =   10.59
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.34
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.23
 STREET FLOW TRAVEL TIME(MIN.) =   0.69   Tc(MIN.) =   11.28
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.851
 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        1.10      0.30     0.900    56
 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 =  0.519
 SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    5.09
 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) =      17.28

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.21
 FLOW VELOCITY(FEET/SEC.) =  6.57   DEPTH*VELOCITY(FT*FT/SEC.) =   2.38
 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
```

A-1


```
 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) =      28.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.45
   HALFSTREET FLOOD WIDTH(FEET) =   16.21
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.65
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.55
 STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =   12.74
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.671
 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.271
 SUBAREA AREA(ACRES) =    9.80      SUBAREA RUNOFF(CFS) =   22.84
 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) =      38.92

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.32
 FLOW VELOCITY(FEET/SEC.) =  6.10   DEPTH*VELOCITY(FT*FT/SEC.) =   2.99
 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  17.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.14
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      38.92
 PIPE TRAVEL TIME(MIN.) =   1.72    Tc(MIN.) =   14.45
 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
```

A-2

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------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.458
  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) =   12.00
  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) =      47.62

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.458
  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) =   19.36
  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) =      66.98

******************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   14.45
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.458
  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
```

A-3

A-4

A-4


```
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    3.93
  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) =      70.92

******************************************************************************
  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  26.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.92
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   15.41
  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.) =   15.41
  *  15 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
  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) =   45.16
  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) =     113.11

******************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   15.41
  *  15 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
  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
```

A-5

A-6

SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.131
SUBAREA AREA(ACRES) = 24.40 SUBAREA RUNOFF(CFS) = 50.97
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) = 164.09

****
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 35.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 17.65
ESTIMATED PIPE DIAMETER(INCH) = 45.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 164.09
PIPE TRAVEL TIME(MIN.) = 0.76 Tc(MIN.) = 16.17
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.) = 16.17
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.306
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	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) = 25.99
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) = 186.13

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 16.17
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.306
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	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

A-8

A-7

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) = 42.52
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) = 228.65

****
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 53.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.19
ESTIMATED PIPE DIAMETER(INCH) = 66.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 228.65
PIPE TRAVEL TIME(MIN.) = 1.39 Tc(MIN.) = 17.56
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.) = 17.56
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.205
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) = 15.95
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) = 234.39

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 17.56
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.205
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

A-18

A-9

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  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) =   17.57
  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) =     251.96

****************************************************************************
  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.) =   17.56
  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 =     251.96

****************************************************************************
  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
*  15 YEAR RAINFALL INTENSITY(INCH/HR) =  4.321
  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        0.40      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) =     11.02
  TOTAL AREA(ACRES) =      3.00   PEAK FLOW RATE(CFS) =     11.02

****************************************************************************
  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
```

A-10


```
  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) =      17.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.21
  STREET FLOW TRAVEL TIME(MIN.) =   1.48   Tc(MIN.) =    6.90
*  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.896
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        2.30      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) =   13.44
  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) =      23.31

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.71
  FLOW VELOCITY(FEET/SEC.) =  6.23   DEPTH*VELOCITY(FT*FT/SEC.) =   2.54
  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
```

A-11

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  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      36.44
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.51
  HALFSTREET FLOOD WIDTH(FEET) =   19.57
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.04
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.58
 STREET FLOW TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    8.19
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.528
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        5.00      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) =   26.22
 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) =      47.25

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  21.68
 FLOW VELOCITY(FEET/SEC.) =  5.38   DEPTH*VELOCITY(FT*FT/SEC.) =   2.96
 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  21.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.20
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.25
 PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    9.01
 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.) =    9.01
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.293
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.60      0.30     0.100    56
 PUBLIC PARK                B        0.20      0.30     0.850    56
 RESIDENTIAL
```

A-12

A-13


```
 ".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) =    8.24
 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) =      52.22

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.01
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.293
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        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) =   51.82
 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) =     104.05

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.01
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.293
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        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) =   26.83
 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) =     130.88

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

A-14

A-15

MAINLINE Tc(MIN.) = 9.01
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 3.293

OA-3

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	5.30	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) = 15.08
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) = 145.96

****
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 30.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 19.26
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 145.96
PIPE TRAVEL TIME(MIN.) = 0.88 Tc(MIN.) = 9.89
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.) = 9.89
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 3.041

A-16

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	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) = 55.95
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) = 190.26

****
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 31.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 24.98
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 190.26
PIPE TRAVEL TIME(MIN.) = 0.74 Tc(MIN.) = 10.63
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.) = 10.63
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.932

A-17

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	3.10	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) = 40.62
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) = 223.77

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

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 10.63
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.932

A-17

SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.70	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) = 8.49
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) = 232.26

****

```
 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.) =   10.63
 RAINFALL INTENSITY(INCH/HR) =   2.93
 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 =     232.26

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      251.96   17.56    2.205  0.30( 0.07) 0.22     130.8     100.00
     2      232.26   10.63    2.932  0.30( 0.12) 0.40      91.8     110.00

 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      436.54   10.63    2.932  0.30( 0.09) 0.32     171.0     110.00
     2      424.23   17.56    2.205  0.30( 0.09) 0.29     222.6     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     436.54    Tc(MIN.) =    10.63
 EFFECTIVE AREA(ACRES) =     170.99   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  78.0 INCH PIPE IS  63.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.07
 ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     436.54
 PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   11.63
 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.) =   11.63
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.808
 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) =   11.75
 EFFECTIVE AREA(ACRES) =    175.69   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) =     436.54
 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<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.63
 RAINFALL INTENSITY(INCH/HR) =   2.81
 AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.31
 EFFECTIVE STREAM AREA(ACRES) =     175.69
 TOTAL STREAM AREA(ACRES) =     227.30
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     436.54

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.902
 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) =     21.14
```

```
 TOTAL AREA(ACRES) =      6.20   PEAK FLOW RATE(CFS) =     21.14

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.902
 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        0.20      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) =    0.65
 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) =      21.79

****************************************************************************
 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  15.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.26
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.79
 PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.57
 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.) =    7.57
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.705
 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        5.40      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) =   29.30
 EFFECTIVE AREA(ACRES) =     15.50   AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.41
```

A-20

A-21


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 TOTAL AREA(ACRES) =       15.5       PEAK FLOW RATE(CFS) =      49.96

****************************************************************************
 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  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.53
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      49.96
 PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =    8.94
 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.) =    8.94
 *  15 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
 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) =   76.08
 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) =     120.57

****************************************************************************
 FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.94
 *  15 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
 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
```

A-22

A-22

```
  ".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) =   30.89
  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) =     151.47

****************************************************************************
  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  51.0 INCH PIPE IS  41.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.22
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     151.47
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.24
  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.) =    9.24
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  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
  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) =   13.92
  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) =     161.24

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.24
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
```

A-23


```
  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) =    0.57
  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) =     161.81

****************************************************************************
  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  39.0 INCH PIPE IS  30.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.98
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     161.81
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   10.16
  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.) =   10.16
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.990
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                  B        0.50      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) =   19.32
  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) =     168.70

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.16
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.990
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

A-25

A-25.1

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) = 34.65
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) = 203.34

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

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

MAINLINE Tc(MIN.) = 10.16
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.990

A-25.1

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) = 25.79
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) = 229.14

****
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)<<<<<
==========

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 34.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 23.61
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 229.14
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 10.56
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.) = 10.56
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.940

A-26

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) = 46.73
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) = 271.90

****
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 57.0 INCH PIPE IS 43.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 18.61
ESTIMATED PIPE DIAMETER(INCH) = 57.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 271.90
PIPE TRAVEL TIME(MIN.) = 0.54 Tc(MIN.) = 11.10
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.) = 11.10
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.873

A-27

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) = 51.08
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) = 316.42

****

```
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.10
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.873
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        1.20      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) =    6.84
 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) =     323.26

****************************************************************************
 FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.10
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.873
 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        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) =   45.89
 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) =     369.15

****************************************************************************
 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  51.0 INCH PIPE IS  40.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  30.27
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     369.15
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   11.51
```

A-27

A-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.) =   11.51
 *  15 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                 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) =    6.45
 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) =     369.15
 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.) =   11.51
 RAINFALL INTENSITY(INCH/HR) =   2.82
 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 =     369.15

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      436.54   11.63    2.808  0.30( 0.09) 0.31     175.7     110.00
     1      424.23   18.56    2.134  0.30( 0.09) 0.29     227.3     100.00
     2      369.15   11.51    2.822  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      803.63   11.51    2.822  0.30( 0.11) 0.37     326.0     120.00
     2      803.72   11.63    2.808  0.30( 0.11) 0.36     327.8     110.00
     3      699.01   18.56    2.134  0.30( 0.10) 0.34     379.4     100.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

A-29

PEAK FLOW RATE(CFS) = 803.72 Tc(MIN.) = 11.63
EFFECTIVE AREA(ACRES) = 327.79 AREA-AVERAGED Fm(INCH/HR) = 0.11
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.36
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 70.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 20.99
ESTIMATED PIPE DIAMETER(INCH) = 93.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 803.72
PIPE TRAVEL TIME(MIN.) = 1.19 Tc(MIN.) = 12.81
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.) = 12.81
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661
SUBAREA LOSS RATE DATA(AMC II):

A-30

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) = 15.32
EFFECTIVE AREA(ACRES) = 334.59 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) = 803.72
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.) = 12.81
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661
SUBAREA LOSS RATE DATA(AMC II):

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

COMMERCIAL	B	2.50	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) = 10.82
EFFECTIVE AREA(ACRES) = 339.29 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) = 803.72
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.) = 12.81
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.661
SUBAREA LOSS RATE DATA(AMC II):

A-31

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) = 31.38
EFFECTIVE AREA(ACRES) = 352.99 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) = 810.26

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	810.75	12.70	2.675	0.30(0.11)	0.37	351.2	120.00
2	810.26	12.81	2.661	0.30(0.11)	0.37	353.0	110.00
3	706.44	19.79	2.045	0.30(0.10)	0.35	404.6	100.00

NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) = 810.75 Tc(MIN.) = 12.70
AREA-AVERAGED Fm(INCH/HR) = 0.11 AREA-AVERAGED Fp(INCH/HR) = 0.30
AREA-AVERAGED Ap = 0.37 EFFECTIVE AREA(ACRES) = 351.24

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

```
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.70
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.675
  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        4.40      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) =   48.19
  EFFECTIVE AREA(ACRES) =    371.84   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) =     858.95

********************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   12.70
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.675
  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) =   17.07
  EFFECTIVE AREA(ACRES) =    379.34   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) =     876.02

********************************************************************************
  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  62.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.33
```

A-31

A-31


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  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     876.02
  PIPE TRAVEL TIME(MIN.) =   1.05    Tc(MIN.) =   13.75
  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.) =   13.75
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.545
  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) =   14.90
  EFFECTIVE AREA(ACRES) =    386.34   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) =     876.02
  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.) =   13.75
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.545
  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) =   16.82
  EFFECTIVE AREA(ACRES) =    394.24   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) =     876.02
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

********************************************************************************
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A-32

A-32

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 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.207
 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        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) =      4.97
 TOTAL AREA(ACRES) =      1.90   PEAK FLOW RATE(CFS) =      4.97

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
 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        4.90      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) =      13.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.30
 AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   1.11
 Tc(MIN.) =   10.43
 SUBAREA AREA(ACRES) =     7.30       SUBAREA RUNOFF(CFS) =   17.46
 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) =      22.00
```

0A-4

0A-5


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 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.02   FLOW VELOCITY(FEET/SEC.) =   7.06
 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  18.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.39
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      22.00
 PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   11.56
 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.) =   11.56
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.817
 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        5.10      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) =   20.61
 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) =      41.46

****************************************************************************
 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  45.0 INCH PIPE IS  35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      41.46
 PIPE TRAVEL TIME(MIN.) =   2.67    Tc(MIN.) =   14.23
 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
----------------------------------------------------------------------------
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0A-6

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  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.23
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.486
  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        0.30      0.30     1.000    63
  NATURAL FAIR COVER
  "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) =   25.97
  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) =      61.97

********************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   14.23
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.486
  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) =    0.39
  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) =      62.36

********************************************************************************
  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  48.0 INCH PIPE IS  38.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.79
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.36
  PIPE TRAVEL TIME(MIN.) =   2.62    Tc(MIN.) =   16.84
```

0A-7

0A-7


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  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.) =   16.84
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.257
  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) =   11.45
  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) =      67.29

********************************************************************************
  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  23.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.29
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =   17.75
  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.) =   17.75
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.192
  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
```

0A-8

0A-9

```
  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) =   22.31
  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) =      87.36

****************************************************************************
  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  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.29
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.36
  PIPE TRAVEL TIME(MIN.) =   5.98    Tc(MIN.) =   23.72
  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       87.36   23.72    1.851  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      876.02   13.75    2.545  0.30( 0.11) 0.37     394.2     120.00
      2      875.16   13.87    2.531  0.30( 0.11) 0.37     396.0     110.00
      3      757.54   20.89    1.987  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      949.30   13.75    2.545  0.30( 0.13) 0.42     424.0     120.00
      2      948.59   13.87    2.531  0.30( 0.13) 0.42     426.0     110.00
      3      841.22   20.89    1.987  0.30( 0.12) 0.41     492.8     100.00
      4      790.20   23.72    1.851  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) =      949.30  Tc(MIN.) =   13.750
  EFFECTIVE AREA(ACRES) =    423.98  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.) =   13.75
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.545
  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) =   18.05
  EFFECTIVE AREA(ACRES) =    432.88   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) =     949.30
  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.) =   13.75
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.545
  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) =    4.90
```

```
  EFFECTIVE AREA(ACRES) =    435.28   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) =     949.30
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      510.2  TC(MIN.) =     13.75
  EFFECTIVE AREA(ACRES) =    435.28  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     949.30

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      949.30   13.75    2.545  0.30( 0.13) 0.43     435.3     120.00
      2      948.59   13.87    2.531  0.30( 0.13) 0.43     437.3     110.00
      3      843.42   20.89    1.987  0.30( 0.13) 0.43     504.1     100.00
      4      790.36   23.72    1.851  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)
        (c) Copyright 1983-2013 Advanced Engineering Software (aes)
            Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-3 BODR 2022 - SUBWATERSHED B                                 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 100-YR EV JULY 2022 ROKAMOTO                                        *
 **********************************************************************

  FILE NAME: PA3B00EV.DAT
  TIME/DATE OF STUDY: 10:33 07/13/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  4.268
  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        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      5.68
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.68

**************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   2.06   Tc(MIN.) =    8.26
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.630
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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
```

B-5

B-6

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  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =   10.33
  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) =      15.14

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.85
  FLOW VELOCITY(FEET/SEC.) =  4.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
  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) =      19.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.35
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.87
  STREET FLOW TRAVEL TIME(MIN.) =   1.48   Tc(MIN.) =    9.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS 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) =      21.63
```

B-7


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  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.74
  FLOW VELOCITY(FEET/SEC.) =  4.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.99
  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.) =    9.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  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        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS 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) =      33.70
```

B-8

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  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        2.60      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) =   36.63
  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) =      70.33

****************************************************************************
  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  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) =      70.33
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   11.25
  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.) =   11.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.048
  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) =   15.13
  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) =      79.62

****************************************************************************
  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  42.0 INCH PIPE IS  29.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.01
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.62
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   12.80
  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<<<<<
============================================================================
```

B-9


```
  MAINLINE Tc(MIN.) =   12.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.834
  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) =   14.87
  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) =      88.53

****************************************************************************
  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  51.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.53
  PIPE TRAVEL TIME(MIN.) =   2.07    Tc(MIN.) =   14.87
  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.) =   14.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.603
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    7.06
  EFFECTIVE AREA(ACRES) =     40.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
```

B-10

B-11

```
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.60
  TOTAL AREA(ACRES) =       40.3       PEAK FLOW RATE(CFS) =      88.53
  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  32.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.94
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.53
  PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   16.33
  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.) =   16.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.468
  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
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
  SUBAREA AREA(ACRES) =    5.80      SUBAREA RUNOFF(CFS) =   12.61
  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) =      95.61

****************************************************************************
  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  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.86
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.61
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   16.72
```

B-12


```
  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.) =   16.72
  RAINFALL INTENSITY(INCH/HR) =   2.44
  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 =      95.61

****************************************************************************
  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) =  3.595
  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
  "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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      5.41
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      5.41

****************************************************************************
  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  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.41
  PIPE TRAVEL TIME(MIN.) =   1.44    Tc(MIN.) =    9.84
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
```

B-14

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.84                                    B-15
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.287
 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) =   12.49
 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) =      17.43

****************************************************************************
 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  24.0 INCH PIPE IS  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.79
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      17.43
 PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   11.06
 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.) =   11.06
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.078             B-16
 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) =   20.64
 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) =      36.94
```



```
****************************************************************************
 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  33.0 INCH PIPE IS  22.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.45
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      36.94
 PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   12.53
 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.) =   12.53
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.868             B-17
 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) =   40.39
 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) =      74.76

****************************************************************************
 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  24.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.71
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      74.76
 PIPE TRAVEL TIME(MIN.) =   1.06    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) =  2.739
 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) =   78.31
 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) =     149.60

****************************************************************************
 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) =  2.739
 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) =    0.71
 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) =     150.30

****************************************************************************
 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  41.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.46
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
```

B-18

B-18


```
 PIPE-FLOW(CFS) =     150.30
 PIPE TRAVEL TIME(MIN.) =   1.77    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) =  2.555
 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) =   22.87
 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) =     162.69

****************************************************************************
 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  38.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.22
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     162.69
 PIPE TRAVEL TIME(MIN.) =   2.47    Tc(MIN.) =   17.83
 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.) =   17.83
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.349
 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
```

B-21

B-23

```
  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) =   28.35
  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) =     177.34

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.349
  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) =   62.16
  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) =     239.50

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.349
  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) =   18.65
```

B-23

B-23


```
  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) =     258.15

****************************************************************************
  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  44.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.63
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     258.15
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   19.08
  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.) =   19.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.260
  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) =   10.21
  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) =     258.22

****************************************************************************
  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.) =   19.08
  RAINFALL INTENSITY(INCH/HR) =   2.26
  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 =     258.22
```

B-27

```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)     NODE
     1       95.61   16.72    2.436  0.30( 0.16) 0.55      46.1      203.00
     2      258.22   19.08    2.260  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      340.27   16.72    2.436  0.30( 0.12) 0.40     162.6      203.00
     2      346.44   19.08    2.260  0.30( 0.12) 0.40     179.1      210.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     346.44    Tc(MIN.) =    19.08
 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  36.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  36.51
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     346.44
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   19.26
 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.) =   19.26
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.249
 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
```

B-28


```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
 SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =   28.75
 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) =     372.04

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.26
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.249
 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) =   29.67
 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) =     401.71
```

B-28

```
****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.26
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.249
 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        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) =    6.17
 EFFECTIVE AREA(ACRES) =    213.70   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) =     407.88
============================================================================
 END OF STUDY SUMMARY:
```

TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 19.26
EFFECTIVE AREA(ACRES) = 213.70 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.427
PEAK FLOW RATE(CFS) = 407.88

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	406.77	16.90	2.421	0.30(0.13)	0.43	197.2	203.00
2	407.88	19.26	2.249	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 BODR 2022 - SUBWATERSHED B                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 2-YR EV SEPT 2022 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: PA3B02EV.DAT
  TIME/DATE OF STUDY: 07:25 09/18/2022
============================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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    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) =  1.470
  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                 -        0.30      0.60      0.100     0    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.60      0.200     0    6.61
  RESIDENTIAL
  ".4 DWELLING/ACRE"         -        0.10      0.60      0.900     0    9.94
  COMMERCIAL                 -        0.30      0.60      0.100     0    6.21
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.60      0.60      0.200     0    6.61
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      1.82
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.82

****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    5.53
```

B-5

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.88
STREET FLOW TRAVEL TIME(MIN.) =   2.55   Tc(MIN.) =    8.76
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.194
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     0.100     -
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) =    2.63
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) =       4.08

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   6.66
FLOW VELOCITY(FEET/SEC.) =  3.46   DEPTH*VELOCITY(FT*FT/SEC.) =   0.97
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) =       4.92
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.30
  HALFSTREET FLOOD WIDTH(FEET) =    7.97
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.23
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.99
STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =   10.75
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.027
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              -        0.40      0.60     0.100     -
USER-DEFINED              -        0.10      0.60     0.200     -
USER-DEFINED              -        0.30      0.60     0.200     -
```

B-6

B-7


```
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) =    1.68
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) =       5.04

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.09
FLOW VELOCITY(FEET/SEC.) =  3.24   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
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.) =   10.75
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.027
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     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) =    3.54
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) =       8.58

****************************************************************************
FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.75
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.027
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED              -        2.60      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) =    5.88
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) =      14.45

****************************************************************************
```

B-8

B-8

```
 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  13.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.13
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.45
 PIPE TRAVEL TIME(MIN.) =   2.22    Tc(MIN.) =   12.97
 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.) =   12.97
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.929
 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) =    3.29
 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) =      15.53

****************************************************************************
 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  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.53
 PIPE TRAVEL TIME(MIN.) =   2.31    Tc(MIN.) =   15.27
 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.) =   15.27
```

B-9

B-10

```
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.833
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        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) =    2.77
 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) =      15.63

****************************************************************************
 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  27.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.80
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.63
 PIPE TRAVEL TIME(MIN.) =   3.18    Tc(MIN.) =   18.45
 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.) =   18.45
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.757
 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) =    1.32
 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) =      15.63
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
 FLOW PROCESS FROM NODE    209.00 TO NODE    209.10 IS CODE =  31
----------------------------------------------------------------------------
```

B-11

```
  >>>>>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  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.63
  PIPE TRAVEL TIME(MIN.) =   2.20    Tc(MIN.) =   20.65
  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.) =   20.65                                    B-12
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.708
  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) =    3.15
  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) =      15.78

****************************************************************************
  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  27.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.78
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   21.25
  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.) =   21.25
```



```
  RAINFALL INTENSITY(INCH/HR) =   0.70
  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 =      15.78

****************************************************************************
  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
                                                                 B-14
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.407
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.232
  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     0    8.41
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.20      0.60     0.200     0    8.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.70
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      1.70

****************************************************************************
  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
  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.) =   3.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.70
  PIPE TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =   10.34
  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.) =   10.34                                    B-15
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.045
  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) =    3.58
  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) =       5.00

****************************************************************************
  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   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.00
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   11.98
  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.) =   11.98                                    B-16
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.973
  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) =    5.83
  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) =      10.44

****************************************************************************
  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  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.44
  PIPE TRAVEL TIME(MIN.) =   2.01    Tc(MIN.) =   13.99
```



```
  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.) =   13.99                                    B-17
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.884
  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) =    9.62
  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) =      18.98

****************************************************************************
  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  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.31
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.98
  PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =   15.47
  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.) =   15.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.829                B-18
  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) =   17.31
  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) =      34.80

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.47                                    B-18
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.829
  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) =    0.16
  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) =      34.96

****************************************************************************
  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  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.09
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.96
  PIPE TRAVEL TIME(MIN.) =   2.51    Tc(MIN.) =   17.98
  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.) =   17.98                                    B-21
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.769
  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) =    5.89
  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) =      37.40
```



```
****************************************************************************
  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  21.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.91
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.40
  PIPE TRAVEL TIME(MIN.) =   3.54    Tc(MIN.) =   21.52
  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.) =   21.52                                    B-23
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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) =    3.72
  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) =      37.40
  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.) =   21.52                                    B-23
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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) =   15.48
  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) =      51.56

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.52
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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) =    3.79
  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) =      55.35

****************************************************************************
  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  33.0 INCH PIPE IS  25.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.23
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.35
  PIPE TRAVEL TIME(MIN.) =   1.85    Tc(MIN.) =   23.36
  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.) =   23.36
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.659
  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) =    2.69
  EFFECTIVE AREA(ACRES) =    133.00   AREA-AVERAGED Fm(INCH/HR) =  0.21
```

B-23

B-27


```
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      133.0       PEAK FLOW RATE(CFS) =      55.35
  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.) =   23.36
  RAINFALL INTENSITY(INCH/HR) =   0.66
  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 =      55.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1       15.78   21.25    0.697  0.60( 0.33) 0.55      46.1     203.00
      2       55.35   23.36    0.659  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1       70.35   21.25    0.697  0.60( 0.24) 0.40     167.1     203.00
      2       69.51   23.36    0.659  0.60( 0.24) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      70.35    Tc(MIN.) =    21.25
  EFFECTIVE AREA(ACRES) =     167.09   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  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.18
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.35
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   21.51
  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.) =   21.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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               -        4.60      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.253
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =    7.16
  EFFECTIVE AREA(ACRES) =    181.79   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) =      75.24

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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      0.60     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.875
  SUBAREA AREA(ACRES) =   16.60      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =    198.39   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) =      77.75

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.51
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.693
  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     0.500     -
  USER-DEFINED               -        0.10      0.60     1.000     -
```

B-28

B-28

B-28


```
  USER-DEFINED               -        0.40      0.60     1.000     -
  USER-DEFINED               -        2.30      0.60     0.500     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.576
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    1.03
  EFFECTIVE AREA(ACRES) =    201.69   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) =      78.78
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     21.51
  EFFECTIVE AREA(ACRES) =    201.69  AREA-AVERAGED Fm(INCH/HR)=  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.431
  PEAK FLOW RATE(CFS)   =      78.78

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       78.78   21.51    0.693  0.60( 0.26) 0.43     201.7     203.00
      2       76.73   23.62    0.655  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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-3 BODR 2022 - SUBWATERSHED B                                 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 5-YR EV JULY 2022 ROKAMOTO                                          *
 **********************************************************************

  FILE NAME: PA3B05EV.DAT
  TIME/DATE OF STUDY: 16:28 07/13/2022
==========================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  2.018
  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                 -        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      2.59
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      2.59

**************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.28
```

B-5

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.55
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
STREET FLOW TRAVEL TIME(MIN.) =   2.42   Tc(MIN.) =    8.63
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.694
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     0.100     -
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) =    4.27
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) =       6.42

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.59
FLOW VELOCITY(FEET/SEC.) =  3.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.19
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) =       7.91
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.34
  HALFSTREET FLOOD WIDTH(FEET) =   10.12
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.57
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
STREET FLOW TRAVEL TIME(MIN.) =   1.80   Tc(MIN.) =   10.43
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
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              -        0.40      0.50     0.100     -
USER-DEFINED              -        0.10      0.50     0.200     -
USER-DEFINED              -        0.30      0.50     0.200     -
```

B-6

B-7


```
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) =    2.98
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) =       8.49

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.26
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.) =   10.43
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
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              -        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) =    5.26
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) =      13.75

****************************************************************************
FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.43
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.483
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
USER-DEFINED              -        2.60      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) =   12.46
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) =      26.21

****************************************************************************
```

B-8

B-8

```
 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  24.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      26.21
 PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   12.38
 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.) =   12.38
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.363                    B-9
 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) =    5.81
 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) =      29.29

****************************************************************************
 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  19.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.63
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.29
 PIPE TRAVEL TIME(MIN.) =   1.97    Tc(MIN.) =   14.35
 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.) =   14.35
```


B-10

```
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.240
 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) =    5.36
 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) =      31.25

****************************************************************************
 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  36.0 INCH PIPE IS  25.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.25
 PIPE TRAVEL TIME(MIN.) =   2.65    Tc(MIN.) =   17.00
 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.) =   17.00                                    B-11
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.128
 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) =    2.53
 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) =      31.25
 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  20.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.58
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.25
  PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =   18.86
  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.) =   18.86                                    B-12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.061
  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) =    5.08
  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) =      32.67

****************************************************************************
  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  33.0 INCH PIPE IS  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.67
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   19.37
  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.) =   19.37
```



```
  RAINFALL INTENSITY(INCH/HR) =   1.04
  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 =      32.67

****************************************************************************
  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          B-14
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.723
  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) =      2.48
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      2.48

****************************************************************************
  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
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =   10.14
  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.) =   10.14                                    B-15
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.501
  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) =    5.42
  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) =       7.57

****************************************************************************
  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  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.57
  PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   11.63
  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.) =   11.63                                    B-16
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.409
  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) =    8.95
  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) =      16.02

****************************************************************************
  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  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.02
  PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =   13.45
  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.) =   13.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.296                B-17
  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) =   16.22
  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) =      30.86

****************************************************************************
  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  24.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.64
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.86
  PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   14.77
  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.) =   14.77
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214                B-18
  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) =   30.11
```

```
  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) =      58.76

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.77
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.214
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.30      SUBAREA RUNOFF(CFS) =    0.27
  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) =      59.04
```

B-18

```
****************************************************************************
  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  39.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.15
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      59.04
  PIPE TRAVEL TIME(MIN.) =   2.22    Tc(MIN.) =   16.99
  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.) =   16.99
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.128
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.212
  SUBAREA AREA(ACRES) =   10.20      SUBAREA RUNOFF(CFS) =    9.39
  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) =      63.52
```

B-21


```
****************************************************************************
  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  36.0 INCH PIPE IS  26.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.26
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      63.52
  PIPE TRAVEL TIME(MIN.) =   3.12    Tc(MIN.) =   20.11
  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.) =   20.11
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.017
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.686
  SUBAREA AREA(ACRES) =   14.70      SUBAREA RUNOFF(CFS) =    8.92
  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) =      65.08
```

B-23

```
****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.11
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.017
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.205
  SUBAREA AREA(ACRES) =   30.20      SUBAREA RUNOFF(CFS) =   24.86
  EFFECTIVE AREA(ACRES) =    118.60   AREA-AVERAGED Fm(INCH/HR) =  0.17
```

B-23

```
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      118.6       PEAK FLOW RATE(CFS) =      89.95

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.11                                    B-23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.017
  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     0.400     -
  USER-DEFINED              -        1.40      0.50     0.400     -
  USER-DEFINED              -        7.40      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) =    9.30      SUBAREA RUNOFF(CFS) =    6.84
  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) =      96.79

****************************************************************************
  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  30.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.06
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.79
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   21.69
  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.) =   21.69                                    B-27
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.979
  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      0.50     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.124
  SUBAREA AREA(ACRES) =    5.10      SUBAREA RUNOFF(CFS) =    4.21
  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) =      96.79
```



```
  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.) =   21.69
  RAINFALL INTENSITY(INCH/HR) =   0.98
  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 =      96.79

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1       32.67   19.37    1.043  0.50( 0.27) 0.55      46.1     203.00
      2       96.79   21.69    0.979  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1      125.87   19.37    1.043  0.50( 0.20) 0.40     164.9     203.00
      2      126.77   21.69    0.979  0.50( 0.20) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     126.77    Tc(MIN.) =    21.69
  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  22.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.07
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     126.77
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =   21.92
  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.) =   21.92                                        B-28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.974
  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) =   11.21
  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) =     136.24

******************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   21.92                                        B-28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.974
  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) =    8.01
  EFFECTIVE AREA(ACRES) =    210.40   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =      210.4       PEAK FLOW RATE(CFS) =     144.25

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      144.68   19.59    1.035  0.50( 0.22) 0.43     196.2     203.00
      2      144.25   21.92    0.974  0.50( 0.21) 0.42     210.4     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     144.68  Tc(MIN.) =   19.59
  AREA-AVERAGED Fm(INCH/HR) =  0.22  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.43  EFFECTIVE AREA(ACRES) =     196.15

******************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
==============================================================================
  MAINLINE Tc(MIN.) =   19.59                                        B-28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.035
  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) =    2.22
  EFFECTIVE AREA(ACRES) =    199.45   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) =     146.90
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     19.59
  EFFECTIVE AREA(ACRES) =    199.45  AREA-AVERAGED Fm(INCH/HR)=  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.432
  PEAK FLOW RATE(CFS)   =     146.90

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      146.90   19.59    1.035  0.50( 0.22) 0.43     199.5     203.00
      2      146.29   21.92    0.974  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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             Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                        Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-3 BODR 2022 - SUBWATERSHED B                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 10-YR EV JULY 2022 ROKAMOTO                                            *
 **************************************************************************

  FILE NAME: PA3B10EV.DAT
  TIME/DATE OF STUDY: 10:36 07/13/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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
```


B-5

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.206
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.821
  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        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      3.72
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.72

**************************************************************************
  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
```

B-6

```
  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) =       7.03
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.03
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   2.25   Tc(MIN.) =    8.46
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.370
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    6.58
  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) =       9.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.51
  FLOW VELOCITY(FEET/SEC.) =  4.11   DEPTH*VELOCITY(FT*FT/SEC.) =   1.44
  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) =      12.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.30
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.94
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.63   Tc(MIN.) =   10.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    4.96
  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) =      13.69
```

B-7


```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
  FLOW VELOCITY(FEET/SEC.) =  4.01   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  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.) =   10.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  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        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
  SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =    7.79
  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) =      21.48
```

B-8

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.09
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.146
  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        2.60      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) =   22.63
  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) =      44.11

****************************************************************************
  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 30.0 INCH PIPE IS 21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 11.95
ESTIMATED PIPE DIAMETER(INCH) = 30.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 44.11
PIPE TRAVEL TIME(MIN.) = 1.70 Tc(MIN.) = 11.79
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.) = 11.79
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.967
B-9
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	2.40	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) = 9.48
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) = 49.54

****
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 33.0 INCH PIPE IS 27.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 9.53
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.54
PIPE TRAVEL TIME(MIN.) = 1.79 Tc(MIN.) = 13.58
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.) = 13.58
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.817
B-10
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
COMMERCIAL	B	1.40	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) = 9.20
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) = 54.57

****
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 42.0 INCH PIPE IS 34.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 6.47
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 54.57
PIPE TRAVEL TIME(MIN.) = 2.36 Tc(MIN.) = 15.93
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.) = 15.93
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.661
B-11
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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 4.35
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) =      54.57
  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  36.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.80
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.57
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   17.57
  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.) =   17.57                                    B-12
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.572
  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
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
  SUBAREA AREA(ACRES) =     5.80      SUBAREA RUNOFF(CFS) =     7.93
  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) =      58.41

****************************************************************************
  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  42.0 INCH PIPE IS  30.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.81
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      58.41
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   18.01
```



```
  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.) =   18.01
  RAINFALL INTENSITY(INCH/HR) =   1.55
  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 =      58.41

****************************************************************************
  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.379                B-14
  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        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      3.55
  TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      3.55

****************************************************************************
  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
  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.) =   4.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.55
  PIPE TRAVEL TIME(MIN.) =   1.58    Tc(MIN.) =    9.99
  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.) =    9.99
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.159
  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) =    8.12
  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) =      11.33

****************************************************************************
  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  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.02
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.33
  PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =   11.34
  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.) =   11.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.011
  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) =   13.34
  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) =      23.88
```

B-15

B-16


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****************************************************************************
  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  27.0 INCH PIPE IS  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.88
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =   13.00
  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.) =   13.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.862
  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) =   25.64
  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) =      47.70

****************************************************************************
  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  27.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      47.70
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   14.20
  LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.
```

B-17

```
****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.20
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.771
  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) =   49.33
  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) =      94.58

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.20
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.771
  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) =    0.45
  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) =      95.03

****************************************************************************
  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  45.0 INCH PIPE IS  35.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.17
```

B-18

B-18


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  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.03
  PIPE TRAVEL TIME(MIN.) =   2.00    Tc(MIN.) =   16.20
  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.) =   16.20
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.645
  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) =   14.52
  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) =     102.34

****************************************************************************
  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  42.0 INCH PIPE IS  33.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.56
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     102.34
  PIPE TRAVEL TIME(MIN.) =   2.80    Tc(MIN.) =   19.00
  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.) =   19.00
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.504
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.20      0.30     0.100    56
  COMMERCIAL                 B        2.40      0.30     0.100    56
  PUBLIC PARK                B        1.20      0.30     0.850    56
```

B-21

B-23

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  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) =   17.18
  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) =     110.18

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.504
  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) =   39.22
  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) =     149.40

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.504
  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
```

B-23

B-23


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  SUBAREA AREA(ACRES) =    9.30      SUBAREA RUNOFF(CFS) =   11.59
  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) =     160.98

****************************************************************************
  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  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.84
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     160.98
  PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =   20.39
  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.) =   20.39
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.446
  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) =    6.47
  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) =     160.98
  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.) =   20.39
  RAINFALL INTENSITY(INCH/HR) =   1.45
  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
```

B-27

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 TOTAL STREAM AREA(ACRES) =     133.00
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     160.98

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       58.41   18.01    1.550  0.30( 0.16) 0.55      46.1     203.00
     2      160.98   20.39    1.446  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      211.65   18.01    1.550  0.30( 0.12) 0.40     163.5     203.00
     2      214.98   20.39    1.446  0.30( 0.12) 0.40     179.1     210.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     214.98    Tc(MIN.) =    20.39
 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  39.0 INCH PIPE IS  28.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  32.91
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     214.98
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   20.59
 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.) =   20.59
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.438
 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
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B-28


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 "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) =   18.02
 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) =     230.61

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.59
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.438
 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) =   17.56
 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) =     248.17

****************************************************************************
 FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   20.59
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.438
 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        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) =    3.76
 EFFECTIVE AREA(ACRES) =    213.70   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) =     251.93
```

B-28

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================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     20.59
  EFFECTIVE AREA(ACRES) =    213.70  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.427
  PEAK FLOW RATE(CFS)   =     251.93

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      251.61   18.20    1.541  0.30( 0.13) 0.43     198.1     203.00
      2      251.93   20.59    1.438  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 BODR 2022 - SUBWATERSHED B                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 25-YR EV JULY 2022 ROKAMOTO                                           *
 ******************************************************************************

  FILE NAME: PA3B25EV.DAT
  TIME/DATE OF STUDY: 10:35 07/13/2022
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  3.587
  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        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      4.76
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.76

******************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    8.34
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.029
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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
```

B-5

B-6

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
  SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    8.54
  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) =      12.54

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  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) =      15.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.79
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.17
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.71
  STREET FLOW TRAVEL TIME(MIN.) =   1.54   Tc(MIN.) =    9.88
  *  10 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        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
  SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    6.47
  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) =      17.80
```

B-7


```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
  FLOW VELOCITY(FEET/SEC.) =  4.26   DEPTH*VELOCITY(FT*FT/SEC.) =   1.80
  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.) =    9.88
  *  10 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        0.70      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
  SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =   10.01
  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) =      27.82

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.88
  *  10 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
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =   13.40      SUBAREA RUNOFF(CFS) =   29.89
  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) =      57.70

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
```

B-8

B-8

```
  >>>>>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  33.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.76
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.70
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   11.47
  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.) =   11.47                                        B-9
  *  10 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
  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) =   12.39
  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) =      65.00

****************************************************************************
  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  39.0 INCH PIPE IS  27.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.00
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   13.09
  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.) =   13.09
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.338                    B-10
  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) =   12.11
  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) =      71.98

****************************************************************************
  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  48.0 INCH PIPE IS  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      71.98
  PIPE TRAVEL TIME(MIN.) =   2.17    Tc(MIN.) =   15.26
  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.) =   15.26
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.142                    B-11
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.20      SUBAREA RUNOFF(CFS) =    5.74
  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) =      71.98
 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  30.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.40
 ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      71.98
 PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   16.80
 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.) =   16.80
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.027
 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.176
 SUBAREA AREA(ACRES) =     5.80      SUBAREA RUNOFF(CFS) =   10.31
 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) =      77.30

****************************************************************************
 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  35.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      77.30
 PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   17.21
```

B-12


```
 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.) =   17.21
 RAINFALL INTENSITY(INCH/HR) =   2.00
 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 =      77.30

****************************************************************************
 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) =  3.014
 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        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      4.52
 TOTAL AREA(ACRES) =      1.70   PEAK FLOW RATE(CFS) =      4.52

****************************************************************************
 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  10.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.29
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.52
 PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =    9.90
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    212.00 =     713.00 FEET.

****************************************************************************
```

B-14

```
 FLOW PROCESS FROM NODE    212.00 TO NODE    212.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.90
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.744
 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) =   10.39
 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) =      14.50

****************************************************************************
 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  16.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      14.50
 PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   11.20
 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.) =   11.20
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.558
 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) =   17.09
 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) =      30.57
```

B-15

B-16


```
****************************************************************************
 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  21.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.01
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      30.57
 PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   12.75
 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.) =   12.75
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.374
 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) =   33.15
 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) =      61.48

****************************************************************************
 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  30.0 INCH PIPE IS  23.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  14.82
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      61.48
 PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =   13.88
 LONGEST FLOWPATH FROM NODE    210.00 TO NODE    215.00 =    3029.00 FEET.

****************************************************************************
```

B-17

```
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.88
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.262
 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) =   64.02
 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) =     122.48

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.88
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.262
 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) =    0.58
 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) =     123.06

****************************************************************************
 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  51.0 INCH PIPE IS  37.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.97
 ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
```

B-18

B-18


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 PIPE-FLOW(CFS) =     123.06
 PIPE TRAVEL TIME(MIN.) =   1.85    Tc(MIN.) =   15.73
 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.) =   15.73
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.105
 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) =   18.74
 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) =     132.86

****************************************************************************
 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  48.0 INCH PIPE IS  34.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.59
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     132.86
 PIPE TRAVEL TIME(MIN.) =   2.58    Tc(MIN.) =   18.31
 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.) =   18.31
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.930
 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
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B-21

B-23

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  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) =   22.80
  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) =     144.01

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.930
  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) =   50.77
  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) =     194.78

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.31
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.930
  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) =   15.15
```

B-23

B-23


```
  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) =     209.93

****************************************************************************
  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  54.0 INCH PIPE IS  42.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.62
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     209.93
  PIPE TRAVEL TIME(MIN.) =   1.33    Tc(MIN.) =   19.64
  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.) =   19.64
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.854
  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) =    8.34
  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) =     209.93
  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.) =   19.64
  RAINFALL INTENSITY(INCH/HR) =   1.85
  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
```

B-27

PEAK FLOW RATE(CFS) AT CONFLUENCE = 209.93

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	77.30	17.21	1.999	0.30(0.16)	0.55	46.1	203.00
2	209.93	19.64	1.854	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 NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	276.60	17.21	1.999	0.30(0.12)	0.40	162.7	203.00
2	281.10	19.64	1.854	0.30(0.12)	0.40	179.1	210.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 281.10 Tc(MIN.) = 19.64
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 32.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 34.83
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 281.10
PIPE TRAVEL TIME(MIN.) = 0.19 Tc(MIN.) = 19.82
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.) = 19.82
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 1.844
SUBAREA LOSS RATE DATA(AMC II):

B-28

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS 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) = 23.39
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) = 301.42

****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 19.82

B-28

* 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
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) = 23.62
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) = 325.04

****
FLOW PROCESS FROM NODE 231.00 TO NODE 231.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 19.82

B-28

* 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 "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) = 4.96
EFFECTIVE AREA(ACRES) = 213.70 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) = 330.00
==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 213.7 TC(MIN.) = 19.82
EFFECTIVE AREA(ACRES) = 213.70 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.427
PEAK FLOW RATE(CFS) = 330.00

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	329.69	17.40	1.987	0.30(0.13)	0.43	197.3	203.00
2	330.00	19.82	1.844	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 BODR 2022 - SUBWATERSHED B                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 50-YR EV JULY 2022 ROKAMOTO                                            *
 ***************************************************************************

  FILE NAME: PA3B50EV.DAT
  TIME/DATE OF STUDY: 17:34 07/13/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  4.095
  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        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.207
  SUBAREA RUNOFF(CFS) =      5.44
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.44

                                                                        B-5

****************************************************************************
  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

                                                                        B-6

  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) =      10.44
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   10.90
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.16
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.49
 STREET FLOW TRAVEL TIME(MIN.) =   2.06   Tc(MIN.) =    8.27
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.505
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.40      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.512
 SUBAREA AREA(ACRES) =    3.30      SUBAREA RUNOFF(CFS) =    9.95
 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) =      14.60

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  12.70
 FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
 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) =      18.26
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.43
   HALFSTREET FLOOD WIDTH(FEET) =   14.73
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.82
 STREET FLOW TRAVEL TIME(MIN.) =   1.50   Tc(MIN.) =    9.77
 *  50 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        0.30      0.30     0.100    56
```

B-7


```
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.600
 SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    7.30
 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) =      20.04

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.27
 FLOW VELOCITY(FEET/SEC.) =  4.40   DEPTH*VELOCITY(FT*FT/SEC.) =   1.92
 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.) =    9.77
 *  50 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        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.115
 SUBAREA AREA(ACRES) =    4.10      SUBAREA RUNOFF(CFS) =   11.22
 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) =      31.26

****************************************************************************
 FLOW PROCESS FROM NODE    206.00 TO NODE    206.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.77
 *  50 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
 RESIDENTIAL
```

B-8

B-8

```
  ".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) =   33.83
  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) =      65.10

****************************************************************************
  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  33.0 INCH PIPE IS  26.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.94
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.10
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =   11.34
  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.) =   11.34
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.844
  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) =   14.06
  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) =      73.93

****************************************************************************
  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)<<<<<
```

B-9


```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   353.00  DOWNSTREAM(FEET) =   343.00
  FLOW LENGTH(FEET) =  1021.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.64
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      73.93
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   12.94
  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.) =   12.94
  *  50 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
  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) =   13.82
  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) =      82.24

****************************************************************************
  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  51.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      82.24
  PIPE TRAVEL TIME(MIN.) =   2.09    Tc(MIN.) =   15.03
  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.) =   15.03
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.388
  SUBAREA LOSS RATE DATA(AMC  II):
```

B-10

B-11

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.500
SUBAREA AREA(ACRES) = 3.20 SUBAREA RUNOFF(CFS) = 6.45
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) = 82.24
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 30.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.85
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 82.24
PIPE TRAVEL TIME(MIN.) = 1.47 Tc(MIN.) = 16.50
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.) = 16.50
* 50 YEAR RAINFALL INTENSITY(INCH/HR) = 2.282

B-12

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.176
SUBAREA AREA(ACRES) = 5.80 SUBAREA RUNOFF(CFS) = 11.64
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) = 87.87

****
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 36.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 8.60
ESTIMATED PIPE DIAMETER(INCH) = 48.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 87.87
PIPE TRAVEL TIME(MIN.) = 0.40 Tc(MIN.) = 16.90
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.) = 16.90
RAINFALL INTENSITY(INCH/HR) = 2.25
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 = 87.87

****
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) = 3.466

B-14

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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.200
SUBAREA RUNOFF(CFS) = 5.21
TOTAL AREA(ACRES) = 1.70 PEAK FLOW RATE(CFS) = 5.21

****

```
 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  11.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.43
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.21
 PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =    9.86
 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.) =    9.86
 *  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
 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) =   11.58
 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) =      16.15

****************************************************************************
 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  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.67
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.15
 PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   11.09
 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.) =   11.09
```

B-15


```
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
 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) =   19.26
 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) =      34.46

****************************************************************************
 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  24.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      34.46
 PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   12.62
 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.) =   12.62
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.685
 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) =   37.71
 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) =      69.83

****************************************************************************
```

B-16

B-17

```
 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  23.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.56
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      69.83
 PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   13.70
 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.) =   13.70                                        B-18
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.551
 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) =   72.70
 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) =     138.95

****************************************************************************
 FLOW PROCESS FROM NODE    215.00 TO NODE    215.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.70                                        B-18
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.551
 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) =    0.66
```



```
 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) =     139.61

****************************************************************************
 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  39.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.36
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     139.61
 PIPE TRAVEL TIME(MIN.) =   1.79    Tc(MIN.) =   15.49
 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.) =   15.49                                        B-21
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
 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) =   21.04
 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) =     149.42

****************************************************************************
 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  48.0 INCH PIPE IS  38.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.74
 ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     149.42
 PIPE TRAVEL TIME(MIN.) =   2.56    Tc(MIN.) =   18.04
 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.) =   18.04
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  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) =   26.00
  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) =     163.21

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.04
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  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) =   57.34
  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) =     220.55

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    219.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

B-23

B-23


```
============================================================================
  MAINLINE Tc(MIN.) =   18.04
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.171
  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) =   17.17
  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) =     237.72

****************************************************************************
  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  57.0 INCH PIPE IS  44.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.17
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     237.72
  PIPE TRAVEL TIME(MIN.) =   1.28    Tc(MIN.) =   19.32
  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.) =   19.32
  *  50 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        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) =    9.37
  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) =     237.72
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
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B-23

B-27

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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.) =   19.32
  RAINFALL INTENSITY(INCH/HR) =   2.08
  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 =     237.72

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       87.87   16.90    2.253  0.30( 0.16) 0.55      46.1     203.00
      2      237.72   19.32    2.079  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      314.13   16.90    2.253  0.30( 0.12) 0.40     162.4     203.00
      2      318.25   19.32    2.079  0.30( 0.12) 0.40     179.1     210.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     318.25    Tc(MIN.) =    19.32
  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  33.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.25
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     318.25
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   19.50
  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.) =   19.50
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.066
  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) =   26.33
  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) =     340.15

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.50
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.066
  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) =   26.94
  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) =     367.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      368.05   17.08    2.240  0.30( 0.13) 0.43     193.7     203.00
      2      367.09   19.50    2.066  0.30( 0.13) 0.42     210.4     210.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     368.05  Tc(MIN.) =   17.08
  AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.43  EFFECTIVE AREA(ACRES) =     193.71
```

B-28

B-28

```
****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    231.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.240
  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        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) =    6.14
  EFFECTIVE AREA(ACRES) =    197.01   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) =     374.19
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      213.7  TC(MIN.) =     17.08
  EFFECTIVE AREA(ACRES) =    197.01  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.433
  PEAK FLOW RATE(CFS)   =     374.19

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      374.19   17.08    2.240  0.30( 0.13) 0.43     197.0     203.00
      2      372.72   19.50    2.066  0.30( 0.13) 0.43     213.7     210.00
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

B-28

```
******************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED C                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 100-YR EV SEPT 2022 ROKAMOTO                                         *
 ***********************************************************************

  FILE NAME: PA3C00EV.DAT
  TIME/DATE OF STUDY: 20:36 09/17/2022
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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    0.200/0.200/ ---    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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.587
  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        1.60      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) =      5.08
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      5.08

******************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   3.15   Tc(MIN.) =   11.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.998
  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) =   11.64
  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) =      15.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  17.46
  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  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.90
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.87
  PIPE TRAVEL TIME(MIN.) =   1.59    Tc(MIN.) =   13.17
  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.) =   13.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.788
  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) =   19.64
  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) =      34.37

****************************************************************************
  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  26.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.18
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.37
  PIPE TRAVEL TIME(MIN.) =   2.89    Tc(MIN.) =   16.06
  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.) =   16.06
```



```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.492
  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) =   35.39
  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) =      66.03

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.06
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.492
  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) =   25.80
  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) =      91.83

****************************************************************************
  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  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.37
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.83
  PIPE TRAVEL TIME(MIN.) =   1.61    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
  *  25 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        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) =    6.61
  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) =      93.43

******************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.272
  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) =   34.73

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.361
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   36.16
  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) =     129.59
```



```
******************************************************************************
  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  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.59
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   18.81
  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.) =   18.81
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.279
  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) =    8.05
  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) =     132.94

******************************************************************************
  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.) =   18.81
  RAINFALL INTENSITY(INCH/HR) =   2.28
  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 =     132.94

******************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  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) =      4.77
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.77

******************************************************************************
  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) =       9.03
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.16
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.91
  STREET FLOW TRAVEL TIME(MIN.) =   2.31   Tc(MIN.) =    9.79
  *  25 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS 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.) =   10.75
  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.) =   10.75
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.128
  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) =   16.41
  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) =      28.33

******************************************************************************
  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  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.33
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.31
  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.) =   11.31
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.038
  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        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) =   34.02
  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) =      61.53

****************************************************************************
  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  24.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.56
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.53
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   11.98
  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.) =   11.98
  *  25 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
  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) =   45.47
  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) =     105.01

****************************************************************************
  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  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.44
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     105.01
  PIPE TRAVEL TIME(MIN.) =   2.70    Tc(MIN.) =   14.68
  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.) =   14.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.622
  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        0.40      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) =   59.19
  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) =     152.49

****************************************************************************
  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  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.67
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.49
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   15.23
  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.) =   15.23
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.568
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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) =   38.06
  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) =     187.23

****************************************************************************
  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.) =   15.23
  RAINFALL INTENSITY(INCH/HR) =   2.57
  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 =     187.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      132.94   18.81    2.279  0.30( 0.09) 0.31      67.6     300.00
      2      187.23   15.23    2.568  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      309.12   15.23    2.568  0.30( 0.11) 0.35     139.5     310.00
      2      298.10   18.81    2.279  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     309.12    Tc(MIN.) =    15.23
  EFFECTIVE AREA(ACRES) =     139.54   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  39.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.43
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     309.12
  PIPE TRAVEL TIME(MIN.) =   2.40    Tc(MIN.) =   17.63
  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.) =   17.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  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
  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) =   41.00
  EFFECTIVE AREA(ACRES) =    159.54   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) =     324.53

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
  MAINLINE Tc(MIN.) =   17.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  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) =   44.44
  EFFECTIVE AREA(ACRES) =    181.44   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) =     368.97

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.63
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.364
  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) =   44.97
  EFFECTIVE AREA(ACRES) =    204.24   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) =     413.94

****************************************************************************
  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  39.3 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.29
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     413.94
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   18.03
  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.) =   18.03
  RAINFALL INTENSITY(INCH/HR) =   2.33
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     204.24
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     413.94

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.587
  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) =      8.89
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      8.89

****************************************************************************
  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) =      19.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.61
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =   10.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.226
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   20.73
  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) =      28.70

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.52   HALFSTREET FLOOD WIDTH(FEET) =  20.12
  FLOW VELOCITY(FEET/SEC.) =  3.77   DEPTH*VELOCITY(FT*FT/SEC.) =   1.97
  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  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.70
  PIPE TRAVEL TIME(MIN.) =   1.83    Tc(MIN.) =   12.01
  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.) =   12.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.937
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   35.17
  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) =      61.25

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.01
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.937
  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) =    0.26
  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) =      61.51

****************************************************************************
  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  27.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.78
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.51
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   13.38
  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.) =   13.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.763
  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        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) =   38.23
  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) =      95.94

****************************************************************************
  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  28.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.75
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.94
  PIPE TRAVEL TIME(MIN.) =   1.91    Tc(MIN.) =   15.29
  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.) =   15.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
  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        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) =   91.68
  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) =     180.33

****************************************************************************
  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  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.77
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.33
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   15.95
  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.) =   15.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.502
  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        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) =   72.68
  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) =     248.56

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.502
  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       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) =   47.87
  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) =     296.44

****************************************************************************
  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  40.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.05
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     296.44
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   17.20
  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.) =   17.20
  *  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
  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) =  134.39
  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) =     417.61

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.20
  *  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
  "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) =   92.70
  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) =     510.32

****************************************************************************
  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  46.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.50
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     510.32
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =   18.70
  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.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   75.00
  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) =     560.41

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
```

```
  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) =   47.97
  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) =     608.38

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  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) =   79.14
  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) =     687.52

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.286
  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) =   81.13
  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) =     768.65

****************************************************************************
  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  66.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.86
  ESTIMATED PIPE DIAMETER(INCH) =  87.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     768.65
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   19.55
  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.) =   19.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.230
  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) =   62.28
  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) =     811.05

****************************************************************************
  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  85.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.07
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     811.05
  PIPE TRAVEL TIME(MIN.) =   2.19    Tc(MIN.) =   21.74
  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.) =   21.74
  RAINFALL INTENSITY(INCH/HR) =   2.10
  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 =     811.05

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
  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) =      3.93
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.93

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.137
  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) =       6.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.05
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   1.50
  Tc(MIN.) =   10.70
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    5.87
  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) =       9.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.69   FLOW VELOCITY(FEET/SEC.) =   6.59
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.757
  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) =      34.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.65
  AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   2.74
```

```
  Tc(MIN.) =   13.43
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   50.20
  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) =      58.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.61   FLOW VELOCITY(FEET/SEC.) =   7.55
  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
  *  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
  "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) =      75.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.02
  AVERAGE FLOW DEPTH(FEET) =   1.90   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =   15.58
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   34.80
  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) =      87.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.01   FLOW VELOCITY(FEET/SEC.) =   7.26
  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.) =   15.58
  *  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
  "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) =    5.23
  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) =      93.14

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.403
  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) =     126.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.56
  AVERAGE FLOW DEPTH(FEET) =   2.36   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =   17.13
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   66.43
  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) =     154.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.54   FLOW VELOCITY(FEET/SEC.) =   7.94
  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.) =   17.13
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.403
  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        1.00      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) =    8.24
  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) =     162.30

********************************************************************************
  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  35.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.40
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     162.30
  PIPE TRAVEL TIME(MIN.) =   6.02    Tc(MIN.) =   23.15
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  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        0.50      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) =     167.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.98
  AVERAGE FLOW DEPTH(FEET) =   2.49   TRAVEL TIME(MIN.) =   3.64
  Tc(MIN.) =   26.79
  SUBAREA AREA(ACRES) =     6.00      SUBAREA RUNOFF(CFS) =    9.64
  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) =     162.30
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.46   FLOW VELOCITY(FEET/SEC.) =   8.93
  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.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  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        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) =   11.83
  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) =     162.30
  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.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   14.85
  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) =     162.30
  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.) =   26.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    9.72
  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) =     166.90

****************************************************************************
  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  33.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.49
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     166.90
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   27.65
  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.) =   27.65
  RAINFALL INTENSITY(INCH/HR) =   1.83
  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 =     166.90

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      413.94   18.03    2.334  0.30( 0.11) 0.37     204.2     310.00
      1      394.23   21.62    2.106  0.30( 0.11) 0.37     217.1     300.00
      2      811.05   21.74    2.100  0.30( 0.11) 0.35     424.2     320.00
      3      166.90   27.65    1.832  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1     1309.80   18.03    2.334  0.30( 0.13) 0.43     632.5     310.00
      2     1357.09   21.62    2.106  0.30( 0.13) 0.43     730.7     300.00
      3     1357.87   21.74    2.100  0.30( 0.13) 0.43     733.4     320.00
      4     1209.26   27.65    1.832  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1357.87    Tc(MIN.) =    21.74
  EFFECTIVE AREA(ACRES) =     733.42   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  61.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  48.35
  ESTIMATED PIPE DIAMETER(INCH) =  78.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1357.87
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   21.87
  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.) =   21.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.093
  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) =  120.30
  EFFECTIVE AREA(ACRES) =    798.52   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) =    1416.22

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.093
  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) =   11.49
  EFFECTIVE AREA(ACRES) =    804.72   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) =    1427.71

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.331
  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) =      4.55
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.55

****************************************************************************
  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) =      17.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
    HALFSTREET FLOOD WIDTH(FEET) =   18.55
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =    7.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.752
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   24.99
```

```
  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) =      28.91

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.93
  FLOW VELOCITY(FEET/SEC.) =  2.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  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  20.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.21
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.91
  PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =    9.43
  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.) =    9.43
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.369
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   45.72
  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) =      71.57

****************************************************************************
  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.) =    9.43
  RAINFALL INTENSITY(INCH/HR) =   3.37
  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 =      71.57

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      4.21
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.21

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.315
  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
  "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) =       6.79
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.49
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =    9.70
  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) =       9.23

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   7.04
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.975
  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        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) =      17.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.24
  AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   2.04
  Tc(MIN.) =   11.74
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   15.57
  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) =      23.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.31   FLOW VELOCITY(FEET/SEC.) =   4.62
  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  11.7 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.59
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.76
  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) =   2.97
  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 =      23.76

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       71.57    9.43    3.369  0.30( 0.16) 0.54      24.8     400.00
      2       23.76   11.75    2.974  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       93.42    9.43    3.369  0.30( 0.19) 0.64      32.7     400.00
      2       86.52   11.75    2.974  0.30( 0.20) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.42    Tc(MIN.) =     9.43
  EFFECTIVE AREA(ACRES) =      32.66   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  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.53
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.42
  PIPE TRAVEL TIME(MIN.) =   1.53    Tc(MIN.) =   10.96
```

```
 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.) =   10.96
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.094
 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        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) =   19.69
 EFFECTIVE AREA(ACRES) =     40.36   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) =     105.04

****************************************************************************
 FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.96
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.094
 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        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) =   37.39
 EFFECTIVE AREA(ACRES) =     54.46   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) =     142.44

****************************************************************************
 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  46.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.40
 ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     142.44
 PIPE TRAVEL TIME(MIN.) =   3.03    Tc(MIN.) =   13.98
 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.) =   13.98
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.695
 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
 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) =   29.08
 EFFECTIVE AREA(ACRES) =     67.46   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) =     151.96

****************************************************************************
 FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.98
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.695
 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) =   46.98
 EFFECTIVE AREA(ACRES) =     87.86   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) =     198.94
```

```
****************************************************************************
  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  45.0 INCH PIPE IS  35.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.26
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     198.94
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   15.68
  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.) =   15.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.526
  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) =  134.53
  EFFECTIVE AREA(ACRES) =    148.66   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) =     320.07

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.526
  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) =   15.09
  EFFECTIVE AREA(ACRES) =    156.06   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) =     335.16

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.526
  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) =   22.08
  EFFECTIVE AREA(ACRES) =    166.26   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) =     357.24

****************************************************************************
  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  42.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.51
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     357.24
  PIPE TRAVEL TIME(MIN.) =   1.90    Tc(MIN.) =   17.58
  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.) =   17.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
  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) =   41.02
  EFFECTIVE AREA(ACRES) =    186.06   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) =     374.60

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
  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) =   34.40
  EFFECTIVE AREA(ACRES) =    202.86   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) =     409.00

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
  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) =   74.04
  EFFECTIVE AREA(ACRES) =    240.36   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) =     483.04

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
  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) =   40.76
  EFFECTIVE AREA(ACRES) =    260.66   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) =     523.80

****************************************************************************
  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  63.0 INCH PIPE IS  51.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.64
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     523.80
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   17.98
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.207
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      2.50
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.50

****************************************************************************
  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   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.50
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    7.13
  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.) =    7.13
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.947
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    5.68
  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) =       8.01

****************************************************************************
  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   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.01
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    8.19
  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.) =    8.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.647
  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) =    9.50
  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) =      16.86

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```
 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  13.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.52
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      16.86
 PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.64
 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.) =    8.64
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
 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) =   17.15
 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) =      33.47

****************************************************************************
 FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    8.64
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.539
 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) =    0.31
 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) =      33.78
```



```
****************************************************************************
 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  15.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.19
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      33.78
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.19
 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.) =    9.19
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.419
 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) =   33.99
 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) =      66.56

****************************************************************************
 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  20.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.90
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      66.56
 PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    9.76
 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.) =    9.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.304
  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) =   67.80
  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) =     131.99

**************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =    9.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.304
  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) =   42.57
  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) =     174.56

**************************************************************************
  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.) =    9.76
  RAINFALL INTENSITY(INCH/HR) =   3.30
  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 =     174.56

**************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.207
  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) =      3.20
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.20

**************************************************************************
  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   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.20
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    7.09
  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.) =    7.09
  *  25 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
  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) =    6.02
  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) =       9.02

****************************************************************************
  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   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.02
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    7.78
  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.) =    7.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.757
  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) =   13.99
  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) =      22.52

****************************************************************************
  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  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.06
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.52
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    9.28
  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.) =    9.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.400
  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) =    9.54
  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) =      29.78

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.400
  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
  "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) =   15.65
  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) =      45.43

****************************************************************************
```

```
 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  21.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.34
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      45.43
 PIPE TRAVEL TIME(MIN.) =   1.94    Tc(MIN.) =   11.22
 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.) =   11.22
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.053
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   68.46
 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) =     108.96

****************************************************************************
 FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.22
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.053
 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        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) =    3.40
 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) =     112.35

****************************************************************************
 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.) =   11.22
 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 =     112.35

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      174.56    9.76    3.304  0.30( 0.12) 0.41      61.0     410.00
     2      112.35   11.22    3.053  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      280.74    9.76    3.304  0.30( 0.13) 0.45      98.4     410.00
     2      273.16   11.22    3.053  0.30( 0.13) 0.45     104.0     420.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     280.74    Tc(MIN.) =     9.76
 EFFECTIVE AREA(ACRES) =      98.41   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  57.0 INCH PIPE IS  44.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.81
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     280.74
 PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   10.72
 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.) =   10.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  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) =   47.31
  EFFECTIVE AREA(ACRES) =    115.71   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) =     312.91

******************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.133
  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) =    2.71
  EFFECTIVE AREA(ACRES) =    116.71   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) =     315.62

******************************************************************************
  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  63.0 INCH PIPE IS  47.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.86
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     315.62
  PIPE TRAVEL TIME(MIN.) =   1.47    Tc(MIN.) =   12.19
```



```
  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.) =   12.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.913
  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) =   50.27
  EFFECTIVE AREA(ACRES) =    137.61   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) =     342.84

******************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   12.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.913
  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) =   34.69
  EFFECTIVE AREA(ACRES) =    152.11   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) =     377.53

******************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      377.53   12.19    2.913  0.30( 0.16) 0.52     152.1     410.00
      2      365.70   13.65    2.732  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        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       523.80   17.98    2.338  0.30( 0.13) 0.45     260.7     400.00
     2       487.10   20.47    2.173  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        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       825.35   12.19    2.913  0.30( 0.14) 0.48     328.8     410.00
     2       834.62   13.65    2.732  0.30( 0.14) 0.48     355.6     420.00
     3       833.56   17.98    2.338  0.30( 0.14) 0.48     418.4     400.00
     4       773.40   20.47    2.173  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) =      834.62  Tc(MIN.) =   13.653
 EFFECTIVE AREA(ACRES) =    355.64  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  53.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  37.04
 ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     834.62
 PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   14.26
 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.) =   14.26
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.665
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   97.11
```



```
 EFFECTIVE AREA(ACRES) =    396.94   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) =     904.07

****************************************************************************
 FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.26
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.665
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.50      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) =    2.13
 EFFECTIVE AREA(ACRES) =    397.84   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) =     906.20

****************************************************************************
 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        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       900.92   12.81    2.832  0.30( 0.13) 0.45     371.0     410.00
     2       906.20   14.26    2.665  0.30( 0.13) 0.45     397.8     420.00
     3       895.22   18.59    2.294  0.30( 0.13) 0.45     460.6     400.00
     4       832.88   21.09    2.136  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        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      1396.54   18.16    2.325  0.30( 0.12) 0.40     703.8     310.00
     2      1427.41   21.75    2.099  0.30( 0.12) 0.40     802.0     300.00
     3      1427.71   21.87    2.093  0.30( 0.12) 0.40     804.7     320.00
     4      1270.31   27.79    1.827  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        Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      2112.99   12.81    2.832  0.30( 0.13) 0.42     867.6     410.00
     2      2172.59   14.26    2.665  0.30( 0.13) 0.42     950.7     420.00
     3      2292.85   18.16    2.325  0.30( 0.13) 0.42    1158.1     310.00
     4      2295.48   18.59    2.294  0.30( 0.13) 0.42    1176.2     400.00
     5      2254.64   21.09    2.136  0.30( 0.13) 0.42    1246.5     430.00
     6      2244.99   21.75    2.099  0.30( 0.13) 0.42    1264.5     300.00
     7      2242.66   21.87    2.093  0.30( 0.13) 0.42    1267.2     320.00
     8      1974.76   27.79    1.827  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) =     2295.48  Tc(MIN.) =   18.590
  EFFECTIVE AREA(ACRES) =   1176.18  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.) =     18.59
  EFFECTIVE AREA(ACRES) =   1176.18  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.419
  PEAK FLOW RATE(CFS)   =    2295.48

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     2112.99   12.81    2.832  0.30( 0.13) 0.42     867.6     410.00
      2     2172.59   14.26    2.665  0.30( 0.13) 0.42     950.7     420.00
      3     2292.85   18.16    2.325  0.30( 0.13) 0.42    1158.1     310.00
      4     2295.48   18.59    2.294  0.30( 0.13) 0.42    1176.2     400.00
      5     2254.64   21.09    2.136  0.30( 0.13) 0.42    1246.5     430.00
      6     2244.99   21.75    2.099  0.30( 0.13) 0.42    1264.5     300.00
      7     2242.66   21.87    2.093  0.30( 0.13) 0.42    1267.2     320.00
      8     1974.76   27.79    1.827  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 BODR 2022 - SUBWATERSHED C                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 2-YR EV SEPT 2022 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: PA3C02EV.DAT
  TIME/DATE OF STUDY: 20:39 09/17/2022
============================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    0.200/0.200/ ---    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) =  1.229
  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"       -        1.60      0.60     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.60
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.25
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =    8.59
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.90
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.60
  STREET FLOW TRAVEL TIME(MIN.) =   4.11   Tc(MIN.) =   12.55
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.948
  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) =    3.28
  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) =       4.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.04
  FLOW VELOCITY(FEET/SEC.) =  2.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.70
  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  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.33
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.48
  PIPE TRAVEL TIME(MIN.) =   2.17    Tc(MIN.) =   14.72
  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.) =   14.72
  *   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             -        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) =    5.27
  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) =       9.23

****************************************************************************
  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  14.9 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.23
  PIPE TRAVEL TIME(MIN.) =   3.95    Tc(MIN.) =   18.67
  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.) =   18.67
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.752
  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      0.100     -
  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) =    9.47
  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) =      17.44

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.67
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.752
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED             -        5.70      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) =    4.37
  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) =      21.81

****************************************************************************
  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  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.48
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      21.81
 PIPE TRAVEL TIME(MIN.) =   2.27    Tc(MIN.) =   20.94
 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.) =   20.94
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.703
 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               -        0.90      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) =    1.65
 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) =      21.81
 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) =  0.746
 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      0.60     0.100    56   18.91
 COMMERCIAL                 -        4.40      0.60     0.100    56   18.91
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       -        0.60      0.60     0.200    56   20.15
 RESIDENTIAL
 "11+ DWELLINGS/ACRE"       -        1.30      0.60     0.200    56   20.15
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       -        7.10      0.60     0.600    56   25.63
 RESIDENTIAL
 "3-4 DWELLINGS/ACRE"       -        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) =    8.28
```



```
 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =   20.94
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.703
 SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =    7.59
 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) =      29.18

****************************************************************************
 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  15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.57
 ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      29.18
 PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   22.58
 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.) =   22.58
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.674
 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     0.100     -
 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) =    2.13
 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) =      29.61

****************************************************************************
 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.) =   22.58
 RAINFALL INTENSITY(INCH/HR) =   0.67
 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 =      29.61

****************************************************************************
  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) =  1.333
  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      0.60     0.100    56    7.47
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        1.10      0.60     0.200    56    7.97
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       -        0.20      0.60     0.200    56    7.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.193
  SUBAREA RUNOFF(CFS) =      1.53
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.53

****************************************************************************
  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) =       2.78
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.47
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.52
  STREET FLOW TRAVEL TIME(MIN.) =   3.00   Tc(MIN.) =   10.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.039
  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     0.100     -
  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) =    2.49
  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) =       3.65

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.66
  FLOW VELOCITY(FEET/SEC.) =  1.78   DEPTH*VELOCITY(FT*FT/SEC.) =   0.60
  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   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.82
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.65
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =   11.75
  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.) =   11.75
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.983
  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     0.100     -
  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) =    4.82
  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) =       8.26

****************************************************************************
  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  10.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.26
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   12.51
  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.) =   12.51
  *   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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.208
  SUBAREA AREA(ACRES) =   12.70      SUBAREA RUNOFF(CFS) =    9.43
  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) =      17.38

****************************************************************************
  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  21.0 INCH PIPE IS  13.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.38
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   13.39
  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.) =   13.39
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.911
  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     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.347
  SUBAREA AREA(ACRES) =   17.80      SUBAREA RUNOFF(CFS) =   11.26
  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) =      27.84

****************************************************************************
  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  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.78
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.84
  PIPE TRAVEL TIME(MIN.) =   3.71    Tc(MIN.) =   17.10
  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.) =   17.10
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.790
  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               -        0.30      0.60     0.900     -
  USER-DEFINED               -        6.80      0.60     0.500     -
  USER-DEFINED               -       19.10      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) =   26.60      SUBAREA RUNOFF(CFS) =   11.72
  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) =      35.13

****************************************************************************
  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  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.96
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      35.13
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   17.89
  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.) =   17.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.771
  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     0.100     -
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.505
  SUBAREA AREA(ACRES) =   17.50      SUBAREA RUNOFF(CFS) =    7.37
  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) =      41.35

****************************************************************************
  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.) =   17.89
  RAINFALL INTENSITY(INCH/HR) =   0.77
  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 =      41.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.61   22.58    0.674  0.60( 0.19) 0.31      67.6     300.00
      2       41.35   17.89    0.771  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       69.49   17.89    0.771  0.60( 0.21) 0.35     138.4     310.00
      2       63.55   22.58    0.674  0.60( 0.21) 0.35     152.4     300.00
```



```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      69.49    Tc(MIN.) =    17.89
  EFFECTIVE AREA(ACRES) =     138.35   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  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.38
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.49
  PIPE TRAVEL TIME(MIN.) =   3.44    Tc(MIN.) =   21.33
  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.) =   21.33
  *   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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.288
  SUBAREA AREA(ACRES) =   20.00      SUBAREA RUNOFF(CFS) =    9.42
  EFFECTIVE AREA(ACRES) =    158.35   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) =      69.61

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.33
  *   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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =    9.41
  EFFECTIVE AREA(ACRES) =    180.25   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) =      79.02

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.33
  *   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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =    7.22
  EFFECTIVE AREA(ACRES) =    203.05   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) =      86.23

****************************************************************************
  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  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.24
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.23
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   21.92
  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.) =   21.92
  RAINFALL INTENSITY(INCH/HR) =   0.69
  AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.60
```



```
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.05
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      86.23

****************************************************************************
  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) =  1.229
  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"       -        2.80      0.60     0.200    56    8.44
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.79
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      2.79

****************************************************************************
  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) =       5.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   2.30   Tc(MIN.) =   10.74
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.028
  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               -        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) =    5.82
  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) =       8.10

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.84
  FLOW VELOCITY(FEET/SEC.) =  2.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  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  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) =       8.10
  PIPE TRAVEL TIME(MIN.) =   2.50    Tc(MIN.) =   13.24
  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.) =   13.24
  *   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               -        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) =    7.87
  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) =      14.98

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   13.24
  *   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               -        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) =    0.07
  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) =      15.05

****************************************************************************
  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  21.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.05
  PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   15.20
  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.) =   15.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.835
  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) =    8.48
  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) =      21.74

****************************************************************************
  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  21.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.96
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.74
  PIPE TRAVEL TIME(MIN.) =   2.74    Tc(MIN.) =   17.94
  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.) =   17.94
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.769
  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) =   18.75
  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) =      38.11

****************************************************************************
  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  21.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.55
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.11
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   18.92
  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.) =   18.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.746
  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) =   15.05
  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) =      51.42

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.92
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.746
  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) =    4.54
  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) =      55.96

****************************************************************************
  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  20.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.36
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.96
  PIPE TRAVEL TIME(MIN.) =   1.88    Tc(MIN.) =   20.80
  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.) =   20.80
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.706
  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) =   32.16
  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) =      83.04

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.80
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.706
  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      0.60     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) =   21.28
  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) =     104.32

****************************************************************************
  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  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.03
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     104.32
  PIPE TRAVEL TIME(MIN.) =   2.22    Tc(MIN.) =   23.02
  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.) =   23.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.666
  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     0.200     -
  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) =   18.87
  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) =     114.25

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.666
  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      0.60     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) =   12.26
  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) =     126.50

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.666
  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      0.60     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) =   15.89
  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) =     142.39

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.02
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.666
  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) =   14.25
  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) =     156.65

****************************************************************************
  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  48.0 INCH PIPE IS  36.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.37
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     156.65
  PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   24.27
  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.) =   24.27
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.643
  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) =   16.36
  EFFECTIVE AREA(ACRES) =    424.20   AREA-AVERAGED Fm(INCH/HR) =  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =      424.2       PEAK FLOW RATE(CFS) =     165.04
```



```
****************************************************************************
  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  60.0 INCH PIPE IS  46.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.16
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.04
  PIPE TRAVEL TIME(MIN.) =   3.25    Tc(MIN.) =   27.52
  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.) =   27.52
  RAINFALL INTENSITY(INCH/HR) =   0.59
  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 =     165.04

****************************************************************************
  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) =  1.147
  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) =      0.69
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  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) =  0.990
  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) =       1.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.81
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.38
  Tc(MIN.) =   11.58
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    0.81
  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) =       1.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   3.96
  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) =  0.805
  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) =       3.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.74
  AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   4.88
  Tc(MIN.) =   16.46
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =    4.19
  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) =       4.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.63   FLOW VELOCITY(FEET/SEC.) =   4.09
  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) =  0.710
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        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) =       5.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.68
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   4.10
  Tc(MIN.) =   20.55
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =    1.72
  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) =       4.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   3.55
  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.) =   20.55
  *   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               -        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) =    0.26
  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) =       4.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  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) =  0.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.50
  AVERAGE FLOW DEPTH(FEET) =   0.74   TRAVEL TIME(MIN.) =   3.34
  Tc(MIN.) =   23.89
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =    1.58
  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) =       4.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   3.34
  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.) =   23.89
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.650
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.00      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.914
  SUBAREA AREA(ACRES) =    4.30      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =     85.70   AREA-AVERAGED Fm(INCH/HR) =  0.60
```



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  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       85.7       PEAK FLOW RATE(CFS) =       4.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  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
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =  14.04    Tc(MIN.) =   37.93
  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) =  0.442
  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     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS 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) =       5.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.86
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   8.48
  Tc(MIN.) =   46.41
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    1.75
  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) =       4.87
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.66   FLOW VELOCITY(FEET/SEC.) =   3.72
```

```
  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.) =   46.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.442
  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) =       4.87
  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.) =   46.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.442
  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) =    0.50
  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) =       4.87
  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.) =   46.41
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.442
  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) =    0.21
  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) =       4.87
  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   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.87
  PIPE TRAVEL TIME(MIN.) =   2.04    Tc(MIN.) =   48.46
  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.) =   48.46
  RAINFALL INTENSITY(INCH/HR) =   0.43
  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 = 4.87

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	86.23	21.92	0.686	0.60(0.22)	0.37	203.1	310.00
1	76.83	26.69	0.606	0.60(0.22)	0.37	217.1	300.00
2	165.04	27.52	0.595	0.60(0.21)	0.35	424.2	320.00
3	4.87	48.46	0.429	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	252.87	21.92	0.686	0.60(0.25)	0.41	593.9	310.00
2	245.45	26.69	0.606	0.60(0.25)	0.41	693.1	300.00
3	243.76	27.52	0.595	0.60(0.25)	0.41	707.9	320.00
4	178.04	48.46	0.429	0.60(0.27)	0.45	758.5	390.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 252.87 Tc(MIN.) = 21.92
EFFECTIVE AREA(ACRES) = 593.88 AREA-AVERAGED Fm(INCH/HR) = 0.25
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.41
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 42.0 INCH PIPE IS 32.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 31.93
ESTIMATED PIPE DIAMETER(INCH) = 42.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 252.87
PIPE TRAVEL TIME(MIN.) = 0.20 Tc(MIN.) = 22.11
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.) = 22.11
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.682
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	0.60	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) = 35.33
EFFECTIVE AREA(ACRES) = 658.98 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 823.6 PEAK FLOW RATE(CFS) = 267.79

****
FLOW PROCESS FROM NODE 331.00 TO NODE 331.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==
MAINLINE Tc(MIN.) = 22.11
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.682
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	-	4.10	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) = 3.42
EFFECTIVE AREA(ACRES) = 665.18 AREA-AVERAGED Fm(INCH/HR) = 0.23
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.38
TOTAL AREA(ACRES) = 829.8 PEAK FLOW RATE(CFS) = 271.21

****
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) = 1.487
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	0.60	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) =      1.35
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.35

****************************************************************************
  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) =       4.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.38   Tc(MIN.) =    8.42
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.230
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =    6.51
  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) =       7.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.24
  FLOW VELOCITY(FEET/SEC.) =  2.15   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  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  18.0 INCH PIPE IS  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
```



```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.58
  PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   10.71
  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.) =   10.71
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.029
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =    9.76
  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) =      15.72

****************************************************************************
  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.) =   10.71
  RAINFALL INTENSITY(INCH/HR) =   1.03
  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 =      15.72

****************************************************************************
  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) =  1.147
  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) =      0.74
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      0.74

****************************************************************************
  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) =  1.063
  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               -        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) =       1.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   0.78
  Tc(MIN.) =    9.97
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    0.79
  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) =       1.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.46
  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) =  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               -        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) =       2.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.64
  AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   3.29
  Tc(MIN.) =   13.26
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    2.15
  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) =       3.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   2.76
  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   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.12
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   13.27
  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.) =   13.27
  RAINFALL INTENSITY(INCH/HR) =   0.92
  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 =       3.12

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.72   10.71    1.029  0.60( 0.32) 0.54      24.8     400.00
      2        3.12   13.27    0.916  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 NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	18.84	10.71	1.029	0.60(0.38)	0.64	32.7	400.00
2	16.33	13.27	0.916	0.60(0.39)	0.65	34.6	430.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 18.84 Tc(MIN.) = 10.71
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 24.0 INCH PIPE IS 17.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 7.84
ESTIMATED PIPE DIAMETER(INCH) = 24.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 18.84
PIPE TRAVEL TIME(MIN.) = 2.24 Tc(MIN.) = 12.96
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.) = 12.96
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930
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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.842
SUBAREA AREA(ACRES) = 7.70 SUBAREA RUNOFF(CFS) = 2.95
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) = 19.07

****
FLOW PROCESS FROM NODE 404.00 TO NODE 404.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.96
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.930
SUBAREA LOSS RATE DATA(AMC II):

DEVELOPMENT TYPE/ LAND USE	SCS SOIL GROUP	AREA (ACRES)	Fp (INCH/HR)	Ap (DECIMAL)	SCS CN
USER-DEFINED	-	8.80	0.60	0.500	-
USER-DEFINED	-	4.20	0.60	0.500	-
USER-DEFINED	-	1.10	0.60	0.400	-

SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.492
SUBAREA AREA(ACRES) = 14.10 SUBAREA RUNOFF(CFS) = 8.05
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) = 27.13

****
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 33.0 INCH PIPE IS 25.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 5.50
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 27.13
PIPE TRAVEL TIME(MIN.) = 4.62 Tc(MIN.) = 17.58
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.) = 17.58
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.778
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 PERVIOUS LOSS RATE, Fp(INCH/HR) = 0.60
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap = 0.698
SUBAREA AREA(ACRES) = 13.00 SUBAREA RUNOFF(CFS) = 4.21
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) = 27.13
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.) =   17.58
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.778
  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      0.60     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) =    9.27
  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) =      33.16

****************************************************************************
  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  24.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.80
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.16
  PIPE TRAVEL TIME(MIN.) =   2.62    Tc(MIN.) =   20.20
  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.) =   20.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        5.50      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) =   31.84
  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) =      60.13

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
================================================================================
  MAINLINE Tc(MIN.) =   20.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        4.70      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) =    1.31
  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) =      61.43

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.20
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.716
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        9.30      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) =    4.37
  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) =      65.80

****************************************************************************
  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  30.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.67
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.80
  PIPE TRAVEL TIME(MIN.) =   2.90    Tc(MIN.) =   23.11
  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.) =   23.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.664
  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     0.200     -
  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) =    9.49
  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) =      67.47

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.664
  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     0.200     -
  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) =    7.24
  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) =      74.72

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.664
  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      0.60     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) =   10.69
  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) =      85.41

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.664
  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     0.400     -
  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) =    7.14
  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) =      92.55

****************************************************************************
  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  33.0 INCH PIPE IS  26.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.96
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.55
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =   23.72
  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) =  1.452
  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) =      0.61
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      0.61

********************************************************************************
  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   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.61
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =    7.52
  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.) =    7.52
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.328
  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) =    1.31
  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) =       1.84

********************************************************************************
  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   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.84
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =    9.11
  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.) =    9.11
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
  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) =    1.87
  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) =       3.33

********************************************************************************
  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   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.33
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =    9.78
  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.) =    9.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.084
  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                -        0.10      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) =    3.55
  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) =       6.52

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.78
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.084
  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) =    0.09
  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) =       6.61

****************************************************************************
  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   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.61
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   10.60
  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.) =   10.60
  *   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                -        0.90      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) =    7.92
  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) =      14.02

****************************************************************************
  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  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.02
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   11.44
  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.) =   11.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.997
  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     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) =   18.45
  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) =      31.71

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =   11.44
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.997
  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     0.600     -
  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) =    9.41
  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) =      41.12

********************************************************************************
  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.) =   11.44
  RAINFALL INTENSITY(INCH/HR) =   1.00
  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 =      41.12

********************************************************************************
  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) =  1.452
  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"         -        0.70      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) =      0.77
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.77
```



```
********************************************************************************
  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   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    7.47
  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.) =    7.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.333
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      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) =    1.37
  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) =       2.04

********************************************************************************
  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   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.04
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =    8.49
  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.) =    8.49
```

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.223
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     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) =    3.06
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) =       4.83

****************************************************************************
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   6.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       4.83
PIPE TRAVEL TIME(MIN.) =   2.14    Tc(MIN.) =   10.64
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.) =   10.64
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.032
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     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) =    1.95
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) =       5.56

****************************************************************************
FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.64
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.032
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               -        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) =    3.27
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) =       8.83

****************************************************************************
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
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.18
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       8.83
PIPE TRAVEL TIME(MIN.) =   2.82    Tc(MIN.) =   13.46
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.) =   13.46
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.908
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      0.60     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) =   15.75
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) =      22.82

****************************************************************************
FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   13.46
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.908
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      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) =    0.71
  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) =      23.53

******************************************************************************
  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.) =   13.46
  RAINFALL INTENSITY(INCH/HR) =   0.91
  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 =      23.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       41.12   11.44    0.997  0.60( 0.25) 0.41      61.0     410.00
      2       23.53   13.46    0.908  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       64.04   11.44    0.997  0.60( 0.27) 0.45      97.5     410.00
      2       59.76   13.46    0.908  0.60( 0.27) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.04    Tc(MIN.) =    11.44
  EFFECTIVE AREA(ACRES) =      97.53   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  33.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.05
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      64.04
  PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   12.82
  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.) =   12.82
  *   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               -        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) =   11.65
  EFFECTIVE AREA(ACRES) =    114.83   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) =      70.34

******************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   12.82
  *   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               -        0.80      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) =    0.63
  EFFECTIVE AREA(ACRES) =    115.83   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) =      70.97

******************************************************************************
  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  36.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.30
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      70.97
  PIPE TRAVEL TIME(MIN.) =   2.13    Tc(MIN.) =   14.95
  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.) =   14.95
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.842
  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     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) =    6.78
  EFFECTIVE AREA(ACRES) =    136.73   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) =      70.97
  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.) =   14.95
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.842
  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     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) =    4.34
  EFFECTIVE AREA(ACRES) =    151.23   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) =      72.31

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       72.31   14.95    0.842  0.60( 0.31) 0.52     151.2     410.00
      2       68.30   17.01    0.792  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       92.55   23.72    0.653  0.60( 0.27) 0.45     260.7     400.00
      2       81.42   26.60    0.608  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      159.42   14.95    0.842  0.60( 0.29) 0.48     315.6     410.00
      2      158.69   17.01    0.792  0.60( 0.29) 0.48     344.7     420.00
      3      141.18   23.72    0.653  0.60( 0.29) 0.48     418.4     400.00
      4      123.60   26.60    0.608  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) =      159.42  Tc(MIN.) =   14.951
  EFFECTIVE AREA(ACRES) =    315.57  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  39.0 INCH PIPE IS  28.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.55
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     159.42
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =   15.87
  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.) =   15.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.819
  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      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) =   26.56
  EFFECTIVE AREA(ACRES) =    356.87   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) =     176.98

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.819
  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      0.100     -
  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) =    0.61
  EFFECTIVE AREA(ACRES) =    357.77   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) =     177.59

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      177.59   15.87    0.819  0.60( 0.27) 0.45     357.8     410.00
      2      174.58   17.94    0.770  0.60( 0.27) 0.45     386.9     420.00
      3      152.26   24.68    0.636  0.60( 0.27) 0.45     460.6     400.00
      4      136.10   27.58    0.594  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      271.21   22.11    0.682  0.60( 0.23) 0.38     665.2     310.00
      2      255.95   26.88    0.604  0.60( 0.23) 0.39     764.4     300.00
      3      254.53   27.71    0.592  0.60( 0.23) 0.39     779.2     320.00
      4      185.09   48.67    0.428  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      431.19   15.87    0.819  0.60( 0.25) 0.41     835.3     410.00
      2      437.09   17.94    0.770  0.60( 0.25) 0.41     926.5     420.00
      3      431.98   22.11    0.682  0.60( 0.24) 0.41    1097.7     310.00
      4      415.25   24.68    0.636  0.60( 0.25) 0.41    1179.2     400.00
      5      395.93   26.88    0.604  0.60( 0.25) 0.41    1226.4     300.00
      6      390.86   27.58    0.594  0.60( 0.25) 0.41    1239.2     430.00
      7      390.19   27.71    0.592  0.60( 0.25) 0.41    1241.7     320.00
      8      283.16   48.67    0.428  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) =      437.09  Tc(MIN.) =   17.935
  EFFECTIVE AREA(ACRES) =    926.46  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.) =     17.94
  EFFECTIVE AREA(ACRES) =    926.46  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.409
  PEAK FLOW RATE(CFS)   =     437.09

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      431.19   15.87    0.819  0.60( 0.25) 0.41     835.3     410.00
      2      437.09   17.94    0.770  0.60( 0.25) 0.41     926.5     420.00
      3      431.98   22.11    0.682  0.60( 0.24) 0.41    1097.7     310.00
      4      415.25   24.68    0.636  0.60( 0.25) 0.41    1179.2     400.00
      5      395.93   26.88    0.604  0.60( 0.25) 0.41    1226.4     300.00
      6      390.86   27.58    0.594  0.60( 0.25) 0.41    1239.2     430.00
      7      390.19   27.71    0.592  0.60( 0.25) 0.41    1241.7     320.00
      8      283.16   48.67    0.428  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)
          (c) Copyright 1983-2013 Advanced Engineering Software (aes)
              Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED C                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 5-YR EV SEPT 2022 ROKAMOTO                                             *
 ***********************************************************************

  FILE NAME: PA3C05EV.DAT
  TIME/DATE OF STUDY: 20:40 09/17/2022
==============================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    0.200/0.200/ ---    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) =  1.719
  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"       -        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) =      2.33
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      2.33

******************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.87
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.06
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   3.80   Tc(MIN.) =   12.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.371
  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             -        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) =    5.04
  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) =       6.87

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.23
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.86
  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  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.87
  PIPE TRAVEL TIME(MIN.) =   2.00    Tc(MIN.) =   14.24
  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.) =   14.24
  *   5 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               -        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) =    8.26
  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) =      14.46

****************************************************************************
  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  18.4 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.46
  PIPE TRAVEL TIME(MIN.) =   3.56    Tc(MIN.) =   17.80
  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.) =   17.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.099
  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     0.100     -
  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) =   14.74
  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) =      27.33

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.099
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.70      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) =    8.92
  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) =      36.25

****************************************************************************
  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  27.0 INCH PIPE IS  21.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.49
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.25
  PIPE TRAVEL TIME(MIN.) =   2.05    Tc(MIN.) =   19.85
  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.) =   19.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.025
  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) =    2.64
  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) =      36.25
  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.059
  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) =   13.94
```



```
  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   19.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.025
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   13.40
  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) =      49.47

****************************************************************************
  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  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.97
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.47
  PIPE TRAVEL TIME(MIN.) =   1.43    Tc(MIN.) =   21.27
  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.) =   21.27
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.989
  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) =    3.31
  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) =      50.72

****************************************************************************
  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.) =   21.27
  RAINFALL INTENSITY(INCH/HR) =   0.99
  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 =      50.72

****************************************************************************
  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) =  1.848
  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) =      2.21
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
  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) =       4.07
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.20
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.81
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.63
  STREET FLOW TRAVEL TIME(MIN.) =   2.76   Tc(MIN.) =   10.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.496
  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     -
  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) =    3.72
  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) =       5.48

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  11.68
  FLOW VELOCITY(FEET/SEC.) =  1.94   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  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  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.48
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   11.38
  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.) =   11.38
  *   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               -        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) =    7.23
  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) =      12.44

****************************************************************************
  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  21.0 INCH PIPE IS  12.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.44
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.07
  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.) =   12.07
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.382
  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               -        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) =   14.60
  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) =      26.65

****************************************************************************
  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  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.14
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.65
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   12.86
  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.) =   12.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.332
  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               -        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) =   18.57
  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) =      44.20

****************************************************************************
  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  30.0 INCH PIPE IS  23.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.77
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.20
  PIPE TRAVEL TIME(MIN.) =   3.37    Tc(MIN.) =   16.23
  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.) =   16.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.156
  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               -        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) =   21.68
  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) =      59.40

****************************************************************************
  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  27.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.80
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      59.40
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   16.94
  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.) =   16.94
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.130
  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     0.100     -
  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) =   13.82
  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) =      71.68

****************************************************************************
  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.) =   16.94
  RAINFALL INTENSITY(INCH/HR) =   1.13
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      84.80
  TOTAL STREAM AREA(ACRES) =      84.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      71.68

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       50.72   21.27    0.989  0.50( 0.16) 0.31      67.6     300.00
      2       71.68   16.94    1.130  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      118.89   16.94    1.130  0.50( 0.18) 0.35     138.6     310.00
      2      111.67   21.27    0.989  0.50( 0.18) 0.35     152.4     300.00
```



```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     118.89    Tc(MIN.) =    16.94
  EFFECTIVE AREA(ACRES) =     138.64   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  36.0 INCH PIPE IS  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.89
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     118.89
  PIPE TRAVEL TIME(MIN.) =   3.03    Tc(MIN.) =   19.97
  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.) =   19.97
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.021
  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     0.200     -
  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) =   15.78
  EFFECTIVE AREA(ACRES) =    158.64   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) =     121.06

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.97
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.021
  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     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.364
  SUBAREA AREA(ACRES) =   21.90      SUBAREA RUNOFF(CFS) =   16.53
  EFFECTIVE AREA(ACRES) =    180.54   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) =     137.59

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.97
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.021
  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     0.500     -
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   15.06
  EFFECTIVE AREA(ACRES) =    203.34   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) =     152.65

****************************************************************************
  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  36.0 INCH PIPE IS  26.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.75
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     152.65
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   20.48
  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.) =   20.48
  RAINFALL INTENSITY(INCH/HR) =   1.01
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.50
```



```
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.34
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     152.65

****************************************************************************
  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.719
  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"       -        2.80      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) =      4.08
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      4.08

****************************************************************************
  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) =       8.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.15
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.07
  STREET FLOW TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   10.56
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.475
  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               -        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) =    8.91
  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) =      12.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.26
  FLOW VELOCITY(FEET/SEC.) =  3.08   DEPTH*VELOCITY(FT*FT/SEC.) =   1.29
  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  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.38
  PIPE TRAVEL TIME(MIN.) =   2.26    Tc(MIN.) =   12.82
  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.) =   12.82
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  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     0.850     -
  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) =   13.75
  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) =      24.86

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```



```
  MAINLINE Tc(MIN.) =   12.82
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  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     0.200     -
  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) =    0.11
  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) =      24.97

****************************************************************************
  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  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.72
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.97
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   14.52
  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.) =   14.52
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.230
  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     0.100     -
  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) =   14.80
  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) =      37.48

****************************************************************************
  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  18.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.48
  PIPE TRAVEL TIME(MIN.) =   2.36    Tc(MIN.) =   16.88
  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.) =   16.88
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.132
  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) =   34.19
  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) =      68.14

****************************************************************************
  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  27.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.76
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.14
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =   17.71
  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.) =   17.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.102
  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) =   27.26
  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) =      93.17

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.102
  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) =   14.08
  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) =     107.25

****************************************************************************
  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  36.0 INCH PIPE IS  28.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.68
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     107.25
  PIPE TRAVEL TIME(MIN.) =   1.63    Tc(MIN.) =   19.34
  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.) =   19.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.044
  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) =   53.16
  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) =     153.00

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.34
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.044
  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) =   36.02
  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) =     189.01

****************************************************************************
  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  42.0 INCH PIPE IS  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.67
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     189.01
  PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   21.30
  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.) =   21.30
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.989
  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) =   30.29
  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) =     207.01

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.30
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.989
  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) =   19.51
  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) =     226.52

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.30
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.989
  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) =   29.06
  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) =     255.57

****************************************************************************
```

```
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.30
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.989
  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     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) =   28.32
  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) =     283.89

****************************************************************************
  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  60.0 INCH PIPE IS  45.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.83
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     283.89
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   22.38
  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.) =   22.38
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.963
  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      0.50     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) =   25.73
  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) =     300.47
```



```
****************************************************************************
  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  75.0 INCH PIPE IS  58.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.80
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     300.47
  PIPE TRAVEL TIME(MIN.) =   2.80    Tc(MIN.) =   25.18
  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.) =   25.18
  RAINFALL INTENSITY(INCH/HR) =   0.90
  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 =     300.47

****************************************************************************
  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) =  1.618
  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      0.50     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) =      1.41
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.41

****************************************************************************
  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) =  1.438
  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) =       2.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.61
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   1.97
  Tc(MIN.) =   11.16
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    1.94
  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) =       3.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   5.03
  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) =  1.208
  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) =      10.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.92
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   3.70
  Tc(MIN.) =   14.87
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   14.47
  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) =      16.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   5.56
  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) =  1.098
  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) =      21.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.10
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   2.96
  Tc(MIN.) =   17.82
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =    9.31
  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) =      23.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =   5.24
  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.) =   17.82
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.098
  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) =    1.40
  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) =      24.93

****************************************************************************
  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) =  1.021
  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) =      33.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.41
  AVERAGE FLOW DEPTH(FEET) =   1.43   TRAVEL TIME(MIN.) =   2.16
  Tc(MIN.) =   19.98
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   16.44
  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) =      38.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   5.61
  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.) =   19.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.021
  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) =    2.18
  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) =      40.31
```



```
****************************************************************************
  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  27.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.35
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.31
  PIPE TRAVEL TIME(MIN.) =   8.48    Tc(MIN.) =   28.46
  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) =  0.779
  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) =      42.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.36
  AVERAGE FLOW DEPTH(FEET) =   1.48   TRAVEL TIME(MIN.) =   5.15
  Tc(MIN.) =   33.61
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    3.49
  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) =      40.31
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.46   FLOW VELOCITY(FEET/SEC.) =   6.30
  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.) =   33.61
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.779
```

```
  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                -        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) =     2.11
  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) =      40.31
  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.) =   33.61
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.779
  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) =     3.16
  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) =      40.31
  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.) =   33.61
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.779
  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) =     1.94
  EFFECTIVE AREA(ACRES) =    117.20   AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =      117.2       PEAK FLOW RATE(CFS) =      40.31
  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  27.0 INCH PIPE IS  17.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.73
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      40.31
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   34.81
  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.) =   34.81
  RAINFALL INTENSITY(INCH/HR) =   0.76
  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 =      40.31

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      152.65   20.48    1.008  0.50( 0.19) 0.37     203.3     310.00
      1      142.87   24.84    0.904  0.50( 0.18) 0.37     217.1     300.00
      2      300.47   25.18    0.897  0.50( 0.18) 0.35     424.2     320.00
      3       40.31   34.81    0.763  0.50( 0.47) 0.94     117.2     390.00

  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      474.95   20.48    1.008  0.50( 0.21) 0.42     617.3     310.00
      2      482.22   24.84    0.904  0.50( 0.21) 0.43     719.3     300.00
      3      482.41   25.18    0.897  0.50( 0.21) 0.43     726.1     320.00
      4      399.43   34.81    0.763  0.50( 0.22) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =     482.41    Tc(MIN.) =    25.18
  EFFECTIVE AREA(ACRES) =     726.07   AREA-AVERAGED Fm(INCH/HR) =  0.21
  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  54.0 INCH PIPE IS  40.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.66
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     482.41
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   25.35
  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.) =   25.35
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  0.895
  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      0.50     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) =   48.59
  EFFECTIVE AREA(ACRES) =    791.17   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) =     494.28

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      494.99   20.65    1.004  0.50( 0.20) 0.40     682.4     310.00
      2      493.51   25.01    0.900  0.50( 0.20) 0.40     784.4     300.00
      3      494.28   25.35    0.895  0.50( 0.20) 0.40     791.2     320.00
      4      406.58   34.99    0.760  0.50( 0.21) 0.42     823.6     390.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     494.99  Tc(MIN.) =   20.65
  AREA-AVERAGED Fm(INCH/HR) =  0.20  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.40  EFFECTIVE AREA(ACRES) =     682.45

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.65
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.004
  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               -        4.10      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) =    5.29
  EFFECTIVE AREA(ACRES) =    688.65   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =      829.8       PEAK FLOW RATE(CFS) =     500.28

****************************************************************************
  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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.040
  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      0.50     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) =      1.99
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.99

****************************************************************************
  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) =       7.25
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.01
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.13
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.15   Tc(MIN.) =    8.19
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.752
  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     0.600     -
  USER-DEFINED               -        4.40      0.50     0.400     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   10.46
  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) =      12.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
  FLOW VELOCITY(FEET/SEC.) =  2.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.09
  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  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.13
  PIPE TRAVEL TIME(MIN.) =   2.05    Tc(MIN.) =   10.24
  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.) =   10.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.495
  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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   17.26
  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) =      27.34

****************************************************************************
  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.) =   10.24
  RAINFALL INTENSITY(INCH/HR) =   1.50
  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 =      27.34

****************************************************************************
  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) =  1.618
  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      0.50     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.51
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.51
```

```
****************************************************************************
  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) =  1.530
  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) =       2.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.99
  AVERAGE FLOW DEPTH(FEET) =   0.40   TRAVEL TIME(MIN.) =   0.65
  Tc(MIN.) =    9.85
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    1.76
  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) =       3.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   5.43
  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) =  1.352
  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) =       5.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.20
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   2.71
  Tc(MIN.) =   12.56
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    5.17
```



```
  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) =       7.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   3.47
  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   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.78
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   12.57
  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.) =   12.57
  RAINFALL INTENSITY(INCH/HR) =   1.35
  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 =       7.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       27.34   10.24    1.495  0.50( 0.27) 0.54      24.8     400.00
      2        7.78   12.57    1.351  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       34.71   10.24    1.495  0.50( 0.32) 0.64      32.8     400.00
      2       31.90   12.57    1.351  0.50( 0.33) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      34.71    Tc(MIN.) =    10.24
```

```
  EFFECTIVE AREA(ACRES) =      32.79   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  30.0 INCH PIPE IS  21.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.12
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.71
  PIPE TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =   12.17
  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.) =   12.17
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.375
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.842
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =    6.61
  EFFECTIVE AREA(ACRES) =     40.49   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) =      37.79

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.17
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.375
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.492
```



```
  SUBAREA AREA(ACRES) =   14.10      SUBAREA RUNOFF(CFS) =   14.33
  EFFECTIVE AREA(ACRES) =     54.59   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) =      52.12

****************************************************************************
  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  42.0 INCH PIPE IS  32.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      52.12
  PIPE TRAVEL TIME(MIN.) =   3.93    Tc(MIN.) =   16.10
  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.) =   16.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.160
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.698
  SUBAREA AREA(ACRES) =   13.00      SUBAREA RUNOFF(CFS) =    9.49
  EFFECTIVE AREA(ACRES) =     67.59   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) =      52.12
  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.) =   16.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.160
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.455
  SUBAREA AREA(ACRES) =   20.40      SUBAREA RUNOFF(CFS) =   17.12
  EFFECTIVE AREA(ACRES) =     87.99   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) =      68.17

****************************************************************************
  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  30.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.23
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.17
  PIPE TRAVEL TIME(MIN.) =   2.23    Tc(MIN.) =   18.33
  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.) =   18.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        5.50      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) =   52.97
  EFFECTIVE AREA(ACRES) =    148.79   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) =     114.79

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        4.70      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) =    4.30
  EFFECTIVE AREA(ACRES) =    156.19   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) =     119.09

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.080
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        9.30      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) =    8.08
  EFFECTIVE AREA(ACRES) =    166.39   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) =     127.17

****************************************************************************
  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  39.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.75
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     127.17
  PIPE TRAVEL TIME(MIN.) =   2.45    Tc(MIN.) =   20.78
  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.) =   20.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  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     0.200     -
  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) =   15.89
  EFFECTIVE AREA(ACRES) =    186.19   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) =     131.25

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  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) =   12.81
  EFFECTIVE AREA(ACRES) =    202.99   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) =     144.05

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   20.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  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) =   24.02
  EFFECTIVE AREA(ACRES) =    240.49   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) =     168.07

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```



```
============================================================================
  MAINLINE Tc(MIN.) =   20.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  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) =   14.13
  EFFECTIVE AREA(ACRES) =    260.79   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) =     182.21

****************************************************************************
  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  31.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.76
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     182.21
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   21.29
  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) =  1.997
```

```
  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) =      1.00
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.00

****************************************************************************
  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   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.51
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =    7.35
  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.) =    7.35
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.865
  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      0.50     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) =    2.25
  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) =       3.17

****************************************************************************
  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   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.17
  PIPE TRAVEL TIME(MIN.) =   1.36    Tc(MIN.) =    8.72
  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.) =    8.72
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.682
  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     0.900     -
  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) =    3.56
  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) =       6.33

****************************************************************************
  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   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.33
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    9.28
  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.) =    9.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  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                -        0.10      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) =    6.56
  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) =      12.53

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.28
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  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     0.200     -
  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) =    0.14
  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) =      12.66

****************************************************************************
  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   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.66
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    9.97
  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.) =    9.97
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  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      0.50     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) =   13.36
  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) =      25.08

****************************************************************************
  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  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.08
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   10.70
  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.) =   10.70
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.467
  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     0.200     -
  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) =   28.65
  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) =      52.76

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.70
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.467
  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     0.600     -
  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) =   16.42
  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) =      69.18

****************************************************************************
  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.) =   10.70
  RAINFALL INTENSITY(INCH/HR) =   1.47
  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 =      69.18

****************************************************************************
  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) =  1.997
  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"         -        0.70      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) =      1.28
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
  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   3.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.28
  PIPE TRAVEL TIME(MIN.) =   0.94    Tc(MIN.) =    7.31
  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.) =    7.31
  *   5 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
  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) =    2.37
  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) =       3.55

****************************************************************************
  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   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.55
  PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =    8.19
  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.) =    8.19
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.753
  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     0.900     -
  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) =    5.46
  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) =       8.72

****************************************************************************
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.72
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =   10.03
  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.) =   10.03
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  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     0.200     -
  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) =    3.55
  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) =      10.70

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.03
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.508
  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     0.600     -
  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) =    5.87
  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) =      16.58

****************************************************************************
  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  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.58
  PIPE TRAVEL TIME(MIN.) =   2.42    Tc(MIN.) =   12.45
  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.) =   12.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  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     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) =   27.15
  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) =      41.59

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.45
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.358
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        1.30      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) =    1.30
  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) =      42.88

****************************************************************************
  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.) =   12.45
  RAINFALL INTENSITY(INCH/HR) =   1.36
  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 =      42.88

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       69.18   10.70    1.467  0.50( 0.21) 0.41      61.0     410.00
      2       42.88   12.45    1.358  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      109.64   10.70    1.467  0.50( 0.22) 0.45      97.9     410.00
      2      106.10   12.45    1.358  0.50( 0.22) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     109.64    Tc(MIN.) =    10.70
  EFFECTIVE AREA(ACRES) =      97.95   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  42.0 INCH PIPE IS  29.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.11
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     109.64
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =   11.89
  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.) =   11.89
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.393
  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      0.300     -
  USER-DEFINED                -        0.10      0.50      0.900     -
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.339
  SUBAREA AREA(ACRES) =   17.30      SUBAREA RUNOFF(CFS) =   19.05
  EFFECTIVE AREA(ACRES) =    115.25   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) =     122.15

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.89
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.393
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    1.07
  EFFECTIVE AREA(ACRES) =    116.25   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) =     123.23

****************************************************************************
  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  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     123.23
  PIPE TRAVEL TIME(MIN.) =   1.85    Tc(MIN.) =   13.74
  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.) =   13.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  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) =   16.48
  EFFECTIVE AREA(ACRES) =    137.15   AREA-AVERAGED Fm(INCH/HR) =  0.24
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =      143.2       PEAK FLOW RATE(CFS) =     127.74

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.74
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.278
  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) =   11.13
  EFFECTIVE AREA(ACRES) =    151.65   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) =     138.87

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      138.87   13.74    1.278  0.50( 0.26) 0.52     151.6     410.00
      2      130.59   15.54    1.180  0.50( 0.26) 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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      182.21   21.29    0.989  0.50( 0.22) 0.45     260.8     400.00
      2      168.69   23.84    0.928  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      300.95   13.74    1.278  0.50( 0.24) 0.48     319.9     410.00
      2      296.94   15.54    1.180  0.50( 0.24) 0.48     348.1     420.00
      3      285.64   21.29    0.989  0.50( 0.24) 0.48     418.5     400.00
      4      263.43   23.84    0.928  0.50( 0.24) 0.48     420.3     430.00
    TOTAL AREA(ACRES) =       420.3

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      300.95  Tc(MIN.) =   13.739
  EFFECTIVE AREA(ACRES) =    319.95  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.

****************************************************************************
  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  48.0 INCH PIPE IS  37.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.43
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     300.95
  PIPE TRAVEL TIME(MIN.) =   0.80    Tc(MIN.) =   14.53
  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.) =   14.53
  *   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               -        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) =   42.43
  EFFECTIVE AREA(ACRES) =    361.25   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) =     326.63

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.53
  *   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               -        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) =    0.95
  EFFECTIVE AREA(ACRES) =    362.15   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) =     327.59

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      327.59   14.53    1.229  0.50( 0.22) 0.45     362.1     410.00
      2      325.81   16.34    1.152  0.50( 0.22) 0.45     390.3     420.00
      3      309.11   22.09    0.970  0.50( 0.22) 0.45     460.7     400.00
      4      284.12   24.67    0.908  0.50( 0.23) 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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      500.28   20.65    1.004  0.50( 0.20) 0.39     688.6     310.00
      2      498.21   25.01    0.900  0.50( 0.20) 0.40     790.6     300.00
      3      498.96   25.35    0.895  0.50( 0.20) 0.40     797.4     320.00
      4      410.50   34.99    0.760  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      777.65   14.53    1.229  0.50( 0.21) 0.42     846.9     410.00
      2      793.98   16.34    1.152  0.50( 0.21) 0.42     935.3     420.00
      3      813.57   20.65    1.004  0.50( 0.21) 0.42    1131.7     310.00
      4      808.70   22.09    0.970  0.50( 0.21) 0.42    1183.0     400.00
      5      782.49   24.67    0.908  0.50( 0.21) 0.42    1245.2     430.00
      6      779.00   25.01    0.900  0.50( 0.21) 0.42    1253.1     300.00
      7      777.79   25.35    0.895  0.50( 0.21) 0.42    1259.9     320.00
      8      633.14   34.99    0.760  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) =      813.57  Tc(MIN.) =   20.648
  EFFECTIVE AREA(ACRES) =   1131.70  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.) =     20.65
  EFFECTIVE AREA(ACRES) =   1131.70  AREA-AVERAGED Fm(INCH/HR)=  0.21
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap = 0.416
  PEAK FLOW RATE(CFS)   =     813.57

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1      777.65   14.53    1.229  0.50( 0.21) 0.42     846.9     410.00
      2      793.98   16.34    1.152  0.50( 0.21) 0.42     935.3     420.00
      3      813.57   20.65    1.004  0.50( 0.21) 0.42    1131.7     310.00
      4      808.70   22.09    0.970  0.50( 0.21) 0.42    1183.0     400.00
      5      782.49   24.67    0.908  0.50( 0.21) 0.42    1245.2     430.00
      6      779.00   25.01    0.900  0.50( 0.21) 0.42    1253.1     300.00
      7      777.79   25.35    0.895  0.50( 0.21) 0.42    1259.9     320.00
      8      633.14   34.99    0.760  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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED C                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 10-YR EV SEPT 2022 ROKAMOTO                                          *
 ***********************************************************************

  FILE NAME: PA3C10EV.DAT
  TIME/DATE OF STUDY: 20:37 09/17/2022
=============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    0.200/0.200/ ---    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) =  2.374
  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        1.60      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) =      3.33
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      3.33

*****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.10
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.25
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.87
  STREET FLOW TRAVEL TIME(MIN.) =   3.49   Tc(MIN.) =   11.92
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.955
  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) =    7.51
  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) =      10.23

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.57
  FLOW VELOCITY(FEET/SEC.) =  2.45   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  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  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.23
  PIPE TRAVEL TIME(MIN.) =   1.81    Tc(MIN.) =   13.73
  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.) =   13.73
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.805
  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) =   12.57
  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) =      21.99

****************************************************************************
  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  30.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.50
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.99
  PIPE TRAVEL TIME(MIN.) =   3.25    Tc(MIN.) =   16.98
  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.) =   16.98
```



```
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.602
  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) =   22.50
  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) =      41.93

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.602
  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) =   15.87
  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) =      57.81

****************************************************************************
  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  33.0 INCH PIPE IS  25.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.94
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.81
  PIPE TRAVEL TIME(MIN.) =   1.80    Tc(MIN.) =   18.78
  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.) =   18.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  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) =    4.17
  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) =      58.61

******************************************************************************
  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) =  1.508
  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) =   22.43

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   22.52
  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) =      81.12
```



```
******************************************************************************
  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  30.0 INCH PIPE IS  23.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.92
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      81.12
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   20.07
  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.) =   20.07
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.459
  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) =    5.10
  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) =      83.06

******************************************************************************
  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.) =   20.07
  RAINFALL INTENSITY(INCH/HR) =   1.46
  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 =      83.06

******************************************************************************
  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) =  2.541
  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) =      3.13
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.13

****************************************************************************
  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) =       5.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.38
    HALFSTREET FLOOD WIDTH(FEET) =   12.07
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.54   Tc(MIN.) =   10.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.156
  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) =    5.52
  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) =       8.16

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  13.95
  FLOW VELOCITY(FEET/SEC.) =  2.11   DEPTH*VELOCITY(FT*FT/SEC.) =   0.87
  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  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.76
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.16
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =   11.08
  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.) =   11.08
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.037
  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) =   10.62
  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) =      18.32

****************************************************************************
  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  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.00
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.32
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   11.71
  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.) =   11.71
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.975
  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        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) =   21.86
  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) =      39.61

****************************************************************************
  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  27.0 INCH PIPE IS  18.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.33
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.61
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   12.43
  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.) =   12.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.910
  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        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) =   28.92
  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) =      67.18

****************************************************************************
  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  36.0 INCH PIPE IS  26.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.07
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      67.18
  PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   15.43
  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.) =   15.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.691
  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        0.40      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) =   36.89
  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) =      96.06

****************************************************************************
  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  33.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.25
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.06
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   16.06
  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.) =   16.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.653
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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) =   23.66
  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) =     117.46

****************************************************************************
  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.) =   16.06
  RAINFALL INTENSITY(INCH/HR) =   1.65
  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 =     117.46

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       83.06   20.07    1.459  0.30( 0.09) 0.31      67.6     300.00
      2      117.46   16.06    1.653  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      193.39   16.06    1.653  0.30( 0.11) 0.35     138.9     310.00
      2      185.64   20.07    1.459  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     193.39    Tc(MIN.) =    16.06
  EFFECTIVE AREA(ACRES) =     138.88   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  42.0 INCH PIPE IS  33.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.28
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     193.39
  PIPE TRAVEL TIME(MIN.) =   2.72    Tc(MIN.) =   18.78
  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.) =   18.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  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
  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) =   25.70
  EFFECTIVE AREA(ACRES) =    158.88   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) =     201.70

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==========================================================================
  MAINLINE Tc(MIN.) =   18.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  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) =   27.69
  EFFECTIVE AREA(ACRES) =    180.78   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) =     229.39

**************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
--------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  MAINLINE Tc(MIN.) =   18.78
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.514
  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) =   27.54
  EFFECTIVE AREA(ACRES) =    203.58   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) =     256.93

**************************************************************************
  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  42.0 INCH PIPE IS  33.7 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.08
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     256.93
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   19.23
  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.) =   19.23
  RAINFALL INTENSITY(INCH/HR) =   1.49
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.58
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     256.93

**************************************************************************
  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) =  2.374
  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) =      5.83
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      5.83

**************************************************************************
  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) =      12.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.09
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.94   Tc(MIN.) =   10.38
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.113
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   13.42
  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) =      18.59

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.46   HALFSTREET FLOOD WIDTH(FEET) =  16.84
  FLOW VELOCITY(FEET/SEC.) =  3.41   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
  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  27.0 INCH PIPE IS  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.59
  PIPE TRAVEL TIME(MIN.) =   2.06    Tc(MIN.) =   12.43
  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.) =   12.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.909
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   22.21
  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) =      38.94

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.909
  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) =    0.17
  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) =      39.11

****************************************************************************
  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  30.0 INCH PIPE IS  23.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.57
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      39.11
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   13.98
  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.) =   13.98
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.787
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.10      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) =   24.09
  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) =      60.55

****************************************************************************
  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  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.42
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      60.55
  PIPE TRAVEL TIME(MIN.) =   2.09    Tc(MIN.) =   16.06
  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.) =   16.06
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.653
  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        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) =   57.32
  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) =     113.00

****************************************************************************
  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  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.77
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     113.00
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =   16.80
  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.) =   16.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.612
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.00      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) =   45.44
  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) =     155.41

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.80
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.612
  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       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) =   28.81
  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) =     184.22

****************************************************************************
  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  45.0 INCH PIPE IS  34.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.44
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     184.22
  PIPE TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   18.21
  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.) =   18.21
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
  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) =   84.82
  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) =     260.02

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.21
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.541
  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       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) =   58.31
  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) =     318.33

****************************************************************************
  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  51.0 INCH PIPE IS  41.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.80
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     318.33
  PIPE TRAVEL TIME(MIN.) =   1.72    Tc(MIN.) =   19.93
  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.) =   19.93
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   47.42
  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) =     348.67

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.93
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
```

```
 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) =   30.37
 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) =     379.03

****************************************************************************
 FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.93
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
 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) =   49.19
 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) =     428.22

****************************************************************************
 FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.93
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.464
 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) =   50.00
 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) =     478.21

****************************************************************************
 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  72.0 INCH PIPE IS  56.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.20
 ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     478.21
 PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   20.88
 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.) =   20.88
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.426
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                B       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) =   39.50
 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) =     504.32

****************************************************************************
 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  90.0 INCH PIPE IS  71.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.35
  ESTIMATED PIPE DIAMETER(INCH) =  90.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     504.32
  PIPE TRAVEL TIME(MIN.) =   2.47    Tc(MIN.) =   23.36
  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.) =   23.36
  RAINFALL INTENSITY(INCH/HR) =   1.34
  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 =     504.32

****************************************************************************
  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) =  2.262
  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) =      2.47
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.47

****************************************************************************
  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) =  2.057
  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) =       4.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.38
  AVERAGE FLOW DEPTH(FEET) =   0.52   TRAVEL TIME(MIN.) =   1.69
  Tc(MIN.) =   10.88
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    3.64
  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) =       5.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   5.86
  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) =  1.786
  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) =      21.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.86
  AVERAGE FLOW DEPTH(FEET) =   1.10   TRAVEL TIME(MIN.) =   3.11
```

```
  Tc(MIN.) =   13.99
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   30.36
  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) =      35.31

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.33   FLOW VELOCITY(FEET/SEC.) =   6.65
  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) =  1.632
  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) =      45.69
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.19
  AVERAGE FLOW DEPTH(FEET) =   1.57   TRAVEL TIME(MIN.) =   2.43
  Tc(MIN.) =   16.43
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   20.74
  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) =      52.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.65   FLOW VELOCITY(FEET/SEC.) =   6.39
  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.) =   16.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.632
```



```
  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) =    3.12
  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) =      55.52

****************************************************************************
  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) =  1.542
  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) =      75.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.64
  AVERAGE FLOW DEPTH(FEET) =   1.94   TRAVEL TIME(MIN.) =   1.76
  Tc(MIN.) =   18.19
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   39.22
  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) =      90.96

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.09   FLOW VELOCITY(FEET/SEC.) =   6.97
  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.) =   18.19
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.542
  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        1.00      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) =    4.90
  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) =      95.86

********************************************************************************
  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  27.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.54
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.86
  PIPE TRAVEL TIME(MIN.) =   6.74    Tc(MIN.) =   24.93
  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) =  1.184
  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        0.50      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) =      98.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.86
  AVERAGE FLOW DEPTH(FEET) =   2.05   TRAVEL TIME(MIN.) =   4.16
  Tc(MIN.) =   29.10
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    5.96
  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) =      95.86
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.02   FLOW VELOCITY(FEET/SEC.) =   7.84
  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.) =   29.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  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        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) =    6.68
  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) =      95.86
  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.) =   29.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =    8.54
  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) =      95.86
  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.) =   29.10
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.184
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    5.55
  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) =      95.86
  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  25.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.17
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.86
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =   30.07
  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.) =   30.07
  RAINFALL INTENSITY(INCH/HR) =   1.16
  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 =      95.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1      256.93   19.23    1.494  0.30( 0.11) 0.37     203.6     310.00
      1      243.66   23.25    1.343  0.30( 0.11) 0.37     217.1     300.00
      2      504.32   23.36    1.339  0.30( 0.11) 0.35     424.2     320.00
      3       95.86   30.07    1.162  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1      808.63   19.23    1.494  0.30( 0.13) 0.43     627.8     310.00
      2      836.44   23.25    1.343  0.30( 0.13) 0.43     730.0     300.00
      3      836.78   23.36    1.339  0.30( 0.13) 0.43     732.3     320.00
      4      735.59   30.07    1.162  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     836.78    Tc(MIN.) =    23.36
  EFFECTIVE AREA(ACRES) =     732.33   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  66.0 INCH PIPE IS  50.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  43.13
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     836.78
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   23.50
  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.) =   23.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  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) =   75.89
  EFFECTIVE AREA(ACRES) =    797.42   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) =     870.55

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   23.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.335
  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) =    7.26
  EFFECTIVE AREA(ACRES) =    803.62   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) =     877.80

****************************************************************************
  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) =  2.862
  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) =      2.96
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.96

****************************************************************************
  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) =      10.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.95   Tc(MIN.) =    8.00
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.447
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
```

```
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   15.94
  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) =      18.46

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.18
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.34
  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  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.46
  PIPE TRAVEL TIME(MIN.) =   1.86    Tc(MIN.) =    9.85
  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.) =    9.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.176
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   28.66
  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) =      44.95

****************************************************************************
  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.) =    9.85
  RAINFALL INTENSITY(INCH/HR) =   2.18
  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 =      44.95

****************************************************************************
  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) =  2.262
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.65
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      2.65

****************************************************************************
  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) =  2.188
  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        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) =       4.26
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.84
  AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   0.56
  Tc(MIN.) =    9.75
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    3.23
  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) =       5.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   6.27
  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) =  1.941
  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        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) =      10.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.74
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   2.32
  Tc(MIN.) =   12.07
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =    9.61
  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) =      14.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.09   FLOW VELOCITY(FEET/SEC.) =   4.08
  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   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.64
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   12.08
  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.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   1.94
  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 =      14.64

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.95    9.85    2.176  0.30( 0.16) 0.54      24.8     400.00
      2       14.64   12.08    1.940  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       58.58    9.85    2.176  0.30( 0.19) 0.64      32.8     400.00
      2       54.32   12.08    1.940  0.30( 0.20) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.58    Tc(MIN.) =     9.85
  EFFECTIVE AREA(ACRES) =      32.79   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  36.0 INCH PIPE IS  26.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.35
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =      58.58
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   11.55
  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.) =   11.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.990
  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        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) =   12.04
  EFFECTIVE AREA(ACRES) =     40.49   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) =      65.11

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.990
  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        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) =   23.37
  EFFECTIVE AREA(ACRES) =     54.59   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) =      88.48

****************************************************************************
  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  51.0 INCH PIPE IS  40.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.36
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      88.48
  PIPE TRAVEL TIME(MIN.) =   3.45    Tc(MIN.) =   15.01
  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.) =   15.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.717
  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
  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) =   17.65
  EFFECTIVE AREA(ACRES) =     67.59   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) =      92.76

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.717
  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) =   29.03
  EFFECTIVE AREA(ACRES) =     87.99   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) =     121.79

****************************************************************************
  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  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.10
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     121.79
  PIPE TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   16.90
  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.) =   16.90
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  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) =   84.23
  EFFECTIVE AREA(ACRES) =    148.79   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) =     197.24

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.90
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  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) =    8.97
  EFFECTIVE AREA(ACRES) =    156.19   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) =     206.21

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.90
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.607
  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) =   13.65
  EFFECTIVE AREA(ACRES) =    166.39   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) =     219.86

****************************************************************************
  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  34.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.66
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     219.86
  PIPE TRAVEL TIME(MIN.) =   2.14    Tc(MIN.) =   19.04
  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.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.503
  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) =   25.61
  EFFECTIVE AREA(ACRES) =    186.19   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) =     229.90

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.503
  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) =   21.32
  EFFECTIVE AREA(ACRES) =    202.99   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     251.22

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.503
  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) =   44.85
  EFFECTIVE AREA(ACRES) =    240.49   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) =     296.07

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.04
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.503
  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) =   24.96
  EFFECTIVE AREA(ACRES) =    260.79   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) =     321.03

****************************************************************************
  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  54.0 INCH PIPE IS  40.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.83
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     321.03
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   19.48
  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) =  2.780
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      1.60
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      1.60

********************************************************************************
  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   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    7.23
  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.) =    7.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.589
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    3.60
  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) =       5.08

********************************************************************************
  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   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.08
  PIPE TRAVEL TIME(MIN.) =   1.20    Tc(MIN.) =    8.43
  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.) =    8.43
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.375
  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) =    5.95
  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) =      10.56
```

```
****************************************************************************
  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   9.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.55
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.56
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    8.92
  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.) =    8.92
  *   5 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        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) =   10.80
  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) =      20.99

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.92
  *   5 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
  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) =    0.20
```



```
  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) =      21.20

****************************************************************************
  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  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.20
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =    9.55
  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.) =    9.55
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.215
  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) =   21.53
  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) =      41.85

****************************************************************************
  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  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.63
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.85
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   10.20
  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.) =   10.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.134
  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) =   43.37
  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) =      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.) =   10.20
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.134
  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) =   26.78
  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) =     110.34

****************************************************************************
  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.) =   10.20
  RAINFALL INTENSITY(INCH/HR) =   2.13
  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 =     110.34

****************************************************************************
  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) =  2.780
  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) =      2.05
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.05

****************************************************************************
  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   4.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.05
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =    7.19
  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.) =    7.19
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.597
  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) =    3.81
  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) =       5.71

****************************************************************************
  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   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.71
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    7.96
  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.) =    7.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.453
  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) =    8.82
  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) =      14.18

****************************************************************************
```



```
  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  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.93
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.18
  PIPE TRAVEL TIME(MIN.) =   1.67    Tc(MIN.) =    9.63
  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.) =    9.63
  *   5 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
  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) =    5.99
  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) =      18.58

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.63
  *   5 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
  "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) =    9.84
  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) =      28.42

****************************************************************************
  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  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.11
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.42
  PIPE TRAVEL TIME(MIN.) =   2.14    Tc(MIN.) =   11.77
  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.) =   11.77
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.969
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   43.19
  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) =      68.27

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.77
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.969
  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        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) =    2.13
  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) =      70.39

****************************************************************************
  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.) =   11.77
  RAINFALL INTENSITY(INCH/HR) =   1.97
  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 =      70.39

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      110.34   10.20    2.134  0.30( 0.12) 0.41      61.0     410.00
      2       70.39   11.77    1.969  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      176.88   10.20    2.134  0.30( 0.13) 0.45      98.3     410.00
      2      171.69   11.77    1.969  0.30( 0.13) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     176.88    Tc(MIN.) =    10.20
  EFFECTIVE AREA(ACRES) =      98.27   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  48.0 INCH PIPE IS  37.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.77
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     176.88
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   11.28
  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.) =   11.28
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.017
 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) =   29.94
 EFFECTIVE AREA(ACRES) =    115.57   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) =     196.47

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.28
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.017
 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) =    1.71
 EFFECTIVE AREA(ACRES) =    116.57   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) =     198.18

****************************************************************************
 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  54.0 INCH PIPE IS  39.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.00
```



```
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     198.18
 PIPE TRAVEL TIME(MIN.) =   1.64    Tc(MIN.) =   12.91
 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.) =   12.91
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.869
 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) =   30.62
 EFFECTIVE AREA(ACRES) =    137.47   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) =     213.27

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.91
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.869
 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) =   21.06
 EFFECTIVE AREA(ACRES) =    151.97   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) =     234.33

****************************************************************************
 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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1      234.33   12.91    1.869  0.30( 0.16) 0.52     152.0     410.00
     2      226.18   14.53    1.749  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      321.03   19.48    1.483  0.30( 0.13) 0.45     260.8     400.00
     2      299.89   21.91    1.389  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      508.00   12.91    1.869  0.30( 0.14) 0.48     324.9     410.00
     2      512.83   14.53    1.749  0.30( 0.14) 0.48     352.2     420.00
     3      509.52   19.48    1.483  0.30( 0.14) 0.48     418.5     400.00
     4      474.94   21.91    1.389  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) =      512.83  Tc(MIN.) =   14.531
  EFFECTIVE AREA(ACRES) =    352.24  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  60.0 INCH PIPE IS  44.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.80
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     512.83
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   15.22
  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.) =   15.22
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   61.39
  EFFECTIVE AREA(ACRES) =    393.54   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) =     555.89

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.22
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.704
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.50      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) =    1.36
  EFFECTIVE AREA(ACRES) =    394.44   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) =     557.25

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      555.32   13.60    1.815  0.30( 0.13) 0.45     367.1     410.00
     2      557.25   15.22    1.704  0.30( 0.13) 0.45     394.4     420.00
     3      547.42   20.17    1.455  0.30( 0.13) 0.45     460.7     400.00
     4      511.61   22.62    1.364  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      860.80   19.37    1.488  0.30( 0.12) 0.40     699.1     310.00
     2      877.73   23.40    1.338  0.30( 0.12) 0.40     801.3     300.00
     3      877.80   23.50    1.335  0.30( 0.12) 0.40     803.6     320.00
     4      771.17   30.22    1.159  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1     1304.24   13.60    1.815  0.30( 0.13) 0.42     857.9     410.00
     2     1340.31   15.22    1.704  0.30( 0.13) 0.42     943.6     420.00
     3     1409.80   19.37    1.488  0.30( 0.13) 0.42    1149.1     310.00
     4     1411.57   20.17    1.455  0.30( 0.13) 0.42    1180.0     400.00
     5     1386.06   22.62    1.364  0.30( 0.13) 0.42    1244.0     430.00
```

6	1378.63	23.40	1.338	0.30(0.13)	0.42	1263.8	300.00
7	1377.29	23.50	1.335	0.30(0.13)	0.42	1266.1	320.00
8	1197.42	30.22	1.159	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) = 1411.57 Tc(MIN.) = 20.170
EFFECTIVE AREA(ACRES) = 1179.98 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.) = 20.17
EFFECTIVE AREA(ACRES) = 1179.98 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.418
PEAK FLOW RATE(CFS) = 1411.57

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1304.24	13.60	1.815	0.30(0.13)	0.42	857.9	410.00
2	1340.31	15.22	1.704	0.30(0.13)	0.42	943.6	420.00
3	1409.80	19.37	1.488	0.30(0.13)	0.42	1149.1	310.00
4	1411.57	20.17	1.455	0.30(0.13)	0.42	1180.0	400.00
5	1386.06	22.62	1.364	0.30(0.13)	0.42	1244.0	430.00
6	1378.63	23.40	1.338	0.30(0.13)	0.42	1263.8	300.00
7	1377.29	23.50	1.335	0.30(0.13)	0.42	1266.1	320.00
8	1197.42	30.22	1.159	0.30(0.13)	0.43	1292.3	390.00

==========

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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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              Ver. 20.0  Release Date: 06/01/2013  License ID 1237

                           Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-3 BODR 2022 - SUBWATERSHED C                                   *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                 *
* 25-YR EV SEPT 2022 ROKAMOTO                                           *
 ************************************************************************

  FILE NAME: PA3C25EV.DAT
  TIME/DATE OF STUDY: 20:37 09/17/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    0.200/0.200/ ---    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) =  3.008
  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        1.60      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) =      4.24
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.24

************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.87
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   3.30   Tc(MIN.) =   11.74
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.490
  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) =    9.62
  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) =      13.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.13
  FLOW VELOCITY(FEET/SEC.) =  2.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  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  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.58
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.12
  PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =   13.42
  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.) =   13.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.306
  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) =   16.17
  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) =      28.30

****************************************************************************
  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  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.30
  PIPE TRAVEL TIME(MIN.) =   3.05    Tc(MIN.) =   16.47
  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.) =   16.47
```



```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =   29.00
  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) =      54.08

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.47
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.051
  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) =   20.88
  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) =      74.96

****************************************************************************
  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  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.69
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.96
  PIPE TRAVEL TIME(MIN.) =   1.69    Tc(MIN.) =   18.16
  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.) =   18.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.939
  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) =    5.40
  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) =      76.07

******************************************************************************
  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) =  1.894
  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) =   28.65

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   18.16
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.939
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   29.36
  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) =     105.43
```



```
******************************************************************************
  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  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.24
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     105.43
  PIPE TRAVEL TIME(MIN.) =   1.21    Tc(MIN.) =   19.37
  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.) =   19.37
  *  10 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
  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) =    6.58
  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) =     107.99

******************************************************************************
  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.) =   19.37
  RAINFALL INTENSITY(INCH/HR) =   1.87
  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 =     107.99

******************************************************************************
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS 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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.07
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.84
  STREET FLOW TRAVEL TIME(MIN.) =   2.41   Tc(MIN.) =    9.89
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.747
  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) =    7.06
  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) =      10.45

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
  FLOW VELOCITY(FEET/SEC.) =  2.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
  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  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.45
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   10.87
  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.) =   10.87
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.601
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        1.90      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) =   13.61
  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) =      23.49

**************************************************************************
  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  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.40
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.49
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   11.47
  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.) =   11.47
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.522
  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        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) =   28.12
  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) =      50.89

****************************************************************************
  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  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.89
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   12.15
  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.) =   12.15
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.441
  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        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) =   37.43
  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) =      86.64

****************************************************************************
  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  29.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.80
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      86.64
  PIPE TRAVEL TIME(MIN.) =   2.83    Tc(MIN.) =   14.98
  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.) =   14.98
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.164
  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        0.40      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) =   48.22
  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) =     124.74

****************************************************************************
  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  27.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.52
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     124.74
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   15.57
  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.) =   15.57
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.117
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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) =   30.96
  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) =     152.85

****************************************************************************
  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.) =   15.57
  RAINFALL INTENSITY(INCH/HR) =   2.12
  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 =     152.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      107.99   19.37    1.868  0.30( 0.09) 0.31      67.6     300.00
      2      152.85   15.57    2.117  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      251.85   15.57    2.117  0.30( 0.11) 0.35     139.2     310.00
      2      241.86   19.37    1.868  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     251.85    Tc(MIN.) =    15.57
  EFFECTIVE AREA(ACRES) =     139.15   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  48.0 INCH PIPE IS  35.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.26
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     251.85
  PIPE TRAVEL TIME(MIN.) =   2.51    Tc(MIN.) =   18.08
  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.) =   18.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.944
  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
  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) =   33.43
  EFFECTIVE AREA(ACRES) =    159.15   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) =     263.55

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   18.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.944
  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) =   36.16
  EFFECTIVE AREA(ACRES) =    181.05   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) =     299.70

******************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   18.08
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.944
  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) =   36.35
  EFFECTIVE AREA(ACRES) =    203.85   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) =     336.05

******************************************************************************
  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  48.0 INCH PIPE IS  35.5 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.72
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     336.05
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   18.50
  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.) =   18.50
  RAINFALL INTENSITY(INCH/HR) =   1.92
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     203.85
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     336.05

******************************************************************************
  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) =  3.008
  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) =      7.43
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      7.43

******************************************************************************
  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) =      16.04
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.90
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.46
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =   10.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.687
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   17.19
  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) =      23.81

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.63
  FLOW VELOCITY(FEET/SEC.) =  3.61   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
  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  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.48
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.81
  PIPE TRAVEL TIME(MIN.) =   1.93    Tc(MIN.) =   12.20
  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.) =   12.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.435
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   28.84
  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) =      50.36

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.435
  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) =    0.21
  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) =      50.57

****************************************************************************
  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  33.0 INCH PIPE IS  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.21
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      50.57
  PIPE TRAVEL TIME(MIN.) =   1.45    Tc(MIN.) =   13.65
  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.) =   13.65
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.283
  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        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) =   31.28
  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) =      78.54

****************************************************************************
  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  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.36
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      78.54
  PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   15.61
  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.) =   15.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.115
  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        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) =   74.77
  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) =     147.19

****************************************************************************
  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  36.0 INCH PIPE IS  26.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.37
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     147.19
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   16.29
  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.) =   16.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.063
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        1.00      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) =   59.24
  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) =     202.60

****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.29
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.063
  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       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) =   38.47
  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) =     241.07

****************************************************************************
  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  51.0 INCH PIPE IS  36.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.03
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     241.07
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   17.60
  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.) =   17.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.974
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
  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) =  109.87
  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) =     339.67

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.60
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.974
  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       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) =   75.69
  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) =     415.36

****************************************************************************
  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  57.0 INCH PIPE IS  44.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.76
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     415.36
  PIPE TRAVEL TIME(MIN.) =   1.60    Tc(MIN.) =   19.20
  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.) =   19.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.878
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   61.29
  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) =     455.15

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.20
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.878
```

```
 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) =   39.22
 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) =     494.37

****************************************************************************
 FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.20
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.878
 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) =   64.25
 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) =     558.62

****************************************************************************
 FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   19.20
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.878
 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) =   65.65
 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) =     624.27

****************************************************************************
 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  81.0 INCH PIPE IS  60.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.75
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     624.27
 PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   20.09
 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.) =   20.09
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.830
 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) =   50.94
 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) =     658.31

****************************************************************************
 FLOW PROCESS FROM NODE    329.00 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) =   320.00  DOWNSTREAM(FEET) =   310.00
  FLOW LENGTH(FEET) =  1981.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN 102.0 INCH PIPE IS  76.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.43
  ESTIMATED PIPE DIAMETER(INCH) = 102.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     658.31
  PIPE TRAVEL TIME(MIN.) =   2.29    Tc(MIN.) =   22.38
  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.) =   22.38
  RAINFALL INTENSITY(INCH/HR) =   1.72
  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 =     658.31

****************************************************************************
  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) =  2.863
  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) =      3.23
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.23

****************************************************************************
  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) =  2.616
  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) =       5.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.79
  AVERAGE FLOW DEPTH(FEET) =   0.57   TRAVEL TIME(MIN.) =   1.57
  Tc(MIN.) =   10.77
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    4.79
  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) =       7.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   6.20
  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) =  2.283
  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) =      28.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.30
  AVERAGE FLOW DEPTH(FEET) =   1.22   TRAVEL TIME(MIN.) =   2.89
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```
  Tc(MIN.) =   13.66
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   40.51
  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) =      47.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.48   FLOW VELOCITY(FEET/SEC.) =   7.14
  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) =  2.090
  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) =      61.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.65
  AVERAGE FLOW DEPTH(FEET) =   1.75   TRAVEL TIME(MIN.) =   2.27
  Tc(MIN.) =   15.92
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   27.88
  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) =      70.42

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.85   FLOW VELOCITY(FEET/SEC.) =   6.86
  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.) =   15.92
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.090
```



```
  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) =    4.19
  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) =      74.60

****************************************************************************
  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) =  1.977
  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) =     101.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.16
  AVERAGE FLOW DEPTH(FEET) =   2.17   TRAVEL TIME(MIN.) =   1.63
  Tc(MIN.) =   17.56
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   52.97
  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) =     122.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.34   FLOW VELOCITY(FEET/SEC.) =   7.49
  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.) =   17.56
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.977
  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        1.00      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) =    6.59
  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) =     129.42

********************************************************************************
  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  42.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.56
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     129.42
  PIPE TRAVEL TIME(MIN.) =   6.33    Tc(MIN.) =   23.88
  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) =  1.521
  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        0.50      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) =     133.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.50
  AVERAGE FLOW DEPTH(FEET) =   2.29   TRAVEL TIME(MIN.) =   3.85
  Tc(MIN.) =   27.73
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    7.79
  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) =     129.42
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.26   FLOW VELOCITY(FEET/SEC.) =   8.42
  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.) =   27.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.521
  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        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) =    9.23
  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) =     129.42
  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.) =   27.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.521
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   11.66
  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) =     129.42
  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.) =   27.73
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.521
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    7.61
  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) =     130.59

****************************************************************************
  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  39.0 INCH PIPE IS  29.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.42
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     130.59
  PIPE TRAVEL TIME(MIN.) =   0.91    Tc(MIN.) =   28.64
  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.) =   28.64
  RAINFALL INTENSITY(INCH/HR) =   1.49
  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 =     130.59

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      336.05   18.50    1.918  0.30( 0.11) 0.37     203.9     310.00
      1      318.70   22.31    1.723  0.30( 0.11) 0.37     217.1     300.00
      2      658.31   22.38    1.720  0.30( 0.11) 0.35     424.2     320.00
      3      130.59   28.64    1.493  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1     1061.03   18.50    1.918  0.30( 0.13) 0.43     630.2     310.00
      2     1097.29   22.31    1.723  0.30( 0.13) 0.43     731.3     300.00
      3     1097.58   22.38    1.720  0.30( 0.13) 0.43     732.9     320.00
      4      969.63   28.64    1.493  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1097.58    Tc(MIN.) =    22.38
  EFFECTIVE AREA(ACRES) =     732.86   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  72.0 INCH PIPE IS  56.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  45.84
  ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1097.58
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =   22.51
  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.) =   22.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.714
  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) =   98.12
  EFFECTIVE AREA(ACRES) =    797.96   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) =    1143.47

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.51
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.714
  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) =    9.37
  EFFECTIVE AREA(ACRES) =    804.16   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) =    1152.84

****************************************************************************
  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) =  3.640
  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) =      3.80
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.80

****************************************************************************
  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) =      14.18
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.47
    HALFSTREET FLOOD WIDTH(FEET) =   17.23
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.83   Tc(MIN.) =    7.88
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.128
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
  SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   20.67
```

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  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) =      23.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.21
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   1.54
  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  27.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.92
  PIPE TRAVEL TIME(MIN.) =   1.73    Tc(MIN.) =    9.61
  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.) =    9.61
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.792
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
  SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   37.48
  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) =      58.70

****************************************************************************
  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.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.79
  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 =      58.70

****************************************************************************
  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) =  2.863
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      3.46
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.46

****************************************************************************
  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) =  2.774
  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        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) =       5.57
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.22
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   0.52
  Tc(MIN.) =    9.72
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    4.23
  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) =       7.57

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   6.71
  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) =  2.473
  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        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) =      13.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.03
  AVERAGE FLOW DEPTH(FEET) =   1.07   TRAVEL TIME(MIN.) =   2.15
  Tc(MIN.) =   11.87
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   12.68
  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) =      19.33

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =   4.36
  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  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.33
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.88
  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.) =   11.88
  RAINFALL INTENSITY(INCH/HR) =   2.47
  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 =      19.33

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       58.70    9.61    2.792  0.30( 0.16) 0.54       24.8     400.00
      2       19.33   11.88    2.472  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       76.62    9.61    2.792  0.30( 0.19) 0.64       32.7     400.00
      2       70.90   11.88    2.472  0.30( 0.20) 0.65       34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      76.62    Tc(MIN.) =     9.61
  EFFECTIVE AREA(ACRES) =      32.73   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  30.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.97
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      76.62
```

```
  PIPE TRAVEL TIME(MIN.) =   1.60    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) =  2.556
  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        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) =   15.96
  EFFECTIVE AREA(ACRES) =     40.43   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) =      85.61

****************************************************************************
  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) =  2.556
  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        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) =   30.56
  EFFECTIVE AREA(ACRES) =     54.53   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) =     116.17

****************************************************************************
  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  44.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.92
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.17
  PIPE TRAVEL TIME(MIN.) =   3.21    Tc(MIN.) =   14.42
  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.) =   14.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.212
  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
  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) =   23.43
  EFFECTIVE AREA(ACRES) =     67.53   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) =     122.74

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.42
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.212
  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) =   38.11
  EFFECTIVE AREA(ACRES) =     87.93   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) =     160.85
```

```
****************************************************************************
  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  42.0 INCH PIPE IS  32.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.26
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     160.85
  PIPE TRAVEL TIME(MIN.) =   1.78    Tc(MIN.) =   16.21
  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.) =   16.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  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) =  109.55
  EFFECTIVE AREA(ACRES) =    148.73   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) =     259.09

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  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) =   12.05
  EFFECTIVE AREA(ACRES) =    156.13   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) =     271.14

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.21
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.069
  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) =   17.89
  EFFECTIVE AREA(ACRES) =    166.33   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) =     289.04

****************************************************************************
  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  51.0 INCH PIPE IS  40.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.87
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     289.04
  PIPE TRAVEL TIME(MIN.) =   2.03    Tc(MIN.) =   18.24
  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.) =   18.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.934
  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) =   33.30
  EFFECTIVE AREA(ACRES) =    186.13   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) =     302.10

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.934
  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) =   27.84
  EFFECTIVE AREA(ACRES) =    202.93   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.43
  TOTAL AREA(ACRES) =      204.8       PEAK FLOW RATE(CFS) =     329.94

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.934
  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) =   59.41
  EFFECTIVE AREA(ACRES) =    240.43   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) =     389.35

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.24
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  1.934
  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) =   32.84
  EFFECTIVE AREA(ACRES) =    260.73   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) =     422.20

****************************************************************************
  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  60.0 INCH PIPE IS  45.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.62
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     422.20
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   18.65
  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) =  3.534
  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.)
  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) =      2.07
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.07

******************************************************************************
  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   4.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.07
  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<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.17
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.303
  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 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)<<<<<
==============================================================================
  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) =  3.039
  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) =    7.80
  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) =      13.85
```

```
****************************************************************************
  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  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.18
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.85
  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) =  2.946
  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) =   14.11
  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) =      27.50

****************************************************************************
  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) =  2.946
  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) =    0.26
  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) =      27.76

****************************************************************************
  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  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.26
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.76
  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) =  2.840
  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) =   28.01
  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) =      54.69

****************************************************************************
  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  19.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.87
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      54.69
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    9.93
  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.) =    9.93
  *  10 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
  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) =   56.02
  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) =     108.64

********************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
--------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
  MAINLINE Tc(MIN.) =    9.93
  *  10 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
  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) =   34.96
  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) =     143.60

********************************************************************************
  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.) =    9.93
  RAINFALL INTENSITY(INCH/HR) =   2.74
```



```
  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 =     143.60

********************************************************************************
  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) =  3.534
  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.)
  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) =      2.66
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.66

********************************************************************************
  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   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.66
  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) =  3.312
  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.) =   8.68
  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) =  3.135
  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) =   11.53
  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) =      18.55

****************************************************************************
  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.) =  10.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.55
  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) =  2.830
  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) =    7.85
  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) =      24.44

****************************************************************************
  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) =  2.830
  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
  "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) =   12.88
  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) =      37.31
```

```
****************************************************************************
  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  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.01
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      37.31
  PIPE TRAVEL TIME(MIN.) =   1.99    Tc(MIN.) =   11.38
  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.) =   11.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.534
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   56.36
  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) =      89.47

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.38
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.534
  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        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) =    2.79
  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) =      92.26

****************************************************************************
  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.) =   11.38
  RAINFALL INTENSITY(INCH/HR) =   2.53
  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 =      92.26

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      143.60    9.93    2.740  0.30( 0.12) 0.41      61.0     410.00
      2       92.26   11.38    2.534  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      231.07    9.93    2.740  0.30( 0.13) 0.45      98.5     410.00
      2      224.58   11.38    2.534  0.30( 0.13) 0.45     104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     231.07    Tc(MIN.) =     9.93
  EFFECTIVE AREA(ACRES) =      98.53   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  54.0 INCH PIPE IS  40.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.06
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     231.07
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   10.93
  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.) =   10.93
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.593
 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) =   38.91
 EFFECTIVE AREA(ACRES) =    115.83   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) =     256.98

****************************************************************************
 FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.93
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.593
 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) =    2.23
 EFFECTIVE AREA(ACRES) =    116.83   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) =     259.21

****************************************************************************
 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  46.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  16.77
 ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     259.21
```



```
 PIPE TRAVEL TIME(MIN.) =   1.56    Tc(MIN.) =   12.49
 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.) =   12.49
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.402
 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) =   40.65
 EFFECTIVE AREA(ACRES) =    137.73   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) =     279.76

****************************************************************************
 FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.49
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.402
 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) =   28.02
 EFFECTIVE AREA(ACRES) =    152.23   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) =     307.78

****************************************************************************
 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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      307.78   12.49    2.402  0.30( 0.16) 0.52     152.2     410.00
     2      298.04   13.95    2.255  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      422.20   18.65    1.909  0.30( 0.13) 0.45     260.7     400.00
     2      394.36   21.01    1.783  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      669.15   12.49    2.402  0.30( 0.14) 0.48     326.9     410.00
     2      675.33   13.95    2.255  0.30( 0.14) 0.48     352.7     420.00
     3      671.16   18.65    1.909  0.30( 0.14) 0.48     418.4     400.00
     4      625.44   21.01    1.783  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) =      675.33  Tc(MIN.) =   13.948
 EFFECTIVE AREA(ACRES) =    352.69  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  66.0 INCH PIPE IS  49.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  35.03
 ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     675.33
 PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   14.59
 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.) =   14.59
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.197
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   79.73
 EFFECTIVE AREA(ACRES) =    393.99   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) =     731.55

****************************************************************************
 FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   14.59
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.197
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.50      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) =    1.76
 EFFECTIVE AREA(ACRES) =    394.89   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) =     733.31

****************************************************************************
 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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      730.70   13.14    2.333  0.30( 0.13) 0.45     369.1     410.00
     2      733.31   14.59    2.197  0.30( 0.13) 0.45     394.9     420.00
     3      720.60   19.30    1.872  0.30( 0.13) 0.45     460.6     400.00
     4      673.12   21.67    1.752  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1130.46   18.63    1.910  0.30( 0.12) 0.40     701.5     310.00
     2     1152.77   22.45    1.717  0.30( 0.12) 0.40     802.6     300.00
     3     1152.84   22.51    1.714  0.30( 0.12) 0.40     804.2     320.00
     4     1017.73   28.78    1.489  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1     1716.38   13.14    2.333  0.30( 0.13) 0.42     863.8     410.00
     2     1760.65   14.59    2.197  0.30( 0.13) 0.42     944.3     420.00
     3     1852.85   18.63    1.910  0.30( 0.13) 0.42    1152.9     310.00
     4     1854.94   19.30    1.872  0.30( 0.13) 0.42    1179.7     400.00
     5     1821.35   21.67    1.752  0.30( 0.13) 0.42    1244.6     430.00
     6     1811.36   22.45    1.717  0.30( 0.13) 0.42    1265.1     300.00
     7     1810.23   22.51    1.714  0.30( 0.13) 0.42    1266.7     320.00
```

```
      8     1581.41   28.78    1.489  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) =     1854.94  Tc(MIN.) =   19.296
  EFFECTIVE AREA(ACRES) =   1179.70  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.) =     19.30
  EFFECTIVE AREA(ACRES) =   1179.70  AREA-AVERAGED Fm(INCH/HR)=  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.419
  PEAK FLOW RATE(CFS)   =    1854.94

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1716.38   13.14    2.333  0.30( 0.13) 0.42     863.8     410.00
      2     1760.65   14.59    2.197  0.30( 0.13) 0.42     944.3     420.00
      3     1852.85   18.63    1.910  0.30( 0.13) 0.42    1152.9     310.00
      4     1854.94   19.30    1.872  0.30( 0.13) 0.42    1179.7     400.00
      5     1821.35   21.67    1.752  0.30( 0.13) 0.42    1244.6     430.00
      6     1811.36   22.45    1.717  0.30( 0.13) 0.42    1265.1     300.00
      7     1810.23   22.51    1.714  0.30( 0.13) 0.42    1266.7     320.00
      8     1581.41   28.78    1.489  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 BODR 2022 - SUBWATERSHED C                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 50-YR EV SEPT 2022 ROKAMOTO                                          *
 ************************************************************************

  FILE NAME: PA3C50EV.DAT
  TIME/DATE OF STUDY: 20:36 09/17/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    0.200/0.200/ ---    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) =  3.457
  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        1.60      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) =      4.89
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.89

****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.36
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.65
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
  STREET FLOW TRAVEL TIME(MIN.) =   3.19   Tc(MIN.) =   11.63
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.808
  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) =   10.88
  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) =      14.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.47   HALFSTREET FLOOD WIDTH(FEET) =  16.99
  FLOW VELOCITY(FEET/SEC.) =  2.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.25
  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  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.67
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.84
  PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =   13.28
  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.) =   13.28
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.603
  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) =   18.31
  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) =      32.04

****************************************************************************
  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  25.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.11
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.04
  PIPE TRAVEL TIME(MIN.) =   2.92    Tc(MIN.) =   16.21
  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.) =   16.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  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) =   32.66
  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) =      60.92

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.303
  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) =   23.69
  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) =      84.62

****************************************************************************
  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  28.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.24
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.62
  PIPE TRAVEL TIME(MIN.) =   1.62    Tc(MIN.) =   17.83
  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.) =   17.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        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) =    6.11
  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) =      86.26

****************************************************************************
  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) =  2.109
  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) =   32.10

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =   17.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.186
  SUBAREA AREA(ACRES) =   17.90      SUBAREA RUNOFF(CFS) =   33.35
  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) =     119.60

****************************************************************************
  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  25.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.22
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     119.60
  PIPE TRAVEL TIME(MIN.) =   1.15    Tc(MIN.) =   18.98
  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.) =   18.98
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.103
  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) =    7.42
  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) =     122.27

****************************************************************************
  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.) =   18.98
  RAINFALL INTENSITY(INCH/HR) =   2.10
  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 =     122.27

****************************************************************************
  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) =  3.732
  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) =      4.63
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      4.63

****************************************************************************
  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) =       8.59
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.42
    HALFSTREET FLOOD WIDTH(FEET) =   14.26
```



```
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.14
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
  STREET FLOW TRAVEL TIME(MIN.) =   2.34   Tc(MIN.) =    9.81
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.064
  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) =    7.89
  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) =      11.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.21
  FLOW VELOCITY(FEET/SEC.) =  2.30   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  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  15.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.34
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.67
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   10.78
  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.) =   10.78
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.913
  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) =   15.27
  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) =      26.36

****************************************************************************
  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  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.83
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.36
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   11.36
  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.) =   11.36
  *  50 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
  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) =   31.77
  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) =      57.47

****************************************************************************
  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  30.0 INCH PIPE IS  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.48
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.47
  PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   12.02
  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.) =   12.02
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  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        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) =   42.54
  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) =      98.31

****************************************************************************
  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  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.32
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      98.31
  PIPE TRAVEL TIME(MIN.) =   2.72    Tc(MIN.) =   14.74
  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.) =   14.74
  *  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
  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) =   54.39
  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) =     140.34

****************************************************************************
  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  27.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.42
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.34
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   15.31
  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.) =   15.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.368
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.40      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) =   34.91
  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) =     171.98

****************************************************************************
  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.) =   15.31
  RAINFALL INTENSITY(INCH/HR) =   2.37
  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 =     171.98

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      122.27   18.98    2.103  0.30( 0.09) 0.31      67.6     300.00
      2      171.98   15.31    2.368  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      283.56   15.31    2.368  0.30( 0.11) 0.35     139.3     310.00
      2      274.05   18.98    2.103  0.30( 0.11) 0.35     152.4     300.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     283.56    Tc(MIN.) =    15.31
  EFFECTIVE AREA(ACRES) =     139.31   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  36.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.14
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     283.56
  PIPE TRAVEL TIME(MIN.) =   2.42    Tc(MIN.) =   17.73
  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.) =   17.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.194
  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
  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) =   37.93
  EFFECTIVE AREA(ACRES) =    159.31   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) =     299.63

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.194
  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) =   41.08
  EFFECTIVE AREA(ACRES) =    181.21   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) =     340.71

****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    307.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.73
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.194
  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
```



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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.574
  SUBAREA AREA(ACRES) =   22.80      SUBAREA RUNOFF(CFS) =   41.48
  EFFECTIVE AREA(ACRES) =    204.01   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) =     382.19

****************************************************************************
  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  36.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  34.95
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     382.19
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   18.13
  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.) =   18.13
  RAINFALL INTENSITY(INCH/HR) =   2.16
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.37
  EFFECTIVE STREAM AREA(ACRES) =     204.01
  TOTAL STREAM AREA(ACRES) =     217.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     382.19

****************************************************************************
  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) =  3.457
  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) =      8.56
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      8.56
```

```
****************************************************************************
  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) =      18.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.39
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.56
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =   10.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =    7.30      SUBAREA RUNOFF(CFS) =   19.14
  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) =      26.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
  FLOW VELOCITY(FEET/SEC.) =  3.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.89
  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  23.0 INCHES
```



```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.58
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.51
  PIPE TRAVEL TIME(MIN.) =   1.90    Tc(MIN.) =   12.11
  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.) =   12.11
  *  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
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.488
  SUBAREA AREA(ACRES) =   14.00      SUBAREA RUNOFF(CFS) =   32.79
  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) =      57.15

****************************************************************************
  FLOW PROCESS FROM NODE    323.00 TO NODE    323.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.11
  *  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
  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) =    0.24
  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) =      57.39

****************************************************************************
  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  25.6 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.68
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.39
  PIPE TRAVEL TIME(MIN.) =   1.38    Tc(MIN.) =   13.49
  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.) =   13.49
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.577
  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        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) =   35.53
  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) =      89.18

****************************************************************************
  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  27.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.66
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      89.18
  PIPE TRAVEL TIME(MIN.) =   1.92    Tc(MIN.) =   15.42
  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.) =   15.42
  *  50 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
  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) =   84.05
  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) =     165.37

****************************************************************************
  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  26.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.40
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     165.37
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   16.08
  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.) =   16.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.312
  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        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) =   66.87
  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) =     228.71
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    326.00 TO NODE    326.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.312
  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       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) =   43.81
  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) =     272.52

****************************************************************************
  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  51.0 INCH PIPE IS  41.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.30
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     272.52
  PIPE TRAVEL TIME(MIN.) =   1.29    Tc(MIN.) =   17.37
  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.) =   17.37
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
  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) =  124.09
  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) =     384.86

****************************************************************************
  FLOW PROCESS FROM NODE    327.00 TO NODE    327.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.37
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.219
  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       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) =   85.55
  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) =     470.41

****************************************************************************
  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  46.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.70
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     470.41
  PIPE TRAVEL TIME(MIN.) =   1.55    Tc(MIN.) =   18.92
  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.) =   18.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.108
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                 B        0.50      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) =   69.02
  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) =     514.47

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.108
  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) =   44.15
  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) =     558.62

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.108
  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) =   72.64
```



```
  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) =     631.26

****************************************************************************
  FLOW PROCESS FROM NODE    328.00 TO NODE    328.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.92
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.108
  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) =   74.38
  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) =     705.63

****************************************************************************
  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  64.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.35
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     705.63
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   19.78
  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.) =   19.78
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.046
  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) =   57.06
  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) =     740.79

****************************************************************************
  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  78.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.93
  ESTIMATED PIPE DIAMETER(INCH) = 108.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     740.79
  PIPE TRAVEL TIME(MIN.) =   2.21    Tc(MIN.) =   21.99
  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.) =   21.99
  RAINFALL INTENSITY(INCH/HR) =   1.93
  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 =     740.79

****************************************************************************
  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) =  3.240
  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) =      3.70
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.70

****************************************************************************
  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) =  2.920
  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) =       6.42
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.95
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.53
  Tc(MIN.) =   10.72
  SUBAREA AREA(ACRES) =     2.30       SUBAREA RUNOFF(CFS) =    5.42
  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) =       8.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   6.40
  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) =  2.574
  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) =      32.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.53
  AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   2.79
  Tc(MIN.) =   13.51
  SUBAREA AREA(ACRES) =    22.70       SUBAREA RUNOFF(CFS) =   46.46
  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) =      54.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.56   FLOW VELOCITY(FEET/SEC.) =   7.41
  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) =  2.339
  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) =      69.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.87
  AVERAGE FLOW DEPTH(FEET) =   1.84   TRAVEL TIME(MIN.) =   2.19
  Tc(MIN.) =   15.71
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   31.75
```



```
  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) =      80.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.94   FLOW VELOCITY(FEET/SEC.) =   7.10
  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.) =   15.71
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.339
  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) =    4.77
  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) =      84.97

****************************************************************************
  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) =  2.226
  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) =     115.39
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.41
  AVERAGE FLOW DEPTH(FEET) =   2.28   TRAVEL TIME(MIN.) =   1.58
  Tc(MIN.) =   17.28
  SUBAREA AREA(ACRES) =    35.10       SUBAREA RUNOFF(CFS) =   60.83
  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) =     141.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.46   FLOW VELOCITY(FEET/SEC.) =   7.77
  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.) =   17.28
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.226
  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        1.00      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) =    7.55
  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) =     148.63

****************************************************************************
  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  32.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.24
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     148.63
  PIPE TRAVEL TIME(MIN.) =   6.08    Tc(MIN.) =   23.36
  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
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.711
  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        0.50      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) =     153.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.80
  AVERAGE FLOW DEPTH(FEET) =   2.41   TRAVEL TIME(MIN.) =   3.72
  Tc(MIN.) =   27.08
  SUBAREA AREA(ACRES) =     6.00       SUBAREA RUNOFF(CFS) =    8.81
  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) =     148.63
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.38   FLOW VELOCITY(FEET/SEC.) =   8.72
  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.) =   27.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.711
  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        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) =   10.67
  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) =     148.63
  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.) =   27.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.711
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.877
  SUBAREA AREA(ACRES) =   10.30      SUBAREA RUNOFF(CFS) =   13.42
  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) =     148.63
  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.) =   27.08
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.711
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.924
  SUBAREA AREA(ACRES) =    6.80      SUBAREA RUNOFF(CFS) =    8.78
  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) =     150.61
```



```
****************************************************************************
  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  30.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.26
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     150.61
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =   27.95
  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.) =   27.95
  RAINFALL INTENSITY(INCH/HR) =   1.68
  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 =     150.61

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      382.19   18.13    2.164  0.30( 0.11) 0.37     204.0     310.00
      1      361.18   21.89    1.939  0.30( 0.11) 0.37     217.1     300.00
      2      740.79   21.99    1.934  0.30( 0.11) 0.35     424.2     320.00
      3      150.61   27.95    1.678  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1     1201.60   18.13    2.164  0.30( 0.13) 0.43     629.8     310.00
      2     1240.51   21.89    1.939  0.30( 0.13) 0.43     731.0     300.00
      3     1241.27   21.99    1.934  0.30( 0.13) 0.43     733.5     320.00
      4     1096.95   27.95    1.678  0.30( 0.13) 0.45     758.5     390.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    1241.27    Tc(MIN.) =    21.99
  EFFECTIVE AREA(ACRES) =     733.51   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  60.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  47.14
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =    1241.27
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   22.12
  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.) =   22.12
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.928
  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) =  110.65
  EFFECTIVE AREA(ACRES) =    798.61   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) =    1298.02

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    331.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   22.12
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  1.928
  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) =   10.57
  EFFECTIVE AREA(ACRES) =    804.81   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) =    1308.59

****************************************************************************
  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) =  4.140
  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) =      4.34
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      4.34

****************************************************************************
  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) =      16.47
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.49
```

```
   HALFSTREET FLOOD WIDTH(FEET) =   18.32
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
 STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    7.82
 *  50 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
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.486
 SUBAREA AREA(ACRES) =    7.70      SUBAREA RUNOFF(CFS) =   24.18
 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) =      27.97

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.57   HALFSTREET FLOOD WIDTH(FEET) =  22.62
 FLOW VELOCITY(FEET/SEC.) =  2.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.66
 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  19.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.16
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      27.97
 PIPE TRAVEL TIME(MIN.) =   1.65    Tc(MIN.) =    9.46
 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.) =    9.46
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.164
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.577
 SUBAREA AREA(ACRES) =   15.90      SUBAREA RUNOFF(CFS) =   42.80
 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) =      67.00

****************************************************************************
 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.) =    9.46
 RAINFALL INTENSITY(INCH/HR) =   3.16
 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 =      67.00

****************************************************************************
 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
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.240
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      3.97
 TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      3.97

****************************************************************************
 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) =  3.094
  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        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) =       6.36
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.41
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   0.51
  Tc(MIN.) =    9.71
  SUBAREA AREA(ACRES) =     1.90       SUBAREA RUNOFF(CFS) =    4.78
  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) =       8.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   6.88
  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) =  2.788
  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        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) =      15.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.15
  AVERAGE FLOW DEPTH(FEET) =   1.13   TRAVEL TIME(MIN.) =   2.09
  Tc(MIN.) =   11.79
  SUBAREA AREA(ACRES) =     6.40       SUBAREA RUNOFF(CFS) =   14.49
  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) =      22.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.28   FLOW VELOCITY(FEET/SEC.) =   4.52
  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  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.30
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.10
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =   11.80
  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.) =   11.80
  RAINFALL INTENSITY(INCH/HR) =   2.79
  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 =      22.10

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       67.00    9.46    3.164  0.30( 0.16) 0.54      24.8     400.00
      2       22.10   11.80    2.787  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       87.39    9.46    3.164  0.30( 0.19) 0.64      32.7     400.00
      2       80.69   11.80    2.787  0.30( 0.20) 0.65      34.6     430.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      87.39    Tc(MIN.) =     9.46
  EFFECTIVE AREA(ACRES) =      32.66   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  31.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.45
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      87.39
  PIPE TRAVEL TIME(MIN.) =   1.54    Tc(MIN.) =   11.00
  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.) =   11.00
  *  50 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        0.10      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) =   18.25
  EFFECTIVE AREA(ACRES) =     40.36   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) =      97.47

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.00
  *  50 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
  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) =   34.75
  EFFECTIVE AREA(ACRES) =     54.46   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) =     132.22

****************************************************************************
  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  46.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.19
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     132.22
  PIPE TRAVEL TIME(MIN.) =   3.11    Tc(MIN.) =   14.11
  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.) =   14.11
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  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
  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) =   26.81
  EFFECTIVE AREA(ACRES) =     67.46   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) =     140.15

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.11
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.501
  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) =   43.41
 EFFECTIVE AREA(ACRES) =     87.86   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) =     183.56

****************************************************************************
 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  33.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.09
 ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     183.56
 PIPE TRAVEL TIME(MIN.) =   1.71    Tc(MIN.) =   15.82
 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.) =   15.82
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.331
 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) =  123.87
 EFFECTIVE AREA(ACRES) =    148.66   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) =     294.01

****************************************************************************
 FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
```



```
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.82
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.331
 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) =   13.79
 EFFECTIVE AREA(ACRES) =    156.06   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) =     307.80

****************************************************************************
 FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   15.82
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.331
 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) =   20.30
 EFFECTIVE AREA(ACRES) =    166.26   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) =     328.10

****************************************************************************
 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  41.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  24.76
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
```

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 PIPE-FLOW(CFS) =     328.10
 PIPE TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   17.77
 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.) =   17.77
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.190
 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) =   37.86
 EFFECTIVE AREA(ACRES) =    186.06   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) =     344.89

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.77
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.190
 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) =   31.72
 EFFECTIVE AREA(ACRES) =    202.86   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) =     376.61

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.77
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.190
 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) =   68.06
 EFFECTIVE AREA(ACRES) =    240.36   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) =     444.67

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.77
 *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.190
 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) =   37.52
 EFFECTIVE AREA(ACRES) =    260.66   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) =     482.19

****************************************************************************
 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  47.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  27.51
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     482.19
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   18.17
  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) =  4.049
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.814
  SUBAREA RUNOFF(CFS) =      2.40
  TOTAL AREA(ACRES) =      0.70   PEAK FLOW RATE(CFS) =      2.40

****************************************************************************
  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   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
```



```
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    7.13
  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.) =    7.13
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.830
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.788
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    5.50
  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) =       7.76

****************************************************************************
  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   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.76
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =    8.21
  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.) =    8.21
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.522
  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) =    9.15
  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) =      16.24

****************************************************************************
  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  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.24
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.66
  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.) =    8.66
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.393
  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) =   16.40
  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) =      32.00

****************************************************************************
  FLOW PROCESS FROM NODE    414.00 TO NODE    414.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.66
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.393
  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) =    0.30
  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) =      32.30

****************************************************************************
  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  17.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.50
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.30
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =    9.23
  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.) =    9.23
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.231
  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) =   32.05
  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) =      62.69

****************************************************************************
  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  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.10
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.69
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    9.83
  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.) =    9.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  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) =   62.70
  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) =     121.88

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.83
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.059
  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
  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) =   39.28
  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) =     161.15

****************************************************************************
  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.) =    9.83
  RAINFALL INTENSITY(INCH/HR) =   3.06
  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 =     161.15

****************************************************************************
  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) =  4.049
  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) =      3.08
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      3.08

****************************************************************************
  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   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.08
```

```
  PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    7.10
  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.) =    7.10
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.839
  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) =    5.82
  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) =       8.73

****************************************************************************
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.73
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    7.79
  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.) =    7.79
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.642
  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) =   13.53
  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) =      21.78

****************************************************************************
  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  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.78
  PIPE TRAVEL TIME(MIN.) =   1.50    Tc(MIN.) =    9.29
  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.) =    9.29
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
  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) =    8.98
  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) =      28.02

****************************************************************************
  FLOW PROCESS FROM NODE    424.00 TO NODE    424.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.29
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  3.212
```

```
  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
  "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) =   14.74
  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) =      42.75

****************************************************************************
  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  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.28
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.75
  PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   11.25
  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.) =   11.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   63.86
  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) =     101.54

****************************************************************************
  FLOW PROCESS FROM NODE    416.00 TO NODE    416.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.25
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
  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        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) =    3.17
  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) =     104.71

****************************************************************************
  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.) =   11.25
  RAINFALL INTENSITY(INCH/HR) =   2.86
  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 =     104.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      161.15    9.83    3.059  0.30( 0.12) 0.41       61.0     410.00
      2      104.71   11.25    2.856  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      259.55    9.83    3.059  0.30( 0.13) 0.45       98.6     410.00
      2      254.67   11.25    2.856  0.30( 0.13) 0.45      104.0     420.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     259.55    Tc(MIN.) =     9.83
  EFFECTIVE AREA(ACRES) =      98.58   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  57.0 INCH PIPE IS  41.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.66
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     259.55
  PIPE TRAVEL TIME(MIN.) =   0.97    Tc(MIN.) =   10.80
  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.) =   10.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.911
  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) =   43.87
  EFFECTIVE AREA(ACRES) =    115.88   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) =     290.28

****************************************************************************
  FLOW PROCESS FROM NODE    417.00 TO NODE    417.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.80
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.911
  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) =    2.51
  EFFECTIVE AREA(ACRES) =    116.88   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) =     292.80

****************************************************************************
  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  60.0 INCH PIPE IS  48.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.35
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     292.80
  PIPE TRAVEL TIME(MIN.) =   1.51    Tc(MIN.) =   12.31
  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.) =   12.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.724
  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) =   46.71
  EFFECTIVE AREA(ACRES) =    137.78   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) =     319.80

****************************************************************************
  FLOW PROCESS FROM NODE    430.00 TO NODE    430.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.31
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.724
  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) =   32.22
  EFFECTIVE AREA(ACRES) =    152.28   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) =     352.03

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      352.03   12.31    2.724  0.30( 0.16) 0.52     152.3     410.00
      2      339.56   13.73    2.548  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      482.19   18.17    2.161  0.30( 0.13) 0.45     260.7     400.00
      2      444.13   20.72    1.995  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      769.16   12.31    2.724  0.30( 0.14) 0.48     328.8     410.00
      2      773.20   13.73    2.548  0.30( 0.14) 0.48     354.6     420.00
      3      766.92   18.17    2.161  0.30( 0.14) 0.48     418.4     400.00
      4      705.28   20.72    1.995  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) =      773.20  Tc(MIN.) =   13.728
  EFFECTIVE AREA(ACRES) =    354.58  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  53.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.15
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     773.20
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =   14.35
  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.) =   14.35
  *  50 YEAR RAINFALL INTENSITY(INCH/HR) =  2.470
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   89.87
  EFFECTIVE AREA(ACRES) =    395.88   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) =     832.21

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      836.74   12.93    2.646  0.30( 0.13) 0.45     370.1     410.00
      2      832.21   14.35    2.470  0.30( 0.13) 0.45     395.9     420.00
      3      819.89   18.80    2.116  0.30( 0.13) 0.45     459.7     400.00
      4      760.00   21.37    1.964  0.30( 0.14) 0.45     461.6     430.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =     836.74  Tc(MIN.) =   12.93
  AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.45  EFFECTIVE AREA(ACRES) =     370.07

****************************************************************************
  FLOW PROCESS FROM NODE    431.00 TO NODE    431.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.93
  *  50 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
  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) =    2.12
  EFFECTIVE AREA(ACRES) =    370.97   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) =     838.86

****************************************************************************
  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	838.86	12.93	2.646	0.30(0.13)	0.45	371.0	410.00
2	834.19	14.35	2.470	0.30(0.13)	0.45	396.8	420.00
3	821.58	18.80	2.116	0.30(0.13)	0.45	460.6	400.00
4	761.56	21.37	1.964	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	1284.06	18.27	2.155	0.30(0.12)	0.40	701.1	310.00
2	1308.25	22.02	1.933	0.30(0.12)	0.40	802.3	300.00
3	1308.59	22.12	1.928	0.30(0.12)	0.40	804.8	320.00
4	1154.83	28.09	1.673	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	1967.60	12.93	2.646	0.30(0.13)	0.42	867.4	410.00
2	1999.59	14.35	2.470	0.30(0.13)	0.42	947.8	420.00
3	2107.16	18.27	2.155	0.30(0.13)	0.42	1154.0	310.00
4	2109.10	18.80	2.116	0.30(0.13)	0.42	1176.1	400.00
5	2065.61	21.37	1.964	0.30(0.13)	0.42	1247.2	430.00
6	2056.77	22.02	1.933	0.30(0.13)	0.42	1264.8	300.00
7	2055.00	22.12	1.928	0.30(0.13)	0.42	1267.3	320.00
8	1794.92	28.09	1.673	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) = 2109.10 Tc(MIN.) = 18.801
EFFECTIVE AREA(ACRES) = 1176.10 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.) = 18.80
EFFECTIVE AREA(ACRES) = 1176.10 AREA-AVERAGED Fm(INCH/HR)= 0.13
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.419
PEAK FLOW RATE(CFS) = 2109.10

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	1967.60	12.93	2.646	0.30(0.13)	0.42	867.4	410.00
2	1999.59	14.35	2.470	0.30(0.13)	0.42	947.8	420.00
3	2107.16	18.27	2.155	0.30(0.13)	0.42	1154.0	310.00
4	2109.10	18.80	2.116	0.30(0.13)	0.42	1176.1	400.00
5	2065.61	21.37	1.964	0.30(0.13)	0.42	1247.2	430.00
6	2056.77	22.02	1.933	0.30(0.13)	0.42	1264.8	300.00
7	2055.00	22.12	1.928	0.30(0.13)	0.42	1267.3	320.00
8	1794.92	28.09	1.673	0.30(0.13)	0.43	1292.3	390.00

==========

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END OF RATIONAL METHOD ANALYSIS

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**************************************************************************
            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 LOCAL                                *
* 100-YR EV APRIL 2022 CPHAN                                           *
 **************************************************************************

  FILE NAME: PA3O00EV.DAT
  TIME/DATE OF STUDY: 16:34 04/29/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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    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) =  3.267
  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        0.80      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) =      2.14
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      2.14

**************************************************************************
  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/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =       5.79
  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) =       9.30

  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) =  2.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
```

O-1

O-2

O-3

```
     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) =      26.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.91
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =   13.06
  SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   33.77
  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) =      42.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.34   FLOW VELOCITY(FEET/SEC.) =   7.82
  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) =  2.640
  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) =      56.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.46
  AVERAGE FLOW DEPTH(FEET) =   1.49   TRAVEL TIME(MIN.) =   1.44
  Tc(MIN.) =   14.50
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   28.90
  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) =      68.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.61   FLOW VELOCITY(FEET/SEC.) =   8.84
  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
----------------------------------------------------------------------------
```

O-4


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  >>>>>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  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.71
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      68.29
  PIPE TRAVEL TIME(MIN.) =   2.17    Tc(MIN.) =   16.68
  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.) =   16.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.439
  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) =   24.12
  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) =      86.56

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.439
  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) =   12.11
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
```

O-5

O-5

```
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      98.67
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     16.68
  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)   =      98.67
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  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 BODR 2022 - SUBWATERSHED O                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 2-YR EV APRIL 2022 CPHAN                                               *
 ****************************************************************************

  FILE NAME: PA3O02EV.DAT
  TIME/DATE OF STUDY: 16:42 04/29/2022
============================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.065
  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"               -        0.80      0.60     1.000    56    9.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.34
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      0.34

****************************************************************************
  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) =  0.991
  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     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) =       0.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.61
  AVERAGE FLOW DEPTH(FEET) =   0.28   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =   11.58
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    1.02
  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) =       1.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   4.10
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.
```

O-1

O-2

```
****************************************************************************
 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) =  0.836                    O-3
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -       14.80      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 =  0.999
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.04
 AVERAGE FLOW DEPTH(FEET) =   0.49   TRAVEL TIME(MIN.) =   3.60
 Tc(MIN.) =   15.18
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =    3.20
 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) =       3.98

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.55   FLOW VELOCITY(FEET/SEC.) =   4.32
 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) =  0.773                    O-4
 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               -       11.70      0.60     1.000     -
 USER-DEFINED               -        1.90      0.60     0.900     -
 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) =       5.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.64
 AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   2.63
 Tc(MIN.) =   17.81
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    2.23
 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) =       5.15

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   4.65
 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   5.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  10.30
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.15
 PIPE TRAVEL TIME(MIN.) =   4.16    Tc(MIN.) =   21.97
 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.) =   21.97
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.685                    O-5
 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               -        0.30      0.60     1.000     -
 USER-DEFINED               -        2.30      0.60     1.000     -
 USER-DEFINED               -        0.60      0.60     1.000     -
 USER-DEFINED               -        1.00      0.60     1.000     -
 USER-DEFINED               -        8.20      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) =   12.50      SUBAREA RUNOFF(CFS) =    0.95
 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) =       5.15
 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.) =   21.97
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.685                    O-5
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        6.20      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) =    6.20      SUBAREA RUNOFF(CFS) =    0.81
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =       5.15
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     21.97
  EFFECTIVE AREA(ACRES) =     51.10  AREA-AVERAGED Fm(INCH/HR)=  0.59
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.984
  PEAK FLOW RATE(CFS)   =       5.15
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  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 BODR 2022 - SUBWATERSHED O                                    *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 5-YR EV APRIL 2022 CPHAN                                               *
 ****************************************************************************

  FILE NAME: PA3O05EV.DAT
  TIME/DATE OF STUDY: 16:44 04/29/2022
============================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.517
  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"               -        0.80      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) =      0.73
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      0.73

****************************************************************************
  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) =  1.433
  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     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) =       1.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.54
  AVERAGE FLOW DEPTH(FEET) =   0.38   TRAVEL TIME(MIN.) =   1.29
  Tc(MIN.) =   11.25
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    2.43
  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) =       3.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   5.04
  LONGEST FLOWPATH FROM NODE    600.00 TO NODE    602.00 =     674.00 FEET.
```

O-1

O-2

```
****************************************************************************
  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) =  1.259
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -       14.80      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) =       8.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.18
  AVERAGE FLOW DEPTH(FEET) =   0.73   TRAVEL TIME(MIN.) =   2.81
  Tc(MIN.) =   14.05
  SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   10.25
  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) =      12.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   5.79
  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) =  1.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        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) =      16.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
  AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   1.96
  Tc(MIN.) =   16.01
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    8.27
  EFFECTIVE AREA(ACRES) =     32.40     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   0.99
```

O-3

O-4


```
  TOTAL AREA(ACRES) =       32.4         PEAK FLOW RATE(CFS) =      19.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   6.45
  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  18.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.28
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.44
  PIPE TRAVEL TIME(MIN.) =   3.00    Tc(MIN.) =   19.01
  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.) =   19.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.056
  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               -        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) =    6.25
  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) =      22.54

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   19.01
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.056
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        6.20      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) =    3.38
```

O-5

O-5

```
  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) =      25.91
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     19.01
  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)   =      25.91
================================================================================
================================================================================
  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 BODR 2022 - SUBWATERSHED O                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 10-YR EV APRIL 2022 CPHAN                                            *
 **********************************************************************

  FILE NAME: PA3O10EV.DAT
  TIME/DATE OF STUDY: 16:47 04/29/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.164
  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        0.80      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) =      1.34
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.34

**************************************************************************
  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) =  2.038
  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        2.90      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) =       3.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.27
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   1.11
  Tc(MIN.) =   11.06
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    4.54
  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) =       5.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   5.84
  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) =  1.828
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
```

O-1

O-2

O-3

```
     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) =      16.13
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.14
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   2.37
  Tc(MIN.) =   13.43
  SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   20.63
  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) =      25.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.12   FLOW VELOCITY(FEET/SEC.) =   6.88
  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) =  1.714
  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) =      34.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.46
  AVERAGE FLOW DEPTH(FEET) =   1.24   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =   15.07
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   17.48
  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) =      41.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.32   FLOW VELOCITY(FEET/SEC.) =   7.84
  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
----------------------------------------------------------------------------
```

O-4


```
  >>>>>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  17.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.26
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.28
  PIPE TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   17.55
  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.) =   17.55
  *   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
  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) =   14.37
  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) =      51.55

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.55
  *   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
  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) =    7.27
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
```

O-5

O-5

```
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      58.82
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     17.55
  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)   =      58.82
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  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 BODR 2022 - SUBWATERSHED O                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 25-YR EV APRIL 2022 CPHAN                                            *
 **********************************************************************

  FILE NAME: PA3O25EV.DAT
  TIME/DATE OF STUDY: 16:50 04/29/2022
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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) =  2.736
  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        0.80      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) =      1.75
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.75

**************************************************************************
  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) =  2.584
  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        2.90      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) =       4.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.60
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   11.00
  SUBAREA AREA(ACRES) =     2.90     SUBAREA RUNOFF(CFS) =    5.96
  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) =       7.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.64   FLOW VELOCITY(FEET/SEC.) =   6.27
  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) =  2.326
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
```

O-1

O-2

O-3

```
     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) =      21.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.56
  AVERAGE FLOW DEPTH(FEET) =   1.04   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   13.21
  SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   27.36
  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) =      34.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.24   FLOW VELOCITY(FEET/SEC.) =   7.38
  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) =  2.185
  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) =      45.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.03
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   1.52
  Tc(MIN.) =   14.74
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   23.30
  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) =      55.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.48   FLOW VELOCITY(FEET/SEC.) =   8.41
  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
----------------------------------------------------------------------------
```

O-4


```
  >>>>>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  18.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.59
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      55.03
  PIPE TRAVEL TIME(MIN.) =   2.30    Tc(MIN.) =   17.04
  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.) =   17.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.011
  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) =   19.30
  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) =      69.24

****************************************************************************
  FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.04
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.011
  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) =    9.71
  EFFECTIVE AREA(ACRES) =     51.10   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.98
```

O-5

O-5

```
  TOTAL AREA(ACRES) =       51.1       PEAK FLOW RATE(CFS) =      78.95
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     17.04
  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)   =      78.95
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

```
****************************************************************************
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           (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 BODR 2022 - SUBWATERSHED O                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 50-YR EV APRIL 2022 CPHAN                                            *
 ************************************************************************

  FILE NAME: PA3O50EV.DAT
  TIME/DATE OF STUDY: 16:52 04/29/2022
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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                  O-1
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.951
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.024
  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        0.80      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) =      1.96
  TOTAL AREA(ACRES) =      0.80   PEAK FLOW RATE(CFS) =      1.96

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891                    O-2
  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        2.90      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) =       5.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.80
  AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =   10.96
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    6.76
  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) =       8.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   6.47
```

```
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.625                  O-3
 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) =      24.35
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.78
 AVERAGE FLOW DEPTH(FEET) =   1.09   TRAVEL TIME(MIN.) =   2.14
 Tc(MIN.) =   13.11
 SUBAREA AREA(ACRES) =    15.00       SUBAREA RUNOFF(CFS) =   31.39
 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) =      39.13

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.31   FLOW VELOCITY(FEET/SEC.) =   7.63
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.442                  O-4
 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) =      52.37
```



```
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.28
 AVERAGE FLOW DEPTH(FEET) =   1.45   TRAVEL TIME(MIN.) =   1.48
 Tc(MIN.) =   14.58
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   26.46
 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) =      62.51

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.55   FLOW VELOCITY(FEET/SEC.) =   8.66
 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  20.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.90
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      62.51
 PIPE TRAVEL TIME(MIN.) =   2.27    Tc(MIN.) =   16.85
 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.) =   16.85
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.257                  O-5
 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) =   22.07
 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) =      79.19

****************************************************************************
 FLOW PROCESS FROM NODE    605.00 TO NODE    605.00 IS CODE =  81
```

```
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   16.85
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.257
  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) =   11.09
  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) =      90.28
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       51.1  TC(MIN.) =     16.85
  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)   =      90.28
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

O-5

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*****************************************************************************
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           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E ROMP                                                *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                  *
* 100-YR EV JUNE 2018 JMITAL                                             *
 ***********************************************************************

  FILE NAME: PA4E00EV.DAT
  TIME/DATE OF STUDY: 10:08 06/03/2018
=============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  4.824                    E-1
  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        0.20      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) =      6.32
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      6.32

*****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.67
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   13.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.27
  STREET FLOW TRAVEL TIME(MIN.) =   1.44   Tc(MIN.) =    6.44      E-2
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.179
  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) =   10.68
  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) =      16.13
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.66
  FLOW VELOCITY(FEET/SEC.) =  3.38   DEPTH*VELOCITY(FT*FT/SEC.) =   1.50
  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) =      26.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.50
    HALFSTREET FLOOD WIDTH(FEET) =   18.95
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.83
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.92
  STREET FLOW TRAVEL TIME(MIN.) =   1.70   Tc(MIN.) =    8.15
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.659
  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) =   19.75
  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) =      33.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.54   HALFSTREET FLOOD WIDTH(FEET) =  21.05
  FLOW VELOCITY(FEET/SEC.) =  4.07   DEPTH*VELOCITY(FT*FT/SEC.) =   2.19
  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
```

E-2.1


```
----------------------------------------------------------------------------
  >>>>>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  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.79
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.82
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    8.98
  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.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  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) =   89.00
  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) =     120.96

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.98
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.462
  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) =   48.40
```

E-3

E-4

```
  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) =     169.36

****************************************************************************
  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.) =    8.98
  RAINFALL INTENSITY(INCH/HR) =   3.46
  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 =     169.36

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.431
  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) =      2.54
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.54

****************************************************************************
  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
```

OE-1


```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
  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) =      13.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.03
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =   10.41
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   21.81
  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) =      24.14

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.87   FLOW VELOCITY(FEET/SEC.) =  10.52
  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
  *  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
  "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) =      40.60
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.13
  AVERAGE FLOW DEPTH(FEET) =   1.38   TRAVEL TIME(MIN.) =   2.36
  Tc(MIN.) =   12.77
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   32.88
```

OE-2

OE-3

```
  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) =      54.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.54   FLOW VELOCITY(FEET/SEC.) =   7.64
  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.) =   12.77
  *  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       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) =   23.74
  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) =      77.85

****************************************************************************
  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  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.54
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      77.85
  PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =   13.58
  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.) =   13.58
  RAINFALL INTENSITY(INCH/HR) =   2.74
  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 =      77.85
```

0E-3


```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
      1      169.36    8.98    3.462  0.30( 0.08) 0.28       55.7     800.00
      2       77.85   13.58    2.740  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      236.09    8.98    3.462  0.30( 0.15) 0.49       78.3     800.00
      2      210.99   13.58    2.740  0.30( 0.17) 0.55       89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     236.09    Tc(MIN.) =     8.98
  EFFECTIVE AREA(ACRES) =      78.25   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  31.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.83
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     236.09
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.39
  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.) =    9.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.376
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
```

E-5

```
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   96.07
  EFFECTIVE AREA(ACRES) =    110.95   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) =     323.55

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.376
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   29.81
  EFFECTIVE AREA(ACRES) =    120.85   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) =     353.36

****************************************************************************
  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.) =    9.39
  RAINFALL INTENSITY(INCH/HR) =   3.38
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.85
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     353.36

****************************************************************************
  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) =  3.488
  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    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30      1.000    66    8.86
```

E-5

OE-4


```
  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) =      2.87
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.87

****************************************************************************
  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) =  2.957
  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
  ".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) =      13.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.47
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   3.01
  Tc(MIN.) =   11.87
  SUBAREA AREA(ACRES) =     8.70      SUBAREA RUNOFF(CFS) =   21.17
  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) =      23.56

  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.) =   11.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
  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
```

OE-5

OE-5

```
  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) =   26.54
  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) =      50.10

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
  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) =   25.11
  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) =      75.21

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.87
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
  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) =   17.70
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
```

OE-6

OE-6


```
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      92.91

****************************************************************************
  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.) =  20.13
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.91
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =   12.89
  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.) =   12.89
  RAINFALL INTENSITY(INCH/HR) =   2.82
  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 =      92.91

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      353.36    9.39    3.376  0.30( 0.13) 0.42     120.9     800.00
      1      303.84   14.01    2.692  0.30( 0.14) 0.47     132.4     810.00
      2       92.91   12.89    2.822  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      435.82    9.39    3.376  0.30( 0.16) 0.52     149.0     800.00
      2      408.74   12.89    2.822  0.30( 0.17) 0.57     168.2     818.00
      3      392.00   14.01    2.692  0.30( 0.17) 0.58     171.0     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     435.82    Tc(MIN.) =     9.39
  EFFECTIVE AREA(ACRES) =     148.97   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.) = 9.39
EFFECTIVE AREA(ACRES) = 148.97 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.522
PEAK FLOW RATE(CFS) = 435.82

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	435.82	9.39	3.376	0.30(0.16)	0.52	149.0	800.00
2	408.74	12.89	2.822	0.30(0.17)	0.57	168.2	818.00
3	392.00	14.01	2.692	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)
          (c) Copyright 1983-2013 Advanced Engineering Software (aes)
              Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E ROMP 2018                                          *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                 *
* 2-YR EV  JUNE 2018 JMITAL                                             *
 ************************************************************************

  FILE NAME: PA4E02EV.DAT
  TIME/DATE OF STUDY: 10:33 06/03/2018
========================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  1.600
  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"          -        0.20      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) =      1.78
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      1.78

************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    7.53
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.41
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.72
  STREET FLOW TRAVEL TIME(MIN.) =   1.87   Tc(MIN.) =    6.87
```

E-1

```
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.398
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                -        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) =     3.19
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) =       4.69

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   8.97
FLOW VELOCITY(FEET/SEC.) =  2.57   DEPTH*VELOCITY(FT*FT/SEC.) =   0.83
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) =       7.53
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.36
  HALFSTREET FLOOD WIDTH(FEET) =   11.21
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.04
STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =    9.15
*   2 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                -        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) =    5.65
```

E-2

E-2.1


```
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) =       9.37

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.30
FLOW VELOCITY(FEET/SEC.) =  3.03   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
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   7.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.56
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       9.37
PIPE TRAVEL TIME(MIN.) =   1.12    Tc(MIN.) =   10.27
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.) =   10.27
*   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                -        2.00      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) =   22.52
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) =      30.91

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.27
*   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
```

E-3

E-4

```
  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) =   13.23
  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) =      44.15

****************************************************************************
  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.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   1.05
  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 =      44.15

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.154
  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    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) =      0.45
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
```

OE-1


```
  >>>>>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) =  1.007
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        2.10      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) =       2.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.59
  AVERAGE FLOW DEPTH(FEET) =   0.35   TRAVEL TIME(MIN.) =   2.07
  Tc(MIN.) =   11.20
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =    3.08
  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) =       3.41

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   6.37
  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) =  0.835
  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               -        0.30      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) =       4.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   4.02
  Tc(MIN.) =   15.22
  SUBAREA AREA(ACRES) =    14.40      SUBAREA RUNOFF(CFS) =    3.04
  EFFECTIVE AREA(ACRES) =     23.70     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```

OE-2

OE-3

```
 TOTAL AREA(ACRES) =       23.7         PEAK FLOW RATE(CFS) =       5.01

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.63   FLOW VELOCITY(FEET/SEC.) =   4.20
 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.) =   15.22
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.835                  OE-3
 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      0.60     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) =    2.20
 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) =       7.21

****************************************************************************
 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   6.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.97
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.21
 PIPE TRAVEL TIME(MIN.) =   1.46    Tc(MIN.) =   16.68
 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.) =   16.68
 RAINFALL INTENSITY(INCH/HR) =   0.80
 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 =       7.21

 ** CONFLUENCE DATA **
```



```
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1       44.15   10.27    1.048  0.60( 0.17) 0.28       55.7      800.00
     2        7.21   16.68    0.800  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1       51.35   10.27    1.048  0.60( 0.29) 0.48       76.7      800.00
     2       38.89   16.68    0.800  0.60( 0.33) 0.55       89.8      810.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.35    Tc(MIN.) =    10.27
 EFFECTIVE AREA(ACRES) =      76.69   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  24.0 INCH PIPE IS  17.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  21.13
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      51.35
 PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =   10.86
 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.) =   10.86
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.022                  E-5
 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      0.60     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) =   23.50
 EFFECTIVE AREA(ACRES) =    109.39   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) =      74.31
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.86
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.022
  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) =    8.57
  EFFECTIVE AREA(ACRES) =    119.29   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) =      82.88

****************************************************************************
  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.) =   10.86
  RAINFALL INTENSITY(INCH/HR) =   1.02
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     119.29
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      82.88

****************************************************************************
  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) =  1.183
  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
```

E-5

OE-4


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  SUBAREA RUNOFF(CFS) =      0.52
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      0.52

****************************************************************************
  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) =  0.900
  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) =       2.12
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.07
  AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   4.78
  Tc(MIN.) =   13.65
  SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =    3.08
  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) =       3.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.49   FLOW VELOCITY(FEET/SEC.) =   4.59
  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.) =   13.65
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.900
  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) =    2.99
  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) =       6.34

****************************************************************************
```

OE-5

OE-5

```
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.65
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.900
 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     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) =    3.29
 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) =       9.63

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   13.65
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.900
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        4.60      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) =    2.01
 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) =      11.64

****************************************************************************
 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
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.21
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      11.64
 PIPE TRAVEL TIME(MIN.) =   1.68    Tc(MIN.) =   15.33
 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.) =   15.33
 RAINFALL INTENSITY(INCH/HR) =   0.83
 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 =      11.64

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1       82.88   10.86    1.022  0.60( 0.25) 0.42     119.3     800.00
     1       59.52   17.32    0.784  0.60( 0.28) 0.47     132.4     810.00
     2       11.64   15.33    0.832  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1       94.52   10.86    1.022  0.60( 0.31) 0.51     146.6     800.00
     2       78.38   15.33    0.832  0.60( 0.34) 0.57     166.9     818.00
     3       69.08   17.32    0.784  0.60( 0.35) 0.58     171.0     810.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      94.52    Tc(MIN.) =    10.86
 EFFECTIVE AREA(ACRES) =     146.64   AREA-AVERAGED Fm(INCH/HR) =  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.51
 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.) =     10.86
 EFFECTIVE AREA(ACRES) =    146.64  AREA-AVERAGED Fm(INCH/HR)=  0.31
 AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap = 0.515
 PEAK FLOW RATE(CFS)    =      94.52

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)     NODE
     1       94.52   10.86    1.022  0.60( 0.31) 0.51     146.6     800.00
     2       78.38   15.33    0.832  0.60( 0.34) 0.57     166.9     818.00
     3       69.08   17.32    0.784  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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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                        Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E ROMP                                               *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                 *
* 5-YR EV JUNE 2018 JMITAL                                              *
 ************************************************************************

  FILE NAME: PA4E05EV.DAT
  TIME/DATE OF STUDY: 10:23 06/03/2018
========================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  2.180
  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"          -        0.20      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) =      2.62
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      2.62

************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.98
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =    9.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.85
  STREET FLOW TRAVEL TIME(MIN.) =   1.74   Tc(MIN.) =    6.74
```

E-1

```
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.947
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                -        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) =     4.70
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) =       7.01

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  10.90
FLOW VELOCITY(FEET/SEC.) =  2.79   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
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) =      11.31
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.40
  HALFSTREET FLOOD WIDTH(FEET) =   13.40
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
STREET FLOW TRAVEL TIME(MIN.) =   2.07   Tc(MIN.) =    8.81
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.669
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                -        0.20      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) =    8.60
```

E-2

E-2.1


```
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) =      14.51

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.88
FLOW VELOCITY(FEET/SEC.) =  3.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.43
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  10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      14.51
PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =    9.82
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.) =    9.82
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.535
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      0.900     -
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) =   36.26
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) =      49.50

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.82
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.535
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      0.900     -
```

E-3

E-4

```
  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) =   20.43
  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) =      69.93

****************************************************************************
  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.) =    9.82
  RAINFALL INTENSITY(INCH/HR) =   1.53
  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 =      69.93

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.627
  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    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) =      0.91
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
  FLOW PROCESS FROM NODE    811.00 TO NODE    812.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

OE-1


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  >>>>>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) =  1.460
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        2.10      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) =       4.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.92
  AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   1.67
  Tc(MIN.) =   10.80
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =    7.26
  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) =       8.04

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   8.05
  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) =  1.264
  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      0.50     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) =      13.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.32
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   3.16
  Tc(MIN.) =   13.97
  SUBAREA AREA(ACRES) =    14.40      SUBAREA RUNOFF(CFS) =    9.90
  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) =      16.29
```

OE-2

OE-3

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.98   FLOW VELOCITY(FEET/SEC.) =   5.66
  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.) =   13.97
  *   5 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                -       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) =    7.15
  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) =      23.44

****************************************************************************
  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  18.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.64
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.44
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   15.08
  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.) =   15.08
  RAINFALL INTENSITY(INCH/HR) =   1.20
  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 =      23.44

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

OE-3


```
       1       69.93    9.82    1.535  0.50( 0.14) 0.28      55.7     800.00
       2       23.44   15.08    1.197  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       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
       1       92.58    9.82    1.535  0.50( 0.24) 0.48      77.9     800.00
       2       76.44   15.08    1.197  0.50( 0.28) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      92.58    Tc(MIN.) =     9.82
  EFFECTIVE AREA(ACRES) =      77.89   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  30.0 INCH PIPE IS  21.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  24.50
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      92.58
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   10.33
  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.) =   10.33
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.490
  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) =   38.36
  EFFECTIVE AREA(ACRES) =    110.59   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) =     125.78

****************************************************************************
```

E-5

```
 FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.33
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.490
 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) =   12.83
 EFFECTIVE AREA(ACRES) =    120.49   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) =     138.60

****************************************************************************
 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.) =   10.33
 RAINFALL INTENSITY(INCH/HR) =   1.49
 AREA-AVERAGED Fm(INCH/HR) =  0.21
 AREA-AVERAGED Fp(INCH/HR) =  0.50
 AREA-AVERAGED Ap =  0.42
 EFFECTIVE STREAM AREA(ACRES) =     120.49
 TOTAL STREAM AREA(ACRES) =     132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     138.60

****************************************************************************
 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) =  1.662
 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) =      1.05
 TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.05
```

E-5

0E-4


```
****************************************************************************
 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) =  1.338
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 USER-DEFINED               -        0.10      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) =       4.67
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.96
 AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   3.92
 Tc(MIN.) =   12.78
 SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =    7.16
 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) =       7.92

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   5.68
 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.) =   12.78
 *   5 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               -        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) =    8.36
 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) =      16.28

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
```

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0E-5

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

MAINLINE Tc(MIN.) = 12.78
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338

OE-6

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) = 8.24
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) = 24.53

****

FLOW PROCESS FROM NODE 820.00 TO NODE 820.00 IS CODE = 81

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

MAINLINE Tc(MIN.) = 12.78
* 5 YEAR RAINFALL INTENSITY(INCH/HR) = 1.338

OE-6

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) = 5.59
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) = 30.11

****

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 21.0 INCH PIPE IS 16.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.02
ESTIMATED PIPE DIAMETER(INCH) = 21.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 30.11
PIPE TRAVEL TIME(MIN.) = 1.37 Tc(MIN.) = 14.15
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.) = 14.15
RAINFALL INTENSITY(INCH/HR) = 1.25
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 = 30.11

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	138.60	10.33	1.490	0.50(0.21)	0.42	120.5	800.00
1	112.01	15.63	1.177	0.50(0.24)	0.47	132.4	810.00
2	30.11	14.15	1.253	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	167.24	10.33	1.490	0.50(0.26)	0.52	148.7	800.00
2	149.55	14.15	1.253	0.50(0.29)	0.57	167.7	818.00
3	139.21	15.63	1.177	0.50(0.29)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 167.24 Tc(MIN.) = 10.33
EFFECTIVE AREA(ACRES) = 148.67 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.) = 10.33
EFFECTIVE AREA(ACRES) = 148.67 AREA-AVERAGED Fm(INCH/HR)= 0.26
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.521
PEAK FLOW RATE(CFS) = 167.24

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	167.24	10.33	1.490	0.50(0.26)	0.52	148.7	800.00
2	149.55	14.15	1.253	0.50(0.29)	0.57	167.7	818.00
3	139.21	15.63	1.177	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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             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-4 SUBAREA E ROMP                                                 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                   *
* 10-YR EV JUNE 2018 JMITAL                                               *
 ***************************************************************************

  FILE NAME: PA4E10EV.DAT
  TIME/DATE OF STUDY: 10:13 06/03/2018
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  3.185                    E-1
  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        0.20      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) =      4.11
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      4.11

******************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.03
  STREET FLOW TRAVEL TIME(MIN.) =   1.59   Tc(MIN.) =    6.59
*   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.728                    E-2
  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) =    6.89
  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) =      10.38
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.01
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   1.20
  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) =      16.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   15.82
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.44
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.53
  STREET FLOW TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =    8.48
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.367
  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) =   12.66
  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) =      21.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.54
  FLOW VELOCITY(FEET/SEC.) =  3.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  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
```

E-2.1


```
----------------------------------------------------------------------------
  >>>>>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  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.11
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.61
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    9.41
  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.) =    9.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.233
  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) =   56.47
  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) =      76.81

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.41
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.233
  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) =   30.91
```

E-3

E-4

```
  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) =     107.73

****************************************************************************
  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.) =    9.41
  RAINFALL INTENSITY(INCH/HR) =   2.23
  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 =     107.73

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.271
  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) =      1.60
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.60

****************************************************************************
  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
```

OE-1


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  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.091
  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) =       8.38
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.02
  AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.44
  Tc(MIN.) =   10.57
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   13.54
  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) =      14.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.73   FLOW VELOCITY(FEET/SEC.) =   9.39
  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) =  1.843
  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
  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) =      25.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.31
  AVERAGE FLOW DEPTH(FEET) =   1.15   TRAVEL TIME(MIN.) =   2.67
  Tc(MIN.) =   13.24
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   19.99
```

OE-2

OE-3

```
 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) =      32.90

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.28   FLOW VELOCITY(FEET/SEC.) =   6.73
 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.) =   13.24
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.843
 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) =   14.44
 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) =      47.34

****************************************************************************
 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  24.0 INCH PIPE IS  17.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.84
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      47.34
 PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   14.17
 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.) =   14.17
 RAINFALL INTENSITY(INCH/HR) =   1.77
 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 =      47.34
```

OE-3


```
 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      107.73    9.41    2.233  0.30( 0.08) 0.28      55.7     800.00
     2       47.34   14.17    1.774  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      148.95    9.41    2.233  0.30( 0.15) 0.49      78.3     800.00
     2      132.07   14.17    1.774  0.30( 0.17) 0.55      89.8     810.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     148.95    Tc(MIN.) =     9.41
 EFFECTIVE AREA(ACRES) =      78.35   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  36.0 INCH PIPE IS  25.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  27.63
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     148.95
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    9.86
 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.) =    9.86
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.174
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
```

E-5

```
  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   60.70
  EFFECTIVE AREA(ACRES) =    111.05   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) =     203.68

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.174
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   19.10
  EFFECTIVE AREA(ACRES) =    120.95   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) =     222.79

****************************************************************************
  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.) =    9.86
  RAINFALL INTENSITY(INCH/HR) =   2.17
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.95
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     222.79

****************************************************************************
  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) =  2.309
  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    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30      1.000    66    8.86
```

E-5

OE-4


```
  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) =      1.81
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      1.81

****************************************************************************
  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) =  1.926
  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
  ".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) =       8.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.76
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   3.38
  Tc(MIN.) =   12.24
  SUBAREA AREA(ACRES) =     8.70       SUBAREA RUNOFF(CFS) =   13.09
  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) =      14.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   6.60
  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.) =   12.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.926
  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
```

OE-5

OE-5

```
  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) =   16.24
  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) =      30.80

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.926
  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) =   15.46
  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) =      46.26

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.24
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.926
  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) =   10.83
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
```

OE-6

OE-6


```
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      57.09

****************************************************************************
  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  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.71
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      57.09
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =   13.40
  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.) =   13.40
  RAINFALL INTENSITY(INCH/HR) =   1.83
  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 =      57.09

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      222.79    9.86    2.174  0.30( 0.13) 0.42     120.9     800.00
      1      190.52   14.64    1.741  0.30( 0.14) 0.47     132.4     810.00
      2       57.09   13.40    1.830  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      274.15    9.86    2.174  0.30( 0.16) 0.52     149.4     800.00
      2      256.01   13.40    1.830  0.30( 0.17) 0.57     168.0     818.00
      3      244.33   14.64    1.741  0.30( 0.17) 0.58     171.0     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     274.15    Tc(MIN.) =     9.86
  EFFECTIVE AREA(ACRES) =     149.36   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.) = 9.86
EFFECTIVE AREA(ACRES) = 149.36 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.523
PEAK FLOW RATE(CFS) = 274.15

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	274.15	9.86	2.174	0.30(0.16)	0.52	149.4	800.00
2	256.01	13.40	1.830	0.30(0.17)	0.57	168.0	818.00
3	244.33	14.64	1.741	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 1264

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-4 SUBAREA E ROMP                                                 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                   *
* 25-YR EV JUNE 2018 JMITAL                                               *
 ***************************************************************************

  FILE NAME: PA4E25EV.DAT
  TIME/DATE OF STUDY: 10:13 06/03/2018
==============================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  4.060
  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        0.20      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) =      5.29
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.29

******************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.74
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   12.62
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.02
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.17
  STREET FLOW TRAVEL TIME(MIN.) =   1.49   Tc(MIN.) =    6.49
*  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.495
  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) =    8.89
  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) =      13.42
```

E-1

E-2

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.49
  FLOW VELOCITY(FEET/SEC.) =  3.24   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) =      21.61
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.75
  STREET FLOW TRAVEL TIME(MIN.) =   1.77   Tc(MIN.) =    8.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.044
  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) =   16.37
  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) =      28.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.51   HALFSTREET FLOOD WIDTH(FEET) =  19.49
  FLOW VELOCITY(FEET/SEC.) =  3.90   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
```

E-2.1


```
----------------------------------------------------------------------------
  >>>>>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) =      28.00
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =    9.12
  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.) =    9.12
  *  10 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
  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) =   73.49
  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) =      99.91

****************************************************************************
  FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.12
  *  10 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
  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) =   40.06
```

E-3

E-4

```
  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) =     139.97

****************************************************************************
  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.) =    9.12
  RAINFALL INTENSITY(INCH/HR) =   2.88
  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 =     139.97

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.875
  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) =      2.09
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.09

****************************************************************************
  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
```

OE-1


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  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.658
  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
  "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) =      11.01
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.65
  AVERAGE FLOW DEPTH(FEET) =   0.65   TRAVEL TIME(MIN.) =   1.34
  Tc(MIN.) =   10.47
  SUBAREA AREA(ACRES) =     8.40       SUBAREA RUNOFF(CFS) =   17.83
  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) =      19.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   9.99
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.352
  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
  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) =      33.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.76
  AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   2.49
  Tc(MIN.) =   12.96
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   26.60
```

OE-2

OE-3

```
  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) =      43.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.42   FLOW VELOCITY(FEET/SEC.) =   7.22
  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.) =   12.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.352
  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) =   19.21
  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) =      62.98

****************************************************************************
  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  19.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.30
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.98
  PIPE TRAVEL TIME(MIN.) =   0.86    Tc(MIN.) =   13.82
  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.) =   13.82
  RAINFALL INTENSITY(INCH/HR) =   2.27
  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 =      62.98
```

0E-3


```
  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      139.97    9.12    2.876  0.30( 0.08) 0.28      55.7     800.00
      2       62.98   13.82    2.267  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      194.42    9.12    2.876  0.30( 0.15) 0.49      78.2     800.00
      2      172.43   13.82    2.267  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     194.42    Tc(MIN.) =     9.12
  EFFECTIVE AREA(ACRES) =      78.22   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  29.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.36
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     194.42
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    9.55
  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.) =    9.55
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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
```

E-5

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  SUBAREA AREA(ACRES) =   32.70      SUBAREA RUNOFF(CFS) =   79.15
  EFFECTIVE AREA(ACRES) =    110.92   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) =     266.05

****************************************************************************
  FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.55
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.801
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   24.69
  EFFECTIVE AREA(ACRES) =    120.82   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) =     290.74

****************************************************************************
  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.) =    9.55
  RAINFALL INTENSITY(INCH/HR) =   2.80
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =     120.82
  TOTAL STREAM AREA(ACRES) =     132.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     290.74

****************************************************************************
  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) =  2.924
  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    8.86
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30      1.000    66    8.86
```

E-5

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```
  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) =      2.36
  TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.36

****************************************************************************
  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) =  2.455
  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
  ".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) =     11.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.15
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   3.16
  Tc(MIN.) =   12.03
  SUBAREA AREA(ACRES) =     8.70      SUBAREA RUNOFF(CFS) =   17.24
  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) =      19.18

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.95   FLOW VELOCITY(FEET/SEC.) =   7.07
  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.) =   12.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
  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
```

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  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) =   21.53
  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) =      40.70

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
  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) =   20.41
  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) =      61.11

****************************************************************************
  FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.03
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.455
  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) =   14.36
  EFFECTIVE AREA(ACRES) =     38.60   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.94
```

OE-6

OE-6


```
  TOTAL AREA(ACRES) =       38.6       PEAK FLOW RATE(CFS) =      75.47

****************************************************************************
  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  22.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.00
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      75.47
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   13.11
  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.) =   13.11
  RAINFALL INTENSITY(INCH/HR) =   2.34
  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 =      75.47

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      290.74    9.55    2.801  0.30( 0.13) 0.42     120.8     800.00
      1      248.28   14.27    2.226  0.30( 0.14) 0.47     132.4     810.00
      2       75.47   13.11    2.337  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       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      358.18    9.55    2.801  0.30( 0.16) 0.52     148.9     800.00
      2      334.19   13.11    2.337  0.30( 0.17) 0.57     168.2     818.00
      3      319.69   14.27    2.226  0.30( 0.17) 0.58     171.0     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     358.18    Tc(MIN.) =     9.55
  EFFECTIVE AREA(ACRES) =     148.95   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.) = 9.55
EFFECTIVE AREA(ACRES) = 148.95 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.522
PEAK FLOW RATE(CFS) = 358.18

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	358.18	9.55	2.801	0.30(0.16)	0.52	148.9	800.00
2	334.19	13.11	2.337	0.30(0.17)	0.57	168.2	818.00
3	319.69	14.27	2.226	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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             Ver. 20.0  Release Date: 06/01/2013  License ID 1264

                          Analysis prepared by:




 ************************ DESCRIPTION OF STUDY *************************
* RMV PA-4 SUBAREA E ROMP                                                 *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                   *
* 50-YR EV JUNE 2018 JMITAL                                               *
 ***************************************************************************

  FILE NAME: PA4E50EV.DAT
  TIME/DATE OF STUDY: 10:12 06/03/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  4.440
  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        0.20      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) =      5.80
  TOTAL AREA(ACRES) =      1.50   PEAK FLOW RATE(CFS) =      5.80

****************************************************************************
  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(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.94
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.32
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.08
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =    6.46
```

E-1

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*  15 YEAR RAINFALL INTENSITY(INCH/HR) =  4.022
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 B        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) =   10.27
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) =      15.50

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  15.43
FLOW VELOCITY(FEET/SEC.) =  3.34   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
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) =      25.04
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.50
  HALFSTREET FLOOD WIDTH(FEET) =   18.63
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.80
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.88
STREET FLOW TRAVEL TIME(MIN.) =   1.71   Tc(MIN.) =    8.18
*  15 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
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
```

E-2

E-2.1


```
".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) =   19.05
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) =      32.61

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  20.74
FLOW VELOCITY(FEET/SEC.) =  4.04   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
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  15.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.74
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      32.61
PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =    9.02
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.) =    9.02
*  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.291
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) =   84.48
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) =     114.82

****************************************************************************
FLOW PROCESS FROM NODE    808.00 TO NODE    808.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

E-3

```
================================================================================
  MAINLINE Tc(MIN.) =    9.02
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.291
  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) =   45.97
  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) =     160.79

****************************************************************************
  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.) =    9.02
  RAINFALL INTENSITY(INCH/HR) =   3.29
  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 =     160.79

****************************************************************************
  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

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.130
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.259
  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
```

E-4

OE-1


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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) =      2.40
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.40

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.957
  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) =      12.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.93
  AVERAGE FLOW DEPTH(FEET) =   0.68   TRAVEL TIME(MIN.) =   1.30
  Tc(MIN.) =   10.43
  SUBAREA AREA(ACRES) =     8.40      SUBAREA RUNOFF(CFS) =   20.09
  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) =      22.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.85   FLOW VELOCITY(FEET/SEC.) =  10.27
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.658
  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
  "CHAPARRAL,BROADLEAF"      B        0.10      0.30      1.000    63
  NATURAL FAIR COVER
  "OPEN BRUSH"               B        0.30      0.30      1.000    66
```

OE-2

OE-3

```
  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) =      37.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.97
  AVERAGE FLOW DEPTH(FEET) =   1.34   TRAVEL TIME(MIN.) =   2.41
  Tc(MIN.) =   12.84
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   30.55
  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) =      50.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.50   FLOW VELOCITY(FEET/SEC.) =   7.47
  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.) =   12.84
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.658
  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
  "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) =   22.07
  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) =      72.35

****************************************************************************
  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  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.25
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.35
  PIPE TRAVEL TIME(MIN.) =   0.82    Tc(MIN.) =   13.66
  LONGEST FLOWPATH FROM NODE    810.00 TO NODE    808.00 =    3058.00 FEET.

****************************************************************************
```

OE-3


```
  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.) =   13.66
  RAINFALL INTENSITY(INCH/HR) =   2.56
  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 =      72.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      160.79    9.02    3.291  0.30( 0.08) 0.28      55.7     800.00
      2       72.35   13.66    2.556  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      224.10    9.02    3.291  0.30( 0.15) 0.49      78.2     800.00
      2      196.27   13.66    2.556  0.30( 0.17) 0.55      89.8     810.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     224.10    Tc(MIN.) =     9.02
  EFFECTIVE AREA(ACRES) =      78.20   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  29.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.60
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     224.10
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =    9.43
  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.) =    9.43
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.174
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   90.11
 EFFECTIVE AREA(ACRES) =    110.90   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) =     303.19

****************************************************************************
 FLOW PROCESS FROM NODE    809.00 TO NODE    809.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.43
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.174
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  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) =   28.01
 EFFECTIVE AREA(ACRES) =    120.80   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) =     331.20

****************************************************************************
 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.) =    9.43
 RAINFALL INTENSITY(INCH/HR) =   3.17
 AREA-AVERAGED Fm(INCH/HR) =  0.13
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.42
 EFFECTIVE STREAM AREA(ACRES) =     120.80
 TOTAL STREAM AREA(ACRES) =     132.40
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     331.20

****************************************************************************
 FLOW PROCESS FROM NODE    818.00 TO NODE    819.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
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E-5

E-5


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 >>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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.335
 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    8.86
 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) =      2.73
 TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.73

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.772
 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
 ".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) =      12.64
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.37
 AVERAGE FLOW DEPTH(FEET) =   0.81   TRAVEL TIME(MIN.) =   3.05
 Tc(MIN.) =   11.92
 SUBAREA AREA(ACRES) =     8.70      SUBAREA RUNOFF(CFS) =   19.72
 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) =      21.95

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
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OE-4

OE-5

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 DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   7.28
 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.) =   11.92
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.772
 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) =   24.70
 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) =      46.64

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.92
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.772
 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) =   23.38
 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) =      70.02

****************************************************************************
 FLOW PROCESS FROM NODE    820.00 TO NODE    820.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.92
```

OE-5

OE-6


```
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.772
 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) =   16.47
 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) =      86.49

****************************************************************************
 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  22.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.90
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      86.49
 PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =   12.95
 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.) =   12.95
 RAINFALL INTENSITY(INCH/HR) =   2.64
 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 =      86.49

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
     1      331.20    9.43    3.174  0.30( 0.13) 0.42     120.8     800.00
     1      281.25   14.09    2.503  0.30( 0.14) 0.47     132.4     810.00
     2       86.49   12.95    2.644  0.30( 0.28) 0.94      38.6     818.00

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

OE-6

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	408.29	9.43	3.174	0.30(0.16)	0.52	148.9	800.00
2	379.97	12.95	2.644	0.30(0.17)	0.57	168.2	818.00
3	362.57	14.09	2.503	0.30(0.17)	0.58	171.0	810.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 408.29 Tc(MIN.) = 9.43
EFFECTIVE AREA(ACRES) = 148.91 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.) = 9.43
EFFECTIVE AREA(ACRES) = 148.91 AREA-AVERAGED Fm(INCH/HR)= 0.16
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.522
PEAK FLOW RATE(CFS) = 408.29

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	408.29	9.43	3.174	0.30(0.16)	0.52	148.9	800.00
2	379.97	12.95	2.644	0.30(0.17)	0.57	168.2	818.00
3	362.57	14.09	2.503	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:

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


 ************************ DESCRIPTION OF STUDY ************************
* RMV PA-4 SUBAREA F                                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 100-YR EV AUG 2018 CCHIU                                            *
 **********************************************************************

  FILE NAME: PA4F00EV.DAT
  TIME/DATE OF STUDY: 15:21 08/06/2018
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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    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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  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        0.70      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) =      2.61
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.61

**************************************************************************
  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   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.61
  PIPE TRAVEL TIME(MIN.) =   2.80    Tc(MIN.) =   16.56
  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.) =   16.56
  RAINFALL INTENSITY(INCH/HR) =   2.45
  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 =       2.61

**************************************************************************
  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
```

F-1

OF-1

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.660
 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) =      4.84
 TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.84

****************************************************************************
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.434
 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) =      11.75
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.84
 AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.97
 Tc(MIN.) =    9.11
 SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   13.82
 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) =      18.33

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =   8.74
 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)<<<<<
```


OF-2

OF-3

```
============================================================================
 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) =  3.186
 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) =      40.56
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.00
 AVERAGE FLOW DEPTH(FEET) =   1.30   TRAVEL TIME(MIN.) =   1.29
 Tc(MIN.) =   10.40
 SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   44.42
 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) =      61.31

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.52   FLOW VELOCITY(FEET/SEC.) =   8.90
 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  26.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
 ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      61.31
 PIPE TRAVEL TIME(MIN.) =   1.32    Tc(MIN.) =   11.72
 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.) =   11.72
 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 =      61.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1        2.61   16.56    2.449  0.30( 0.30) 1.00       1.2     900.00
     2       61.31   11.72    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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1       63.61   11.72    2.978  0.30( 0.30) 1.00      24.4     910.00
     2       51.82   16.56    2.449  0.30( 0.30) 1.00      24.8     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      63.61    Tc(MIN.) =    11.72
 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.) =   11.72
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
 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 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) =      77.62
```

F-2


```
****************************************************************************
 FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.72
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
 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 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.) =   12.23
 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.) =   12.23
 RAINFALL INTENSITY(INCH/HR) =   2.91
 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
```

F-2

```
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     104.73

****************************************************************************
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.768
 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) =      2.81
 TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.81

****************************************************************************
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.499
 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
 "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) =      22.56
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.18
 AVERAGE FLOW DEPTH(FEET) =   0.91   TRAVEL TIME(MIN.) =   1.08
 Tc(MIN.) =    8.82
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   39.45
 EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
```

OF-4

OF-5


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 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      42.04

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.14   FLOW VELOCITY(FEET/SEC.) =  10.75
 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
 *  25 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
 "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) =      52.01
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.31
 AVERAGE FLOW DEPTH(FEET) =   1.44   TRAVEL TIME(MIN.) =   1.21
 Tc(MIN.) =   10.03
 SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   19.94
 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) =      58.74

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   8.55
 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
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
 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
```

OF-6

OF-7

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  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) =      76.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.34
  AVERAGE FLOW DEPTH(FEET) =   1.75   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   11.72
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   35.67
  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) =      88.93

  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.) =   11.72
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.978
  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) =  152.55
  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) =     241.48

****************************************************************************
  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
```

OF-7


```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.853
  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
  "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) =     245.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.01
  AVERAGE FLOW DEPTH(FEET) =   2.73   TRAVEL TIME(MIN.) =   0.92
  Tc(MIN.) =   12.64
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    8.04
  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) =     241.48
  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.) =   12.64
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.853
  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
  "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) =   73.76
  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) =     312.06
```

OF-8

OF-8

```
****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.632
  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
  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) =     324.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.60
  AVERAGE FLOW DEPTH(FEET) =   3.77   TRAVEL TIME(MIN.) =   1.94
  Tc(MIN.) =   14.58
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   24.34
  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) =     312.06
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.72   FLOW VELOCITY(FEET/SEC.) =   7.52
  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.) =   14.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.632
  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
```

OF-9


```
  "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) =  255.62
  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) =     564.96

****************************************************************************
  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  84.0 INCH PIPE IS  63.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.24
  ESTIMATED PIPE DIAMETER(INCH) =  84.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     564.96
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =   15.81
  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.) =   15.81
  RAINFALL INTENSITY(INCH/HR) =   2.51
  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 =     564.96

****************************************************************************
  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) =  3.709
  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.)
```

OF-10

```
  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) =      1.84
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.84

****************************************************************************
  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) =  3.469
  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) =       9.17
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.38
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   1.00
  Tc(MIN.) =    8.95
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   14.64
  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) =      16.35

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.80   FLOW VELOCITY(FEET/SEC.) =   8.60
  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  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.83
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.35
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.
```

OF-11


```
****************************************************************************
  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.) =    9.43
  RAINFALL INTENSITY(INCH/HR) =   3.37
  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 =      16.35

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      104.73   12.23    2.907  0.30( 0.24) 0.79      42.4     910.00
      1       85.22   17.10    2.405  0.30( 0.24) 0.79      42.8     900.00
      2      564.96   15.81    2.514  0.30( 0.30) 1.00     269.2     920.00
      3       16.35    9.43    3.368  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      578.11    9.43    3.368  0.30( 0.29) 0.96     199.1     930.00
      2      633.32   12.23    2.907  0.30( 0.29) 0.96     256.4     910.00
      3      667.18   15.81    2.514  0.30( 0.29) 0.97     317.6     920.00
      4      633.61   17.10    2.405  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     667.18    Tc(MIN.) =    15.81
  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.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.81
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.514
  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
```

F-3

```
  ".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) =   72.13
  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) =     707.63

****************************************************************************
  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  66.0 INCH PIPE IS  48.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  37.87
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     707.63
  PIPE TRAVEL TIME(MIN.) =   0.39    Tc(MIN.) =   16.20
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.480
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   19.64
  EFFECTIVE AREA(ACRES) =    359.81   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     716.29

****************************************************************************
  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)<<<<<
```

F-4


```
============================================================================
  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  52.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.61
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     716.29
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   16.64
  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.) =   16.64
  RAINFALL INTENSITY(INCH/HR) =   2.44
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.89
  EFFECTIVE STREAM AREA(ACRES) =     359.81
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     716.29

****************************************************************************
  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
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.780
  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) =      3.76
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.76

****************************************************************************
  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
```

OF-13

OF-14

```
 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) =  3.413
 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) =      28.07
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.05
 AVERAGE FLOW DEPTH(FEET) =   0.92   TRAVEL TIME(MIN.) =   1.52
 Tc(MIN.) =    9.21
 SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   48.47
 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) =      51.83

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =  12.91
 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  17.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.75
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      51.83
 PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   10.05
 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.) =   10.05
 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) =      18.50
 TOTAL STREAM AREA(ACRES) =      18.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.83

****************************************************************************
 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) =  3.265
 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) =      3.74
 TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.74
```

OF-15

```
****************************************************************************
 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) =       5.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.01
 AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   1.46
 Tc(MIN.) =   11.42
```

OF-16

```
  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) =  2.862
  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) =      24.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.70
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =   12.58
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   33.20
  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) =      40.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.01   FLOW VELOCITY(FEET/SEC.) =  13.26
  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
```

OF-17

OF-18

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.711
  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) =      69.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.64
  AVERAGE FLOW DEPTH(FEET) =   1.35   TRAVEL TIME(MIN.) =   1.26
  Tc(MIN.) =   13.84
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   57.73
  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) =      95.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.53   FLOW VELOCITY(FEET/SEC.) =  13.68
  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
  *  25 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
  "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
```

OF-19

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     114.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.99
  AVERAGE FLOW DEPTH(FEET) =   1.96   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =   15.20
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   37.82
  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) =     128.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.04   FLOW VELOCITY(FEET/SEC.) =  10.27
  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
  *  25 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
  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) =     143.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.15
  AVERAGE FLOW DEPTH(FEET) =   2.28   TRAVEL TIME(MIN.) =   1.17
  Tc(MIN.) =   16.37
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   30.01
  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) =     152.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.34   FLOW VELOCITY(FEET/SEC.) =   9.29
  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
----------------------------------------------------------------------------
```

OF-20


```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.37
  *  25 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
  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) =   69.97
  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) =     222.18

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.37
  *  25 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
  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) =   13.06
  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) =     235.23

****************************************************************************
  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  36.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.88
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     235.23
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   17.32
```

OF-20

OF-21

```
 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.) =   17.32
 RAINFALL INTENSITY(INCH/HR) =   2.39
 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 =     235.23

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      658.92   10.28    3.207  0.30( 0.25) 0.85     241.3     930.00
     1      697.04   13.07    2.800  0.30( 0.26) 0.87     298.6     910.00
     1      716.29   16.64    2.443  0.30( 0.27) 0.89     359.8     920.00
     1      682.20   17.94    2.340  0.30( 0.27) 0.89     359.9     900.00
     2       51.83   10.05    3.249  0.30( 0.30) 1.00      18.5     940.00
     3      235.23   17.32    2.388  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      897.76   10.05    3.249  0.30( 0.27) 0.89     324.3     940.00
     2      904.51   10.28    3.207  0.30( 0.27) 0.89     331.5     930.00
     3      953.57   13.07    2.800  0.30( 0.27) 0.90     408.2     910.00
     4      985.86   16.64    2.443  0.30( 0.28) 0.92     494.3     920.00
     5      970.50   17.32    2.388  0.30( 0.28) 0.92     499.1     950.00
     6      947.93   17.94    2.340  0.30( 0.28) 0.92     499.1     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     985.86    Tc(MIN.) =    16.64
 EFFECTIVE AREA(ACRES) =     494.26   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.92
 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.) =   16.64
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
 SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =  100.20
 EFFECTIVE AREA(ACRES) =    540.96   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.86
 TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =    1063.91

****************************************************************************
 FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   16.64
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.443
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   17.37
 EFFECTIVE AREA(ACRES) =    548.96   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =    1081.28
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     16.64
 EFFECTIVE AREA(ACRES) =    548.96  AREA-AVERAGED Fm(INCH/HR)=  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.848
 PEAK FLOW RATE(CFS)   =    1081.28

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1     1027.94   10.05    3.249  0.30( 0.24) 0.79     379.0     940.00
     2     1032.45   10.28    3.207  0.30( 0.24) 0.79     386.2     930.00
     3     1064.32   13.07    2.800  0.30( 0.25) 0.82     462.9     910.00
     4     1081.28   16.64    2.443  0.30( 0.25) 0.85     549.0     920.00
     5     1063.18   17.32    2.388  0.30( 0.25) 0.85     553.8     950.00
     6     1039.52   17.94    2.340  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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             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-4 SUBAREA F                                                       *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                    *
* 2-YR EV AUG 2018 CCHIU                                                   *
 ****************************************************************************

  FILE NAME: PA4F02EV.DAT
  TIME/DATE OF STUDY: 15:47 08/07/2018
============================================================================
  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;  1.600
   2)   10.00;  1.060
   3)   15.00;  0.840
   4)   20.00;  0.720
   5)   25.00;  0.630
   6)   30.00;  0.560
   7)   40.00;  0.480
   8)   50.00;  0.420
   9)   60.00;  0.366
  10)   90.00;  0.300
  11)  120.00;  0.246
  12)  180.00;  0.190
  13)  360.00;  0.136
  14) 1200.00;  0.080
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (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    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) =  0.894
  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"       -        0.70      0.60     1.000     0   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.50      0.60     1.000     0   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      0.32

****************************************************************************
  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   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.49
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.32
  PIPE TRAVEL TIME(MIN.) =   5.20    Tc(MIN.) =   18.96
  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.) =   18.96
  RAINFALL INTENSITY(INCH/HR) =   0.74
  AREA-AVERAGED Fm(INCH/HR) =  0.60
  AREA-AVERAGED Fp(INCH/HR) =  0.60
```

F-1

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.32

****************************************************************************
  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) =  1.261
  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"      -        0.10      0.60     1.000     0    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.50      0.60     1.000     0    8.14
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.00      0.60     1.000     0    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.95
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      0.95

****************************************************************************
  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) =  1.097
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED               -        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) =       2.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.04
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   1.51
  Tc(MIN.) =    9.66
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    2.19
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```

OF-1

OF-2


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  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =       2.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   5.58
  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) =  0.983
  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               -        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) =       5.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.94
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   2.09
  Tc(MIN.) =   11.74
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =    5.90
  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) =       8.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.35
  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  18.0 INCH PIPE IS  11.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.15
  PIPE TRAVEL TIME(MIN.) =   2.16    Tc(MIN.) =   13.90
  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
```

OF-3

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------------------------------------------------------------------------------
  >>>>>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) =   0.89
  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 =       8.15

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.32   18.96    0.745  0.60( 0.60) 1.00       1.2     900.00
      2        8.15   13.90    0.888  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        8.46   13.90    0.888  0.60( 0.60) 1.00      24.5     910.00
      2        4.42   18.96    0.745  0.60( 0.60) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.46    Tc(MIN.) =    13.90
  EFFECTIVE AREA(ACRES) =      24.48   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.) =   13.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.888
  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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =     7.10      SUBAREA RUNOFF(CFS) =     5.01
  EFFECTIVE AREA(ACRES) =     31.58   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.81
```

F-2


```
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      11.36

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.90
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.888
  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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =    10.90      SUBAREA RUNOFF(CFS) =     4.52
  EFFECTIVE AREA(ACRES) =     42.48   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) =      15.88

****************************************************************************
  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  11.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.88
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   14.70
  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.) =   14.70
  RAINFALL INTENSITY(INCH/HR) =   0.85
  AREA-AVERAGED Fm(INCH/HR) =  0.47
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.48
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.88

****************************************************************************
  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) =  1.304
  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     0    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.70      0.60     1.000     0    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.57
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      0.57

******************************************************************************
  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) =  1.123
  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) =       3.87
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.89
  AVERAGE FLOW DEPTH(FEET) =   0.47   TRAVEL TIME(MIN.) =   1.68
  Tc(MIN.) =    9.42
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =    6.45
  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) =       6.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   6.88
  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
```

OF-4

OF-5


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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
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.001
  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) =       8.23
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.26
  AVERAGE FLOW DEPTH(FEET) =   0.72   TRAVEL TIME(MIN.) =   1.91
  Tc(MIN.) =   11.33
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    2.71
  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) =       7.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.22
  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) =  0.877
  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) =       9.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.99
  AVERAGE FLOW DEPTH(FEET) =   0.81   TRAVEL TIME(MIN.) =   2.84
  Tc(MIN.) =   14.17
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =    3.69
  EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.60
```

OF-6

OF-7

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 AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =       9.19

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.79   FLOW VELOCITY(FEET/SEC.) =   4.92
 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.) =   14.17
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.877
 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      0.60     1.000     -
 USER-DEFINED                -       17.00      0.60     1.000     -
 USER-DEFINED                -       36.60      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) =   63.30      SUBAREA RUNOFF(CFS) =   15.76
 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) =      24.95

****************************************************************************
 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) =  0.821
 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                -        0.30      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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      25.30
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
 AVERAGE FLOW DEPTH(FEET) =   1.16   TRAVEL TIME(MIN.) =   1.62
 Tc(MIN.) =   15.79
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    0.70
 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) =      24.95
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

OF-7

OF-8


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 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.15   FLOW VELOCITY(FEET/SEC.) =   6.24
 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.) =   15.79
 *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.821
 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     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =    6.39
 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) =      27.03

****************************************************************************
 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) =  0.735
 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     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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      27.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.11
 AVERAGE FLOW DEPTH(FEET) =   1.50   TRAVEL TIME(MIN.) =   3.59
 Tc(MIN.) =   19.38
 SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =    1.41
 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) =      27.03
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

OF-9

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  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.48   FLOW VELOCITY(FEET/SEC.) =   4.09
  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.) =   19.38
*   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.735
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =  121.80      SUBAREA RUNOFF(CFS) =   14.81
  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) =      32.74

****************************************************************************
  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  30.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.05
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.74
  PIPE TRAVEL TIME(MIN.) =   2.47    Tc(MIN.) =   21.85
  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.) =   21.85
  RAINFALL INTENSITY(INCH/HR) =   0.69
  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 =      32.74
```

OF-9


```
****************************************************************************
  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) =  1.281
  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     0    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      0.37

****************************************************************************
  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) =  1.117
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.927
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.86
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =   1.52
  Tc(MIN.) =    9.47
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    2.57
  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) =       2.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.41   FLOW VELOCITY(FEET/SEC.) =   5.52
  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
----------------------------------------------------------------------------
```

OF-10

OF-11

```
  >>>>>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   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.85
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   10.21
  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.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   1.05
  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 =       2.85

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       15.88   14.70    0.853  0.60( 0.47) 0.79      42.5     910.00
      1       10.45   19.84    0.724  0.60( 0.47) 0.79      42.8     900.00
      2       32.74   21.85    0.687  0.60( 0.60) 1.00     269.2     920.00
      3        2.85   10.21    1.051  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       51.47   10.21    1.051  0.60( 0.58) 0.96     161.1     930.00
      2       50.32   14.70    0.853  0.60( 0.58) 0.96     229.3     910.00
      3       44.13   19.84    0.724  0.60( 0.58) 0.97     292.9     900.00
      4       42.37   21.85    0.687  0.60( 0.58) 0.97     317.7     920.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      51.47    Tc(MIN.) =    10.21
  EFFECTIVE AREA(ACRES) =     161.05   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.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.21
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.051
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.237
  SUBAREA AREA(ACRES) =   32.80      SUBAREA RUNOFF(CFS) =   26.83
  EFFECTIVE AREA(ACRES) =    193.85   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) =      95.75

****************************************************************************
  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  30.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.59
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      95.75
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =   10.87
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.87
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  1.022
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =    5.97
  EFFECTIVE AREA(ACRES) =    203.25   AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60  AREA-AVERAGED Ap =  0.82
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =      96.64
```

F-3

F-4

```
******************************************************************************
  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  33.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.47
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.64
  PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =   11.58
  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.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   0.99
  AREA-AVERAGED Fm(INCH/HR) =  0.49
  AREA-AVERAGED Fp(INCH/HR) =  0.60
  AREA-AVERAGED Ap =  0.82
  EFFECTIVE STREAM AREA(ACRES) =     203.25
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      96.64

******************************************************************************
  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) =  1.309
  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     0    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.10      0.60      1.000     0    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      0.77

******************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
```

OF-13


```
------------------------------------------------------------------------------
  >>>>>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) =  1.056
  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) =       4.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.98
  AVERAGE FLOW DEPTH(FEET) =   0.46   TRAVEL TIME(MIN.) =   2.41
  Tc(MIN.) =   10.10
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =    7.10
  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) =       7.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   8.02
  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   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.59
  PIPE TRAVEL TIME(MIN.) =   1.33    Tc(MIN.) =   11.43
  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.) =   11.43
  RAINFALL INTENSITY(INCH/HR) =   1.00
```

OF-14

```
  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 =       7.59

****************************************************************************
  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) =  1.064
  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"                -        0.40      0.60     1.000     0    9.96
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.00      0.60     1.000     0    9.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.60
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      0.58

****************************************************************************
  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) =  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                -        0.10      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) =       0.88
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.08
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   2.38
  Tc(MIN.) =   12.34
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      3.20     AREA-AVERAGED Fm(INCH/HR) =   0.60
  AREA-AVERAGED Fp(INCH/HR) =   0.60  AREA-AVERAGED Ap =   1.00
```

OF-15

OF-16


```
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =       1.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   3.24
  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) =  0.870
  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                -        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) =       2.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.80
  AVERAGE FLOW DEPTH(FEET) =   0.37   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =   14.33
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =    3.50
  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) =       4.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.43   FLOW VELOCITY(FEET/SEC.) =   7.63
  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) =  0.802
  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                -        0.10      0.60     1.000     -
  USER-DEFINED                -        0.60      0.60     1.000     -
  USER-DEFINED                -        2.10      0.60     1.000     -
```

OF-17

OF-18

```
  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) =       6.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.09
  AVERAGE FLOW DEPTH(FEET) =   0.56   TRAVEL TIME(MIN.) =   2.24
  Tc(MIN.) =   16.57
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =    4.85
  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) =       8.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.61   FLOW VELOCITY(FEET/SEC.) =   7.32
  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) =  0.741
  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               -        0.40      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) =       9.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.33
  AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   2.55
  Tc(MIN.) =   19.12
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =    2.35
  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) =       8.05
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.72   FLOW VELOCITY(FEET/SEC.) =   5.15
  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)<<<<<
```

OF-19


```
============================================================================
  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) =  0.694
  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               -        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) =       8.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.55
  AVERAGE FLOW DEPTH(FEET) =   0.80   TRAVEL TIME(MIN.) =   2.35
  Tc(MIN.) =   21.47
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =    1.30
  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) =       8.05
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   4.47
  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.) =   21.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.694
  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      0.60     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) =    3.03
  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) =       9.61

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   21.47
  *   2 YEAR RAINFALL INTENSITY(INCH/HR) =  0.694
  SUBAREA LOSS RATE DATA(AMC  II):
```

OF-20

OF-20

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	-	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) = 0.56
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) = 10.18

****
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
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN 18.0 INCH PIPE IS 9.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.72
ESTIMATED PIPE DIAMETER(INCH) = 18.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 10.18
PIPE TRAVEL TIME(MIN.) = 2.03 Tc(MIN.) = 23.50
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.) = 23.50
RAINFALL INTENSITY(INCH/HR) = 0.66
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 = 10.18

** CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	96.64	11.58	0.990	0.60(0.49)	0.82	203.3	930.00
1	78.36	16.13	0.813	0.60(0.51)	0.86	271.5	910.00
1	54.94	21.39	0.695	0.60(0.53)	0.88	335.1	900.00
1	45.99	23.47	0.658	0.60(0.54)	0.89	359.9	920.00
2	7.59	11.43	0.997	0.60(0.60)	1.00	18.5	940.00
3	10.18	23.50	0.657	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	114.41	11.43	0.997	0.60(0.52)	0.87	277.8	940.00
2	114.28	11.58	0.990	0.60(0.52)	0.87	281.3	930.00
3	92.61	16.13	0.813	0.60(0.54)	0.90	372.8	910.00
4	66.94	21.39	0.695	0.60(0.55)	0.92	463.5	900.00
5	57.27	23.47	0.658	0.60(0.55)	0.92	498.9	920.00
6	57.05	23.50	0.657	0.60(0.55)	0.92	499.1	950.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 114.41 Tc(MIN.) = 11.43
EFFECTIVE AREA(ACRES) = 277.81 AREA-AVERAGED Fm(INCH/HR) = 0.52
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.87
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.) = 11.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.997
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) = 36.97
EFFECTIVE AREA(ACRES) = 324.51 AREA-AVERAGED Fm(INCH/HR) = 0.46
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.77
TOTAL AREA(ACRES) = 545.8 PEAK FLOW RATE(CFS) = 155.51

****
FLOW PROCESS FROM NODE 905.00 TO NODE 905.00 IS CODE = 81

>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========
MAINLINE Tc(MIN.) = 11.43
* 2 YEAR RAINFALL INTENSITY(INCH/HR) = 0.997
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) = 6.75
EFFECTIVE AREA(ACRES) = 332.51 AREA-AVERAGED Fm(INCH/HR) = 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.76

TOTAL AREA(ACRES) = 553.8 PEAK FLOW RATE(CFS) = 162.26

==========

END OF STUDY SUMMARY:
TOTAL AREA(ACRES) = 553.8 TC(MIN.) = 11.43
EFFECTIVE AREA(ACRES) = 332.51 AREA-AVERAGED Fm(INCH/HR)= 0.45
AREA-AVERAGED Fp(INCH/HR) = 0.60 AREA-AVERAGED Ap = 0.758
PEAK FLOW RATE(CFS) = 162.26

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	162.26	11.43	0.997	0.60(0.45)	0.76	332.5	940.00
2	161.72	11.58	0.990	0.60(0.46)	0.76	336.0	930.00
3	127.13	16.13	0.813	0.60(0.48)	0.80	427.5	910.00
4	89.51	21.39	0.695	0.60(0.50)	0.84	518.2	900.00
5	73.92	23.47	0.658	0.60(0.51)	0.85	553.6	920.00
6	73.65	23.50	0.657	0.60(0.51)	0.85	553.8	950.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

```
************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             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-4 SUBAREA F                                                   *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                *
* 5-YR EV AUG 2018 CCHIU                                               *
 ************************************************************************

  FILE NAME: PA4F05EV.DAT
  TIME/DATE OF STUDY: 15:51 08/07/2018
========================================================================
  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;  2.180
   2)   10.00;  1.510
   3)   15.00;  1.200
   4)   20.00;  1.020
   5)   25.00;  0.900
   6)   30.00;  0.830
   7)   40.00;  0.690
   8)   50.00;  0.610
   9)   60.00;  0.550
  10)   90.00;  0.440
  11)  120.00;  0.370
  12)  180.00;  0.310
  13)  360.00;  0.210
  14) 1200.00;  0.090
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  1.277
  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"      -        0.70      0.50     1.000     0   13.76
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        0.50      0.50     1.000     0   13.76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.84
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      0.84

************************************************************************
  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   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.67
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.84
  PIPE TRAVEL TIME(MIN.) =   3.89    Tc(MIN.) =   17.65
  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.) =   17.65
  RAINFALL INTENSITY(INCH/HR) =   1.10
  AREA-AVERAGED Fm(INCH/HR) =  0.50
  AREA-AVERAGED Fp(INCH/HR) =  0.50
```

F-1

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.84

****************************************************************************
  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) =  1.759
  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     0    8.14
  NATURAL FAIR COVER
  "CHAPARRAL,BROADLEAF"      -        0.50      0.50     1.000     0    8.14
  NATURAL FAIR COVER
  "OPEN BRUSH"               -        1.00      0.50     1.000     0    8.14
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.81
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      1.81

****************************************************************************
  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) =  1.589
  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     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) =       4.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.02
  AVERAGE FLOW DEPTH(FEET) =   0.48   TRAVEL TIME(MIN.) =   1.27
  Tc(MIN.) =    9.41
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    4.80
  EFFECTIVE AREA(ACRES) =      6.50     AREA-AVERAGED Fm(INCH/HR) =   0.50
  AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
```

OF-1

OF-2


```
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =       6.37

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.56   FLOW VELOCITY(FEET/SEC.) =   6.73
  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) =  1.441
  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               -        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) =      13.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.07
  AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   11.11
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   14.49
  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) =      19.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.00   FLOW VELOCITY(FEET/SEC.) =   6.71
  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  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.99
  PIPE TRAVEL TIME(MIN.) =   1.74    Tc(MIN.) =   12.85
  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
```

OF-3

```
--------------------------------------------------------------------------------
  >>>>>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.) =   12.85
  RAINFALL INTENSITY(INCH/HR) =   1.33
  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 =      19.99

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        0.84   17.65    1.105  0.50( 0.50) 1.00       1.2     900.00
      2       19.99   12.85    1.333  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       20.83   12.85    1.333  0.50( 0.50) 1.00      24.5     910.00
      2       15.34   17.65    1.105  0.50( 0.50) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.83    Tc(MIN.) =    12.85
  EFFECTIVE AREA(ACRES) =      24.47   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.) =   12.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.333
  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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
  SUBAREA AREA(ACRES) =     7.10      SUBAREA RUNOFF(CFS) =     7.96
  EFFECTIVE AREA(ACRES) =     31.57   AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.81
```

F-2


```
  TOTAL AREA(ACRES) =       31.9       PEAK FLOW RATE(CFS) =      26.31

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.85
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.333
  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               -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
  SUBAREA AREA(ACRES) =    10.90      SUBAREA RUNOFF(CFS) =     9.59
  EFFECTIVE AREA(ACRES) =     42.47   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) =      35.90

****************************************************************************
  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  15.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.82
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      35.90
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =   13.50
  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.) =   13.50
  RAINFALL INTENSITY(INCH/HR) =   1.29
  AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =      42.47
  TOTAL STREAM AREA(ACRES) =      42.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      35.90

****************************************************************************
  FLOW PROCESS FROM NODE    920.00 TO NODE    921.00 IS CODE =  21
```

F-2

```
------------------------------------------------------------------------------
  >>>>>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) =  1.813
  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     0    7.74
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        0.70      0.50     1.000     0    7.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.06

******************************************************************************
  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) =  1.626
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.08
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   1.40
  Tc(MIN.) =    9.13
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   13.88
  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) =      14.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   8.24
  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
```

OF-4

OF-5


```
------------------------------------------------------------------------------
  >>>>>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) =  1.466
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.05
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.37
  AVERAGE FLOW DEPTH(FEET) =   0.97   TRAVEL TIME(MIN.) =   1.58
  Tc(MIN.) =   10.71
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =    6.52
  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) =      19.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.99   FLOW VELOCITY(FEET/SEC.) =   6.47
  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) =  1.327
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      24.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.32
  AVERAGE FLOW DEPTH(FEET) =   1.14   TRAVEL TIME(MIN.) =   2.24
  Tc(MIN.) =   12.95
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   11.01
  EFFECTIVE AREA(ACRES) =     36.90     AREA-AVERAGED Fm(INCH/HR) =   0.50
```

OF-6

OF-7

```
 AREA-AVERAGED Fp(INCH/HR) =   0.50  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       36.9         PEAK FLOW RATE(CFS) =      27.46

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.19   FLOW VELOCITY(FEET/SEC.) =   6.43
 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.) =   12.95                                        OF-7
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.327
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =   47.10
 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) =      74.55

****************************************************************************
 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          OF-8
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.251
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      75.74
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.23
 AVERAGE FLOW DEPTH(FEET) =   1.75   TRAVEL TIME(MIN.) =   1.23
 Tc(MIN.) =   14.18
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    2.36
 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) =      74.55
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```



```
 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.74   FLOW VELOCITY(FEET/SEC.) =   8.19
 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.) =   14.18
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.251          OF-8
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA AREA(ACRES) =   32.10      SUBAREA RUNOFF(CFS) =   21.68
 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) =      91.72

****************************************************************************
 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          OF-9
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.134
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      95.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.58
 AVERAGE FLOW DEPTH(FEET) =   2.38   TRAVEL TIME(MIN.) =   2.64
 Tc(MIN.) =   16.82
 SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =    6.62
 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) =      91.72
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.35   FLOW VELOCITY(FEET/SEC.) =   5.55
  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.) =   16.82
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.134
  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      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) =   69.51
  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) =     153.64

****************************************************************************
  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  51.0 INCH PIPE IS  39.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.12
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     153.64
  PIPE TRAVEL TIME(MIN.) =   1.70    Tc(MIN.) =   18.53
  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.) =   18.53
  RAINFALL INTENSITY(INCH/HR) =   1.07
  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 =     153.64
```

OF-9


```
****************************************************************************
  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) =  1.784
  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      0.50      1.000     0    7.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      0.69

****************************************************************************
  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) =  1.612
  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      0.900     -
  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) =       3.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.76
  AVERAGE FLOW DEPTH(FEET) =   0.44   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =    9.24
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    5.27
  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) =       5.87

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   6.60
  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
----------------------------------------------------------------------------
```

OF-10

OF-11

```
  >>>>>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   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.87
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    9.84
  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.) =    9.84
  RAINFALL INTENSITY(INCH/HR) =   1.53
  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 =       5.87

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       35.90   13.50    1.293  0.50( 0.39) 0.79      42.5     910.00
      1       27.33   18.35    1.079  0.50( 0.40) 0.79      42.8     900.00
      2      153.64   18.53    1.073  0.50( 0.50) 1.00     269.2     920.00
      3        5.87    9.84    1.531  0.50( 0.47) 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      184.59    9.84    1.531  0.50( 0.48) 0.96     179.7     930.00
      2      194.09   13.50    1.293  0.50( 0.48) 0.96     244.3     910.00
      3      184.34   18.35    1.079  0.50( 0.49) 0.97     315.1     900.00
      4      184.05   18.53    1.073  0.50( 0.49) 0.97     317.7     920.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     194.09    Tc(MIN.) =    13.50
  EFFECTIVE AREA(ACRES) =     244.28   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.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
```



```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.50
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.293
  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     -
  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) =   34.68
  EFFECTIVE AREA(ACRES) =    277.08   AREA-AVERAGED Fm(INCH/HR) =  0.44
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =      350.5       PEAK FLOW RATE(CFS) =     213.23

****************************************************************************
  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  42.0 INCH PIPE IS  31.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.04
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     213.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   14.03
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.03
  *   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                -        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) =    8.43
  EFFECTIVE AREA(ACRES) =    286.48   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.50  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     213.43
```

F-3

F-4

```
****************************************************************************
  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  45.0 INCH PIPE IS  32.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.05
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     213.43
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   14.61
  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.) =   14.61
  RAINFALL INTENSITY(INCH/HR) =   1.22
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.50
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =     286.48
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     213.43

****************************************************************************
  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) =  1.819
  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     0    7.69
  NATURAL FAIR COVER
  "OPEN BRUSH"                -        1.10      0.50     1.000     0    7.69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      1.42
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.42

****************************************************************************
  FLOW PROCESS FROM NODE    941.00 TO NODE    942.00 IS CODE =  51
```

OF-13


```
----------------------------------------------------------------------------
  >>>>>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) =  1.552
  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) =       9.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.41
  AVERAGE FLOW DEPTH(FEET) =   0.62   TRAVEL TIME(MIN.) =   2.00
  Tc(MIN.) =    9.69
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   16.37
  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) =      17.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   9.90
  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  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.14
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.51
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =   10.76
  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.) =   10.76
  RAINFALL INTENSITY(INCH/HR) =   1.46
  AREA-AVERAGED Fm(INCH/HR) =  0.50
```

OF-14

```
 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 =      17.51

****************************************************************************
 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) =  1.515
 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"                -        0.40      0.50     1.000     0    9.96
 NATURAL FAIR COVER
 "OPEN BRUSH"                -        1.00      0.50     1.000     0    9.96
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 SUBAREA RUNOFF(CFS) =      1.28
 TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      1.28

****************************************************************************
 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) =  1.394
 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                -        0.40      0.50     1.000     -
 USER-DEFINED                -        0.60      0.50     1.000     -
 USER-DEFINED                -        0.70      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) =       2.00
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.85
 AVERAGE FLOW DEPTH(FEET) =   0.42   TRAVEL TIME(MIN.) =   1.90
 Tc(MIN.) =   11.87
 SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    1.45
 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) =       2.57
```

OF-15

OF-16


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 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   4.05
 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) =  1.298
 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                -        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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.50
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.76
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.72
 AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.55
 Tc(MIN.) =   13.42
 SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   10.34
 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) =      12.64

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   9.87
 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) =  1.196
 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                -        0.10      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     -
```

OF-17

OF-18

```
  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) =      20.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.35
  AVERAGE FLOW DEPTH(FEET) =   0.86   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =   15.12
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   16.65
  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) =      27.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =  10.04
  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) =  1.129
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  USER-DEFINED                -        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) =      32.90
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.30
  AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   1.86
  Tc(MIN.) =   16.98
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   10.47
  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) =      35.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =   7.43
  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
```

OF-19


```
  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) =  1.071
  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                -        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) =      39.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.62
  AVERAGE FLOW DEPTH(FEET) =   1.41   TRAVEL TIME(MIN.) =   1.62
  Tc(MIN.) =   18.59
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =    7.91
  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) =      40.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.42   FLOW VELOCITY(FEET/SEC.) =   6.66
  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.) =   18.59
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.071
  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     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) =   18.43
  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) =      58.53

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   18.59
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.071
  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     -
```

OF-20

OF-20

OF-21

```
  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) =     3.44
  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) =      61.96

****************************************************************************
  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  30.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.55
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.96
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   19.91
  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.) =   19.91
  RAINFALL INTENSITY(INCH/HR) =   1.02
  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 =      61.96

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      213.39   10.96    1.451  0.50( 0.42) 0.84     221.9     930.00
      1      213.43   14.61    1.224  0.50( 0.43) 0.86     286.5     910.00
      1      197.51   19.49    1.038  0.50( 0.45) 0.89     357.3     900.00
      1      196.73   19.67    1.032  0.50( 0.45) 0.89     359.9     920.00
      2       17.51   10.76    1.463  0.50( 0.50) 1.00      18.5     940.00
      3       61.96   19.91    1.023  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
```



```
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      291.21   10.76    1.463  0.50( 0.44) 0.88     301.7     940.00
      2      292.65   10.96    1.451  0.50( 0.44) 0.88     306.8     930.00
      3      288.56   14.61    1.224  0.50( 0.45) 0.90     393.6     910.00
      4      269.27   19.49    1.038  0.50( 0.46) 0.92     494.0     900.00
      5      268.37   19.67    1.032  0.50( 0.46) 0.92     497.7     920.00
      6      265.33   19.91    1.023  0.50( 0.46) 0.92     499.1     950.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     292.65    Tc(MIN.) =    10.96
  EFFECTIVE AREA(ACRES) =     306.83   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.) =   10.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.451
  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) =    56.85
  EFFECTIVE AREA(ACRES) =    353.53   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) =     335.72

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.96
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.451
  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) =    10.08
  EFFECTIVE AREA(ACRES) =    361.53   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) =     345.80
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     10.96
```

F-5

F-5

EFFECTIVE AREA(ACRES) = 361.53 AREA-AVERAGED Fm(INCH/HR)= 0.39
AREA-AVERAGED Fp(INCH/HR) = 0.50 AREA-AVERAGED Ap = 0.775
PEAK FLOW RATE(CFS) = 345.80

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	345.01	10.76	1.463	0.50(0.39)	0.77	356.4	940.00
2	345.80	10.96	1.451	0.50(0.39)	0.78	361.5	930.00
3	329.72	14.61	1.224	0.50(0.41)	0.81	448.3	910.00
4	303.40	19.49	1.038	0.50(0.42)	0.85	548.7	900.00
5	301.98	19.67	1.032	0.50(0.42)	0.85	552.4	920.00
6	298.39	19.91	1.023	0.50(0.42)	0.85	553.8	950.00

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-4 SUBAREA F                                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 10-YR EV AUG 2018 CCHIU                                             *
 **********************************************************************

  FILE NAME: PA4F10EV.DAT
  TIME/DATE OF STUDY: 15:20 08/06/2018
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  1.803
  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        0.70      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) =      1.62
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      1.62

**************************************************************************
  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   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.62
  PIPE TRAVEL TIME(MIN.) =   3.22    Tc(MIN.) =   16.98
  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.) =   16.98
  RAINFALL INTENSITY(INCH/HR) =   1.60
  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 =       1.62

**************************************************************************
  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
```

F-1

OF-1

```
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.142
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  2.422
 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 BROUSH"               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) =      3.06
 TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      3.06

****************************************************************************
 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) =  2.257
 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 BROUSH"               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 BROUSH"               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) =       7.37
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.01
 AVERAGE FLOW DEPTH(FEET) =   0.59   TRAVEL TIME(MIN.) =   1.09
 Tc(MIN.) =    9.23
 SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =    8.63
 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) =      11.45

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.70   FLOW VELOCITY(FEET/SEC.) =   7.81
 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)<<<<<
```


OF-2

OF-3

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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
 *   5 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
 NATURAL FAIR COVER
 "OPEN BROUSH"               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 BROUSH"               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 BROUSH"               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) =      25.15
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.11
 AVERAGE FLOW DEPTH(FEET) =   1.09   TRAVEL TIME(MIN.) =   1.45
 Tc(MIN.) =   10.68
 SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   27.38
 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) =      37.79

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =   7.89
 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)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   470.00  DOWNSTREAM(FEET) =   459.00
 FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.93
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      37.79
 PIPE TRAVEL TIME(MIN.) =   1.49    Tc(MIN.) =   12.17
 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.) =   12.17
 RAINFALL INTENSITY(INCH/HR) =   1.93
 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 =      37.79

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.62   16.98    1.602  0.30( 0.30) 1.00       1.2     900.00
     2       37.79   12.17    1.932  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       39.25   12.17    1.932  0.30( 0.30) 1.00      24.5     910.00
     2       31.79   16.98    1.602  0.30( 0.30) 1.00      24.8     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      39.25    Tc(MIN.) =    12.17
 EFFECTIVE AREA(ACRES) =      24.46   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.) =   12.17
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.932
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   12.01
 EFFECTIVE AREA(ACRES) =     31.56   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) =      47.93
```

F-2


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****************************************************************************
 FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.17
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.932
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   16.86
 EFFECTIVE AREA(ACRES) =     42.46   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) =      64.79

****************************************************************************
 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  27.0 INCH PIPE IS  21.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.92
 ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      64.79
 PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =   12.75
 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.) =   12.75
 RAINFALL INTENSITY(INCH/HR) =   1.88
 AREA-AVERAGED Fm(INCH/HR) =  0.24
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.79
 EFFECTIVE STREAM AREA(ACRES) =      42.46
 TOTAL STREAM AREA(ACRES) =      42.80
```

F-2

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 PEAK FLOW RATE(CFS) AT CONFLUENCE =      64.79

****************************************************************************
 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) =  2.492
 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) =      1.78
 TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
 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) =  2.297
 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) =      14.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.18
 AVERAGE FLOW DEPTH(FEET) =   0.76   TRAVEL TIME(MIN.) =   1.21
 Tc(MIN.) =    8.95
 SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   24.62
 EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
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OF-4

OF-5


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 AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
 TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      26.24

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.96   FLOW VELOCITY(FEET/SEC.) =   9.52
 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) =  2.121
 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) =      32.38
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.37
 AVERAGE FLOW DEPTH(FEET) =   1.21   TRAVEL TIME(MIN.) =   1.37
 Tc(MIN.) =   10.31
 SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   12.29
 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) =      36.21

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =   7.58
 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) =  1.928
 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
```

OF-6

OF-7

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  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) =      47.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.42
  AVERAGE FLOW DEPTH(FEET) =   1.45   TRAVEL TIME(MIN.) =   1.91
  Tc(MIN.) =   12.22
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   21.68
  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) =      54.05

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.54   FLOW VELOCITY(FEET/SEC.) =   7.63
  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.) =   12.22
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.928
  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) =   92.72
  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) =     146.78

****************************************************************************
  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
```

OF-7


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  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.841
  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) =     149.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.73
  AVERAGE FLOW DEPTH(FEET) =   2.26   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =   13.26
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    4.85
  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) =     146.78
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.25   FLOW VELOCITY(FEET/SEC.) =   9.70
  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.) =   13.26
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.841
  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        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) =   44.52
  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) =     188.35
```

OF-8

OF-8

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****************************************************************************
  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) =  1.689
  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
  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) =     195.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.68
  AVERAGE FLOW DEPTH(FEET) =   3.12   TRAVEL TIME(MIN.) =   2.20
  Tc(MIN.) =   15.47
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   14.50
  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) =     188.35
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.08   FLOW VELOCITY(FEET/SEC.) =   6.63
  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.) =   15.47
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.689
  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
```

OF-9


```
  "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) =  152.23
  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) =     336.45

****************************************************************************
  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  69.0 INCH PIPE IS  52.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.01
  ESTIMATED PIPE DIAMETER(INCH) =  69.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     336.45
  PIPE TRAVEL TIME(MIN.) =   1.40    Tc(MIN.) =   16.86
  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.) =   16.86
  RAINFALL INTENSITY(INCH/HR) =   1.61
  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 =     336.45

****************************************************************************
  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) =  2.454
  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.)
```

OF-10

```
  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) =      1.16
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
  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) =  2.279
  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) =       5.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.61
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =   1.12
  Tc(MIN.) =    9.07
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =    9.18
  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) =      10.25

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.67   FLOW VELOCITY(FEET/SEC.) =   7.65
  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  12.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.90
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.25
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.61
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.
```

OF-11


```
****************************************************************************
  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.) =    9.61
  RAINFALL INTENSITY(INCH/HR) =   2.21
  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 =      10.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       64.79   12.75    1.882  0.30( 0.24) 0.79      42.5     910.00
      1       52.60   17.57    1.572  0.30( 0.24) 0.79      42.8     900.00
      2      336.45   16.86    1.609  0.30( 0.30) 1.00     269.2     920.00
      3       10.25    9.61    2.207  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      348.00    9.61    2.207  0.30( 0.29) 0.96     191.1     930.00
      2      380.92   12.75    1.882  0.30( 0.29) 0.96     251.7     910.00
      3      397.91   16.86    1.609  0.30( 0.29) 0.97     317.7     920.00
      4      386.49   17.57    1.572  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     397.91    Tc(MIN.) =    16.86
  EFFECTIVE AREA(ACRES) =     317.65   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.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.86
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.609
  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
```

F-3

```
  ".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) =   45.39
  EFFECTIVE AREA(ACRES) =    350.45   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) =     422.04

****************************************************************************
  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  54.0 INCH PIPE IS  40.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.21
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     422.04
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   17.31
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.31
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.585
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   12.07
  EFFECTIVE AREA(ACRES) =    359.85   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     426.66

****************************************************************************
  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)<<<<<
```

F-4


```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.56
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     426.66
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   17.80
  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.) =   17.80
  RAINFALL INTENSITY(INCH/HR) =   1.56
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.89
  EFFECTIVE STREAM AREA(ACRES) =     359.85
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     426.66

****************************************************************************
  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) =  2.500
  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) =      2.38
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.38

****************************************************************************
  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
```

OF-13

OF-14

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  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) =  2.235
  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) =      17.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.88
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   1.70
  Tc(MIN.) =    9.39
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   30.13
  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) =      32.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =  11.51
  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  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.63
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.22
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =   10.32
  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.) =   10.32
  RAINFALL INTENSITY(INCH/HR) =   2.12
  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 =      32.22

****************************************************************************
  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) =  2.162
  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) =      2.35
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      2.35
```

OF-15

```
****************************************************************************
  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) =  1.983
  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) =       3.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.41
  AVERAGE FLOW DEPTH(FEET) =   0.53   TRAVEL TIME(MIN.) =   1.66
  Tc(MIN.) =   11.62
```

OF-16

```
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    2.73
  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) =       4.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.58   FLOW VELOCITY(FEET/SEC.) =   4.76
  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) =  1.867
  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) =      15.02
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.30
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   1.31
  Tc(MIN.) =   12.93
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   20.31
  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) =      24.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.84   FLOW VELOCITY(FEET/SEC.) =  11.67
  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
```

OF-17

OF-18

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  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.761
  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) =      42.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.16
  AVERAGE FLOW DEPTH(FEET) =   1.12   TRAVEL TIME(MIN.) =   1.43
  Tc(MIN.) =   14.36
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   34.97
  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) =      58.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.26   FLOW VELOCITY(FEET/SEC.) =  12.13
  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) =  1.663
  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
```

OF-19

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  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      69.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.82
  AVERAGE FLOW DEPTH(FEET) =   1.62   TRAVEL TIME(MIN.) =   1.54
  Tc(MIN.) =   15.90
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   22.69
  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) =      76.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.68   FLOW VELOCITY(FEET/SEC.) =   9.05
  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) =  1.589
  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
  "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) =      85.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.03
  AVERAGE FLOW DEPTH(FEET) =   1.89   TRAVEL TIME(MIN.) =   1.33
  Tc(MIN.) =   17.23
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   17.87
  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) =      90.61

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.93   FLOW VELOCITY(FEET/SEC.) =   8.15
  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
----------------------------------------------------------------------------
```

OF-20


```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.589
  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) =   41.65
  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) =     132.26

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.23
  *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.589
  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
  "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) =    7.77
  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) =     140.04

****************************************************************************
  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  39.0 INCH PIPE IS  30.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.98
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     140.04
  PIPE TRAVEL TIME(MIN.) =   1.09    Tc(MIN.) =   18.32
```

OF-21

```
 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.) =   18.32
 RAINFALL INTENSITY(INCH/HR) =   1.54
 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 =     140.04

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      398.08   10.58    2.091  0.30( 0.25) 0.84     233.3     930.00
     1      419.41   13.69    1.808  0.30( 0.26) 0.87     293.9     910.00
     1      426.66   17.80    1.560  0.30( 0.27) 0.89     359.9     920.00
     1      415.28   18.51    1.526  0.30( 0.27) 0.89     359.9     900.00
     2       32.22   10.32    2.119  0.30( 0.30) 1.00      18.5     940.00
     3      140.04   18.32    1.535  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      543.03   10.32    2.119  0.30( 0.27) 0.89     314.2     940.00
     2      546.99   10.58    2.091  0.30( 0.27) 0.89     321.5     930.00
     3      573.91   13.69    1.808  0.30( 0.27) 0.90     402.6     910.00
     4      587.81   17.80    1.560  0.30( 0.28) 0.92     495.6     920.00
     5      580.30   18.32    1.535  0.30( 0.28) 0.92     499.1     950.00
     6      576.01   18.51    1.526  0.30( 0.28) 0.92     499.1     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     587.81    Tc(MIN.) =    17.80
 EFFECTIVE AREA(ACRES) =     495.65   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.92
 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.) =   17.80
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
 SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =   63.11
 EFFECTIVE AREA(ACRES) =    542.35   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.86
 TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     635.78

****************************************************************************
 FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.80
 *   5 YEAR RAINFALL INTENSITY(INCH/HR) =  1.560
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   11.02
 EFFECTIVE AREA(ACRES) =    550.35   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     646.80
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     17.80
 EFFECTIVE AREA(ACRES) =    550.35  AREA-AVERAGED Fm(INCH/HR)=  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.848
 PEAK FLOW RATE(CFS)   =     646.80

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1      625.72   10.32    2.119  0.30( 0.23) 0.78     368.9     940.00
     2      628.14   10.58    2.091  0.30( 0.24) 0.78     376.2     930.00
     3      643.37   13.69    1.808  0.30( 0.25) 0.82     457.3     910.00
     4      646.80   17.80    1.560  0.30( 0.25) 0.85     550.3     920.00
     5      638.30   18.32    1.535  0.30( 0.25) 0.85     553.8     950.00
     6      633.81   18.51    1.526  0.30( 0.25) 0.85     553.8     900.00
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

F-5

F-5

```
**************************************************************************
            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-4 SUBAREA F                                                  *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                               *
* 25-YR EV JULY 2018 CCHIU                                            *
 **********************************************************************

  FILE NAME: PA4F25EV.DAT
  TIME/DATE OF STUDY: 15:18 08/06/2018
==========================================================================
  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
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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) =  2.273
  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        0.70      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) =      2.13
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.13

**************************************************************************
  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   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.13
  PIPE TRAVEL TIME(MIN.) =   2.97    Tc(MIN.) =   16.73
  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.) =   16.73
  RAINFALL INTENSITY(INCH/HR) =   2.03
  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 =       2.13

**************************************************************************
  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
```

F-1

OF-1

SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) = 8.142
* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 3.070
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	8.14
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) = 3.99
TOTAL AREA(ACRES) = 1.60 PEAK FLOW RATE(CFS) = 3.99

****
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

OF-2

* 10 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
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) = 9.66
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.41
AVERAGE FLOW DEPTH(FEET) = 0.66 TRAVEL TIME(MIN.) = 1.03
Tc(MIN.) = 9.17
SUBAREA AREA(ACRES) = 4.90 SUBAREA RUNOFF(CFS) = 11.32
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) = 15.02

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 0.78 FLOW VELOCITY(FEET/SEC.) = 8.33
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

OF-3

* 10 YEAR RAINFALL INTENSITY(INCH/HR) = 2.651
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	0.10	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) = 33.12
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 7.63
AVERAGE FLOW DEPTH(FEET) = 1.20 TRAVEL TIME(MIN.) = 1.35
Tc(MIN.) = 10.52
SUBAREA AREA(ACRES) = 17.10 SUBAREA RUNOFF(CFS) = 36.18
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) = 49.93

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.40 FLOW VELOCITY(FEET/SEC.) = 8.48
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 24.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 10.62
ESTIMATED PIPE DIAMETER(INCH) = 33.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 49.93
PIPE TRAVEL TIME(MIN.) = 1.40 Tc(MIN.) = 11.92
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.) =   11.92
 RAINFALL INTENSITY(INCH/HR) =   2.47
 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 =      49.93

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.13   16.73    2.032  0.30( 0.30) 1.00       1.2     900.00
     2       49.93   11.92    2.468  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       Q      Tc   Intensity   Fp(Fm)     Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       51.83   11.92    2.468  0.30( 0.30) 1.00      24.5     910.00
     2       42.02   16.73    2.032  0.30( 0.30) 1.00      24.8     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      51.83    Tc(MIN.) =    11.92
 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.) =   11.92                                        F-2
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.468
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.175
 SUBAREA AREA(ACRES) =    7.10      SUBAREA RUNOFF(CFS) =   15.44
 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) =      63.15
```



```
****************************************************************************
 FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   11.92                                        F-2
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.468
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.712
 SUBAREA AREA(ACRES) =   10.90      SUBAREA RUNOFF(CFS) =   22.12
 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) =      85.26

****************************************************************************
 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  24.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.29
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      85.26
 PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =   12.45
 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.) =   12.45
 RAINFALL INTENSITY(INCH/HR) =   2.41
 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 =      85.26

****************************************************************************
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  3.161
  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) =      2.32
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.32

****************************************************************************
  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) =  2.922
  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) =      18.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.70
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    8.87
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   32.33
  EFFECTIVE AREA(ACRES) =     14.60     AREA-AVERAGED Fm(INCH/HR) =   0.30
```

OF-4

OF-5


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  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.6         PEAK FLOW RATE(CFS) =      34.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.06   FLOW VELOCITY(FEET/SEC.) =  10.16
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
  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) =      42.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.91
  AVERAGE FLOW DEPTH(FEET) =   1.34   TRAVEL TIME(MIN.) =   1.27
  Tc(MIN.) =   10.15
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   16.24
  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) =      47.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.40   FLOW VELOCITY(FEET/SEC.) =   8.13
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.466
  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
```

OF-6

OF-7

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  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) =      62.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.91
  AVERAGE FLOW DEPTH(FEET) =   1.62   TRAVEL TIME(MIN.) =   1.79
  Tc(MIN.) =   11.94
  SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   28.85
  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) =      71.92

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.71   FLOW VELOCITY(FEET/SEC.) =   8.24
  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.) =   11.94
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.466
  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) =  123.37
  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) =     195.29

****************************************************************************
  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
```

OF-7


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  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
  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) =     198.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.46
  AVERAGE FLOW DEPTH(FEET) =   2.51   TRAVEL TIME(MIN.) =   0.97
  Tc(MIN.) =   12.90
  SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    6.48
  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) =     195.29
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.50   FLOW VELOCITY(FEET/SEC.) =  10.42
  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.) =   12.90
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.358
  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        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) =   59.45
  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) =     251.52
```

OF-8

OF-8

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****************************************************************************
  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
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.167
  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
  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) =     261.27
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.18
  AVERAGE FLOW DEPTH(FEET) =   3.48   TRAVEL TIME(MIN.) =   2.05
  Tc(MIN.) =   14.96
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   19.49
  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) =     251.52
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  3.43   FLOW VELOCITY(FEET/SEC.) =   7.12
  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.) =   14.96
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.167
  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
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OF-9

OF-9


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  "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) =  204.64
  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) =     452.30

****************************************************************************
  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  75.0 INCH PIPE IS  60.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.01
  ESTIMATED PIPE DIAMETER(INCH) =  75.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     452.30
  PIPE TRAVEL TIME(MIN.) =   1.31    Tc(MIN.) =   16.27
  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.) =   16.27
  RAINFALL INTENSITY(INCH/HR) =   2.06
  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 =     452.30

****************************************************************************
  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) =  3.111
  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.)
```

OF-10

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  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) =      1.52
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.52

****************************************************************************
  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) =  2.898
  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) =      7.54
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.03
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =    9.00
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   12.02
  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) =      13.43

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.74   FLOW VELOCITY(FEET/SEC.) =   8.24
  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  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.51
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.43
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    9.50
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    903.00 =    1027.00 FEET.
```

OF-11


```
****************************************************************************
  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.) =    9.50
  RAINFALL INTENSITY(INCH/HR) =   2.81
  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 =      13.43

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       85.26   12.45    2.406  0.30( 0.24) 0.79      42.5     910.00
      1       69.14   17.28    1.994  0.30( 0.24) 0.79      42.8     900.00
      2      452.30   16.27    2.065  0.30( 0.30) 1.00     269.2     920.00
      3       13.43    9.50    2.810  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      466.26    9.50    2.810  0.30( 0.29) 0.96     195.3     930.00
      2      509.82   12.45    2.406  0.30( 0.29) 0.96     254.2     910.00
      3      534.30   16.27    2.065  0.30( 0.29) 0.97     317.6     920.00
      4      512.52   17.28    1.994  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     534.30    Tc(MIN.) =    16.27
  EFFECTIVE AREA(ACRES) =     317.63   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.

****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.27
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.065
  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
```

F-3

```
  ".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) =   58.86
  EFFECTIVE AREA(ACRES) =    350.43   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) =     565.87

****************************************************************************
  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  60.0 INCH PIPE IS  45.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  35.68
  ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     565.87
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   16.69
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.69
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.035
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.527
  SUBAREA AREA(ACRES) =    9.40      SUBAREA RUNOFF(CFS) =   15.88
  EFFECTIVE AREA(ACRES) =    359.83   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     572.34

****************************************************************************
  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)<<<<<
```

F-4


```
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   370.00  DOWNSTREAM(FEET) =   330.00
  FLOW LENGTH(FEET) =   872.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  63.0 INCH PIPE IS  49.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.68
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     572.34
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   17.15
  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.) =   17.15
  RAINFALL INTENSITY(INCH/HR) =   2.00
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.89
  EFFECTIVE STREAM AREA(ACRES) =     359.83
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     572.34

****************************************************************************
  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) =  3.172
  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) =      3.10
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.10

****************************************************************************
  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
```

OF-13

OF-14

```
 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) =  2.848
 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) =      22.98
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.56
 AVERAGE FLOW DEPTH(FEET) =   0.85   TRAVEL TIME(MIN.) =   1.59
 Tc(MIN.) =    9.28
 SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   39.67
 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) =      42.42

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.07   FLOW VELOCITY(FEET/SEC.) =  12.28
 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  15.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.05
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      42.42
 PIPE TRAVEL TIME(MIN.) =   0.87    Tc(MIN.) =   10.15
 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.) =   10.15
 RAINFALL INTENSITY(INCH/HR) =   2.71
 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 =      42.42

****************************************************************************
 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) =  2.734
 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) =      3.07
 TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.07
```

OF-15

```
****************************************************************************
 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) =  2.519
 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) =       4.87
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.78
 AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   1.53
 Tc(MIN.) =   11.50
```

OF-16

```
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    3.60
  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) =       6.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.65   FLOW VELOCITY(FEET/SEC.) =   5.11
  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) =  2.378
  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) =      19.86
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.07
  AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   1.22
  Tc(MIN.) =   12.72
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   26.93
  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) =      32.91

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =  12.59
  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
```

OF-17

OF-18

```
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.247
  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) =      56.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.03
  AVERAGE FLOW DEPTH(FEET) =   1.25   TRAVEL TIME(MIN.) =   1.32
  Tc(MIN.) =   14.04
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   46.60
  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) =      77.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.41   FLOW VELOCITY(FEET/SEC.) =  13.01
  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) =  2.125
  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
```

OF-19

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      92.64
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.47
  AVERAGE FLOW DEPTH(FEET) =   1.81   TRAVEL TIME(MIN.) =   1.43
  Tc(MIN.) =   15.47
  SUBAREA AREA(ACRES) =    18.50       SUBAREA RUNOFF(CFS) =   30.39
  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) =     102.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.88   FLOW VELOCITY(FEET/SEC.) =   9.72
  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) =  2.034
  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
  "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) =     115.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.67
  AVERAGE FLOW DEPTH(FEET) =   2.10   TRAVEL TIME(MIN.) =   1.24
  Tc(MIN.) =   16.71
  SUBAREA AREA(ACRES) =    15.40       SUBAREA RUNOFF(CFS) =   24.03
  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) =     121.85

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.15   FLOW VELOCITY(FEET/SEC.) =   8.80
  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
----------------------------------------------------------------------------
```

OF-20


```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.71
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.034
  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) =   56.01
  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) =     177.86

****************************************************************************
  FLOW PROCESS FROM NODE    956.00 TO NODE    956.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.71
  *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.034
  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
  "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) =   10.45
  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) =     188.31

****************************************************************************
  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  45.0 INCH PIPE IS  32.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.78
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     188.31
  PIPE TRAVEL TIME(MIN.) =   1.00    Tc(MIN.) =   17.71
```

OF-20

OF-21

```
 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.) =   17.71
 RAINFALL INTENSITY(INCH/HR) =   1.97
 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 =     188.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      531.36   10.39    2.669  0.30( 0.25) 0.85     237.5     930.00
     1      560.37   13.33    2.314  0.30( 0.26) 0.87     296.4     910.00
     1      572.34   17.15    2.004  0.30( 0.27) 0.89     359.8     920.00
     1      550.50   18.16    1.938  0.30( 0.27) 0.89     359.9     900.00
     2       42.42   10.15    2.706  0.30( 0.30) 1.00      18.5     940.00
     3      188.31   17.71    1.967  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      724.89   10.15    2.706  0.30( 0.27) 0.89     319.5     940.00
     2      730.24   10.39    2.669  0.30( 0.27) 0.89     326.9     930.00
     3      767.22   13.33    2.314  0.30( 0.27) 0.90     405.8     910.00
     4      788.73   17.15    2.004  0.30( 0.28) 0.92     495.2     920.00
     5      778.06   17.71    1.967  0.30( 0.28) 0.92     499.1     950.00
     6      764.47   18.16    1.938  0.30( 0.28) 0.92     499.1     900.00

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     788.73    Tc(MIN.) =    17.15
 EFFECTIVE AREA(ACRES) =     495.22   AREA-AVERAGED Fm(INCH/HR) =  0.28
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.92
 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.) =   17.15
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.004
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
 SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =   81.74
 EFFECTIVE AREA(ACRES) =    541.92   AREA-AVERAGED Fm(INCH/HR) =  0.26
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.86
 TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     851.49

****************************************************************************
 FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   17.15
 *  10 YEAR RAINFALL INTENSITY(INCH/HR) =  2.004
 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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   14.21
 EFFECTIVE AREA(ACRES) =    549.92   AREA-AVERAGED Fm(INCH/HR) =  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
 TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     865.70
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     17.15
 EFFECTIVE AREA(ACRES) =    549.92  AREA-AVERAGED Fm(INCH/HR)=  0.25
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.848
 PEAK FLOW RATE(CFS)   =     865.70

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
     1      832.14   10.15    2.706  0.30( 0.24) 0.78     374.2     940.00
     2      835.52   10.39    2.669  0.30( 0.24) 0.79     381.6     930.00
     3      857.38   13.33    2.314  0.30( 0.25) 0.82     460.5     910.00
     4      865.70   17.15    2.004  0.30( 0.25) 0.85     549.9     920.00
     5      853.42   17.71    1.967  0.30( 0.25) 0.85     553.8     950.00
     6      839.20   18.16    1.938  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)
         (c) Copyright 1983-2013 Advanced Engineering Software (aes)
             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-4 SUBAREA F                                                       *
* RATIONAL METHOD HYDROLOGY MODEL LOCAL                                    *
* 50-YR EV AUG 2018 CCHIU                                                  *
 ****************************************************************************

  FILE NAME: PA4F50EV.DAT
  TIME/DATE OF STUDY: 15:17 08/06/2018
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   15.00
  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;  4.440
   2)   10.00;  3.010
   3)   15.00;  2.390
   4)   20.00;  2.030
   5)   25.00;  1.790
   6)   30.00;  1.600
   7)   40.00;  1.370
   8)   50.00;  1.200
   9)   60.00;  1.060
  10)   90.00;  0.860
  11)  120.00;  0.730
  12)  180.00;  0.590
  13)  360.00;  0.410
  14) 1200.00;  0.170
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (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    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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.544
  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        0.70      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) =      2.42
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      2.42

****************************************************************************
  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   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.42
  PIPE TRAVEL TIME(MIN.) =   2.86    Tc(MIN.) =   16.62
  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.) =   16.62
  RAINFALL INTENSITY(INCH/HR) =   2.27
  AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

F-1

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.20
  TOTAL STREAM AREA(ACRES) =       1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.42

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.541
  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 BROWSH"              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) =      4.67
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.67

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.257
  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 BROWSH"              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 BROWSH"              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) =      11.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.68
  AVERAGE FLOW DEPTH(FEET) =   0.70   TRAVEL TIME(MIN.) =   0.99
```

OF-1

OF-2


```
  Tc(MIN.) =    9.14
  SUBAREA AREA(ACRES) =     4.90       SUBAREA RUNOFF(CFS) =   13.04
  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) =      17.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.82   FLOW VELOCITY(FEET/SEC.) =   8.59
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.955
  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 BROWSH"              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 BROWSH"              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 BROWSH"              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) =      37.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.88
  AVERAGE FLOW DEPTH(FEET) =   1.26   TRAVEL TIME(MIN.) =   1.31
  Tc(MIN.) =   10.44
  SUBAREA AREA(ACRES) =    17.10       SUBAREA RUNOFF(CFS) =   40.86
  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) =      56.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.47   FLOW VELOCITY(FEET/SEC.) =   8.70
  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
```

OF-3

```
  FLOW LENGTH(FEET) =   890.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.06
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      56.40
  PIPE TRAVEL TIME(MIN.) =   1.34    Tc(MIN.) =   11.78
  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.) =   11.78
  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) =      23.60
  TOTAL STREAM AREA(ACRES) =      23.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        2.42   16.62    2.273  0.30( 0.30) 1.00       1.2     900.00
      2       56.40   11.78    2.789  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       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       58.56   11.78    2.789  0.30( 0.30) 1.00      24.5     910.00
      2       47.13   16.62    2.273  0.30( 0.30) 1.00      24.8     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      58.56    Tc(MIN.) =    11.78
  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.) =   11.78
  *  15 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
```



```
  "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) =   17.49
  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) =      72.26

****************************************************************************
  FLOW PROCESS FROM NODE    902.00 TO NODE    902.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.78
  *  15 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
  "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) =   25.26
  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) =      97.52

****************************************************************************
  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  23.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.36
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.52
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =   12.29
  LONGEST FLOWPATH FROM NODE    910.00 TO NODE    903.00 =    2948.00 FEET.
```


F-2

F-2

```
****************************************************************************
  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.) =   12.29
  RAINFALL INTENSITY(INCH/HR) =   2.73
  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 =      97.52

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.657
  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) =      2.72
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.72

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.345
  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
```

OF-4

OF-5


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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) =      21.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.07
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   1.09
  Tc(MIN.) =    8.83
  SUBAREA AREA(ACRES) =    13.70       SUBAREA RUNOFF(CFS) =   37.54
  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) =      40.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.12   FLOW VELOCITY(FEET/SEC.) =  10.55
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.003
  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) =      49.14
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.19
  AVERAGE FLOW DEPTH(FEET) =   1.41   TRAVEL TIME(MIN.) =   1.23
  Tc(MIN.) =   10.06
  SUBAREA AREA(ACRES) =     7.50       SUBAREA RUNOFF(CFS) =   18.24
  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) =      53.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.46   FLOW VELOCITY(FEET/SEC.) =   8.38
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    923.00 =    1484.00 FEET.

****************************************************************************
```

OF-6

```
 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
 *  15 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
 "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) =      70.34
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.15
 AVERAGE FLOW DEPTH(FEET) =   1.70   TRAVEL TIME(MIN.) =   1.74
 Tc(MIN.) =   11.80
 SUBAREA AREA(ACRES) =    14.80       SUBAREA RUNOFF(CFS) =   33.13
 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) =      82.60

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.80   FLOW VELOCITY(FEET/SEC.) =   8.52
 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.) =   11.80
 *  15 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
 "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
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OF-7

OF-7


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 SUBAREA AREA(ACRES) =   63.30      SUBAREA RUNOFF(CFS) =  141.70
 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) =     224.31

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.671
 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) =     228.04
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.82
 AVERAGE FLOW DEPTH(FEET) =   2.65   TRAVEL TIME(MIN.) =   0.93
 Tc(MIN.) =   12.73
 SUBAREA AREA(ACRES) =     3.50       SUBAREA RUNOFF(CFS) =    7.47
 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) =     224.31
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  2.64   FLOW VELOCITY(FEET/SEC.) =  10.77
 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.) =   12.73
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.671
 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
```

OF-8

OF-8

```
"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) =   68.51
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) =     289.83

****************************************************************************
 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
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.427
```

OF-9

```
 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
 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) =     300.94
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.46
 AVERAGE FLOW DEPTH(FEET) =   3.67   TRAVEL TIME(MIN.) =   1.97
 Tc(MIN.) =   14.71
 SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   22.20
 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) =     289.83
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  3.62   FLOW VELOCITY(FEET/SEC.) =   7.38
 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.) =   14.71
 *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.427
```

OF-9

```
 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) =  233.11
 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) =     515.22

****************************************************************************
 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  81.0 INCH PIPE IS  61.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.81
 ESTIMATED PIPE DIAMETER(INCH) =  81.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     515.22
 PIPE TRAVEL TIME(MIN.) =   1.25    Tc(MIN.) =   15.96
 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.) =   15.96
 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) =     269.20
 TOTAL STREAM AREA(ACRES) =     269.20
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     515.22
```

```
****************************************************************************
  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
  *  15 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.)
  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) =      1.78
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      1.78

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.307
  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) =      8.74
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.33
  AVERAGE FLOW DEPTH(FEET) =   0.63   TRAVEL TIME(MIN.) =   1.01
  Tc(MIN.) =    8.96
  SUBAREA AREA(ACRES) =     5.10       SUBAREA RUNOFF(CFS) =   13.90
  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) =      15.53

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.78   FLOW VELOCITY(FEET/SEC.) =   8.48
  LONGEST FLOWPATH FROM NODE    930.00 TO NODE    932.00 =     773.00 FEET.
```

OF-10

OF-11


```
****************************************************************************
  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  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.76
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.53
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    9.44
  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.) =    9.44
  RAINFALL INTENSITY(INCH/HR) =   3.17
  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 =      15.53

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.52   12.29    2.726  0.30( 0.24) 0.79      42.5     910.00
      1       78.43   17.16    2.234  0.30( 0.24) 0.79      42.8     900.00
      2      515.22   15.96    2.321  0.30( 0.30) 1.00     269.2     920.00
      3       15.53    9.44    3.169  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      536.60    9.44    3.169  0.30( 0.29) 0.96     197.6     930.00
      2      587.00   12.29    2.726  0.30( 0.29) 0.96     255.5     910.00
      3      609.34   15.96    2.321  0.30( 0.29) 0.97     317.6     920.00
      4      582.04   17.16    2.234  0.30( 0.29) 0.97     317.7     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     609.34    Tc(MIN.) =    15.96
  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.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    903.00 TO NODE    903.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.96
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.321
  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) =   66.42
  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) =     646.62

****************************************************************************
  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  63.0 INCH PIPE IS  47.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.87
  ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     646.62
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   16.37
  LONGEST FLOWPATH FROM NODE    920.00 TO NODE    904.00 =    6061.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    904.00 TO NODE    904.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.37
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.292
  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
```

F-3

F-4


```
  ".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) =   18.05
  EFFECTIVE AREA(ACRES) =    359.81   AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =      359.9       PEAK FLOW RATE(CFS) =     655.47

****************************************************************************
  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  66.0 INCH PIPE IS  51.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.70
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     655.47
  PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =   16.81
  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.) =   16.81
  RAINFALL INTENSITY(INCH/HR) =   2.26
  AREA-AVERAGED Fm(INCH/HR) =  0.27
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.89
  EFFECTIVE STREAM AREA(ACRES) =     359.81
  TOTAL STREAM AREA(ACRES) =     359.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     655.47

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.670
  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
```

OF-13

```
  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) =      3.64
  TOTAL AREA(ACRES) =      1.20   PEAK FLOW RATE(CFS) =      3.64

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.227
  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) =      26.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.85
  AVERAGE FLOW DEPTH(FEET) =   0.90   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =    9.24
  SUBAREA AREA(ACRES) =    17.30       SUBAREA RUNOFF(CFS) =   45.58
  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) =      48.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.13   FLOW VELOCITY(FEET/SEC.) =  12.68
  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  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.57
```

OF-14


```
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      48.74
  PIPE TRAVEL TIME(MIN.) =   0.84    Tc(MIN.) =   10.08
  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.) =   10.08
  RAINFALL INTENSITY(INCH/HR) =   3.00
  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 =      48.74

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  3.020
  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) =      3.43
  TOTAL AREA(ACRES) =      1.40   PEAK FLOW RATE(CFS) =      3.43

****************************************************************************
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.831
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

OF-15

OF-16

```
     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) =       5.48
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.95
  AVERAGE FLOW DEPTH(FEET) =   0.61   TRAVEL TIME(MIN.) =   1.48
  Tc(MIN.) =   11.44
  SUBAREA AREA(ACRES) =     1.80       SUBAREA RUNOFF(CFS) =    4.10
  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) =       7.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.68   FLOW VELOCITY(FEET/SEC.) =   5.23
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.685
  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) =      22.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.46
  AVERAGE FLOW DEPTH(FEET) =   0.81   TRAVEL TIME(MIN.) =   1.18
  Tc(MIN.) =   12.62
  SUBAREA AREA(ACRES) =    14.40       SUBAREA RUNOFF(CFS) =   30.91
  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) =      37.78
```

OF-17


```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.98   FLOW VELOCITY(FEET/SEC.) =  13.08
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.526
  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) =      64.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.42
  AVERAGE FLOW DEPTH(FEET) =   1.32   TRAVEL TIME(MIN.) =   1.28
  Tc(MIN.) =   13.90
  SUBAREA AREA(ACRES) =    26.60       SUBAREA RUNOFF(CFS) =   53.29
  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) =      88.55

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.48   FLOW VELOCITY(FEET/SEC.) =  13.42
  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
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.369
  SUBAREA LOSS RATE DATA(AMC  II):
```

OF-18

OF-19

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) = 105.78
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 9.80
AVERAGE FLOW DEPTH(FEET) = 1.90 TRAVEL TIME(MIN.) = 1.38
Tc(MIN.) = 15.29
SUBAREA AREA(ACRES) = 18.50 SUBAREA RUNOFF(CFS) = 34.45
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) = 116.77

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 1.97 FLOW VELOCITY(FEET/SEC.) = 10.02
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
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.283

OF-20

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) = 130.51

TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) = 8.93
AVERAGE FLOW DEPTH(FEET) = 2.21 TRAVEL TIME(MIN.) = 1.20
Tc(MIN.) = 16.49
SUBAREA AREA(ACRES) = 15.40 SUBAREA RUNOFF(CFS) = 27.48
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) = 139.37

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) = 2.26 FLOW VELOCITY(FEET/SEC.) = 9.09
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.) = 16.49
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.283

OF-20

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) = 64.07
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) = 203.44

****

FLOW PROCESS FROM NODE 956.00 TO NODE 956.00 IS CODE = 81

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

==========

MAINLINE Tc(MIN.) = 16.49
* 15 YEAR RAINFALL INTENSITY(INCH/HR) = 2.283

OF-21

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) = 11.96
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) =     215.40

****************************************************************************
  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  34.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.62
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     215.40
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   17.45
  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.) =   17.45
  RAINFALL INTENSITY(INCH/HR) =   2.21
  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 =     215.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      603.66   10.31    2.972  0.30( 0.25) 0.85     239.8     930.00
      1      646.92   13.14    2.620  0.30( 0.26) 0.87     297.7     910.00
      1      655.47   16.81    2.260  0.30( 0.27) 0.89     359.8     920.00
      1      627.48   18.02    2.173  0.30( 0.27) 0.89     359.9     900.00
      2       48.74   10.08    3.000  0.30( 0.30) 1.00      18.5     940.00
      3      215.40   17.45    2.214  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       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      820.90   10.08    3.000  0.30( 0.27) 0.89     322.8     940.00
      2      829.55   10.31    2.972  0.30( 0.27) 0.89     329.6     930.00
      3      885.53   13.14    2.620  0.30( 0.27) 0.90     407.1     910.00
      4      903.35   16.81    2.260  0.30( 0.28) 0.92     494.6     920.00
      5      890.60   17.45    2.214  0.30( 0.28) 0.92     499.1     950.00
      6      872.08   18.02    2.173  0.30( 0.28) 0.92     499.1     900.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
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  PEAK FLOW RATE(CFS) =     903.35    Tc(MIN.) =    16.81
  EFFECTIVE AREA(ACRES) =     494.59   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.92
  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.) =   16.81
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.260
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.196
  SUBAREA AREA(ACRES) =   46.70      SUBAREA RUNOFF(CFS) =   92.51
  EFFECTIVE AREA(ACRES) =    541.29   AREA-AVERAGED Fm(INCH/HR) =  0.26
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =      545.8       PEAK FLOW RATE(CFS) =     975.32

****************************************************************************
  FLOW PROCESS FROM NODE    905.00 TO NODE    905.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.81
  *  15 YEAR RAINFALL INTENSITY(INCH/HR) =  2.260
  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 PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    8.00      SUBAREA RUNOFF(CFS) =   16.05
  EFFECTIVE AREA(ACRES) =    549.29   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =      553.8       PEAK FLOW RATE(CFS) =     991.38
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      553.8  TC(MIN.) =     16.81
  EFFECTIVE AREA(ACRES) =    549.29  AREA-AVERAGED Fm(INCH/HR)=  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.848
  PEAK FLOW RATE(CFS)   =     991.38

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc    Intensity   Fp(Fm)     Ap      Ae     HEADWATER
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F-5

F-5

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	939.05	10.08	3.000	0.30(0.24)	0.79	377.5	940.00
2	946.10	10.31	2.972	0.30(0.24)	0.79	384.3	930.00
3	986.93	13.14	2.620	0.30(0.25)	0.82	461.8	910.00
4	991.38	16.81	2.260	0.30(0.25)	0.85	549.3	920.00
5	976.31	17.45	2.214	0.30(0.25)	0.85	553.8	950.00
6	955.97	18.02	2.173	0.30(0.25)	0.85	553.8	900.00

END OF RATIONAL METHOD ANALYSIS