Appendix 2.1

Post-Development Hydrology Calculations:
Rational Method
1-year, 2-year, 10-year, &100-year Storm Events

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* Independence at Canyon Springs                                        *
* Post-development Hydrology                                            *
* 1-Year Storm Event                                                    *
 ************************************************************************

  FILE NAME: LMCR-PSD.DAT
  TIME/DATE OF STUDY: 11:23 08/01/2025
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    1.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    1.00   1-HOUR INTENSITY(INCH/HOUR) =   0.400
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 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.*

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   151.05
  UPSTREAM ELEVATION(FEET) =    575.72
  DOWNSTREAM ELEVATION(FEET) =    573.33
  ELEVATION DIFFERENCE(FEET) =      2.39
  TC = 0.323*[(  151.05**3)/(     2.39)]**.2 =    5.503
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.485
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8483
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     156.05 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0181
  FLOW LENGTH(FEET) =   142.15   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.92
```

```
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    5.92
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     298.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   151.07
  UPSTREAM ELEVATION(FEET) =    572.96
  DOWNSTREAM ELEVATION(FEET) =    570.79
  ELEVATION DIFFERENCE(FEET) =      2.17
  TC = 0.323*[(  151.07**3)/(     2.17)]**.2 =    5.611
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.470
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8479
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.76
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      0.76

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0815
  FLOW LENGTH(FEET) =     8.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.34
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.62
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =     159.57 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.76     5.62       1.468        0.61
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =     159.57 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.77     5.92       1.427        0.61
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     298.20 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.49       5.62        1.468
      2       1.51       5.92        1.427

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.51   Tc(MIN.) =    5.92
  TOTAL AREA(ACRES) =        1.2

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0181
  FLOW LENGTH(FEET) =    64.06   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.00
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.51
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.07
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.10 =     362.26 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.12   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.63
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.51
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     426.38 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   156.28
  UPSTREAM ELEVATION(FEET) =    570.33
  DOWNSTREAM ELEVATION(FEET) =    567.75
  ELEVATION DIFFERENCE(FEET) =      2.58
  TC = 0.323*[(  156.28**3)/(     2.58)]**.2 =    5.531
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.481
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8482
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.481
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8482
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.32
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       0.76
  TC(MIN.) =    5.53

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =    17.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.80
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.76
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.64
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE      7.00 =     173.78 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.76     5.64       1.466        0.60
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE      7.00 =     173.78 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.49     5.97       1.421        1.22
      2        1.51     6.26       1.384        1.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     426.38 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.16       5.64        1.466
      2       2.22       5.97        1.421
      3       2.22       6.26        1.384

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       2.22   Tc(MIN.) =    5.97
  TOTAL AREA(ACRES) =        1.8

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    47.85   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.76
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.22
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    6.14
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =     474.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   345.49
  UPSTREAM ELEVATION(FEET) =    574.97
  DOWNSTREAM ELEVATION(FEET) =    568.23
  ELEVATION DIFFERENCE(FEET) =      6.74
  TC = 0.323*[(  345.49**3)/(     6.74)]**.2 =    7.347
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.267
```

```
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8422
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.38   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     4.29   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.07
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.40
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     10.00 =     349.78 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.40     7.36       1.266        0.38
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     10.00 =     349.78 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.16     5.80       1.443        1.82
      2        2.22     6.14       1.399        1.82
      3        2.22     6.43       1.364        1.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =     474.23 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.48       5.80        1.443
      2       2.56       6.14        1.399
      3       2.57       6.43        1.364
      4       2.46       7.36        1.266

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.57   Tc(MIN.) =    6.43
```

```
  TOTAL AREA(ACRES) =        2.2

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    60.46   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.57
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    6.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     534.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.339
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8444
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    0.67
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       3.24
  TC(MIN.) =    6.65

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    78.75   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.85
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.24
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    6.92
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =     613.44 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.58
  UPSTREAM ELEVATION(FEET) =    570.24
  DOWNSTREAM ELEVATION(FEET) =    567.49
  ELEVATION DIFFERENCE(FEET) =      2.75
  TC = 0.323*[(  245.58**3)/(     2.75)]**.2 =    7.162
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.285
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8428
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0319
  FLOW LENGTH(FEET) =     7.77   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.21
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.19
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.00 =     253.35 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.21      7.19       1.283        0.19
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.00 =     253.35 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.19      6.30       1.379        2.79
      2        3.24      6.63       1.341        2.79
      3        3.24      6.92       1.310        2.79
      4        3.08      7.86       1.221        2.79
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =     613.44 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.37       6.30        1.379
      2       3.44       6.63        1.341
      3       3.44       6.92        1.310
      4       3.38       7.19        1.283
      5       3.28       7.86        1.221

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.44   Tc(MIN.) =    6.92
  TOTAL AREA(ACRES) =        3.0

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     17.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    67.22   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.92
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.44
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.15
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     680.66 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.287
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8428
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       3.80
  TC(MIN.) =    7.15

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =   112.47   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.03
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.80
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =     793.13 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.251
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8417
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    0.35
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       4.15
  TC(MIN.) =    7.52
  ** PEAK FLOW RATE TABLE **
  STREAM   RUNOFF       Tc
  NUMBER    (CFS)     (MIN.)
     1        4.12       6.90
     2        4.16       7.23
     3        4.15       7.52
     4        4.08       7.79
     5        3.94       8.47
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =       4.16  Tc(MIN.) =    7.23
```

```
+----------------------------------------------------------------------+
| INTO MWS UNIT                                                        |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  41
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
  REPRESENTATIVE SLOPE =  0.0617
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.28
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.16
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.28
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     19.00 =     836.13 FEET.

+----------------------------------------------------------------------+
| INTO DETENTION TANK                                                  |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  10
----------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
======================================================================

**********************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  13
----------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
======================================================================

**********************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
======================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   308.13
  UPSTREAM ELEVATION(FEET) =    572.22
  DOWNSTREAM ELEVATION(FEET) =    567.97
```

```
  ELEVATION DIFFERENCE(FEET) =      4.25
  TC = 0.323*[(  308.13**3)/(     4.25)]**.2 =    7.522
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.251
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8417
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.74   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0130
  FLOW LENGTH(FEET) =    49.20   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.47
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       0.78
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    7.71
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     357.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.235
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8412
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.41
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       1.19
  TC(MIN.) =    7.71

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.28
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.19
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    8.25
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     528.20 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.24
  UPSTREAM ELEVATION(FEET) =    567.99
  DOWNSTREAM ELEVATION(FEET) =    566.85
  ELEVATION DIFFERENCE(FEET) =      1.14
  TC = 0.323*[(  117.24**3)/(     1.14)]**.2 =    5.481
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.489
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8484
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0288
  FLOW LENGTH(FEET) =     7.29   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.66
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.33
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.50
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     124.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    62.88   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.84
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.33
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    5.87
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     23.00 =     187.41 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.33     5.87       1.433        0.26
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     23.00 =     187.41 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.19     8.25       1.190        1.14
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     528.20 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.19       5.87        1.433
      2       1.47       8.25        1.190

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.47   Tc(MIN.) =    8.25
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
```

```
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    20.25   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.31
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.47
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     548.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.183
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8395
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       1.74
  TC(MIN.) =    8.32

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     30.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    73.72   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.50
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.74
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.60
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =     622.17 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8388
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.14
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       1.88
  TC(MIN.) =    8.60

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

```
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.88
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.78
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     687.17 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   207.00
  UPSTREAM ELEVATION(FEET) =    567.07
  DOWNSTREAM ELEVATION(FEET) =    563.88
  ELEVATION DIFFERENCE(FEET) =      3.19
  TC = 0.323*[(  207.00**3)/(     3.19)]**.2 =    6.275
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.382
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8456
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.59     6.28       1.382        0.50
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     31.00 =     207.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.68     6.43       1.364        1.82
      2        1.88     8.78       1.149        1.82
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     687.17 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.23       6.28        1.382
      2       2.26       6.43        1.364
      3       2.37       8.78        1.149

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.37   Tc(MIN.) =    8.78
  TOTAL AREA(ACRES) =        2.3

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     34.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.37
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.84
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     34.00 =     710.17 FEET.

+----------------------------------------------------------------------------+
| INTO MWS UNIT                                                              |
|                                                                            |
|                                                                            |
```

```
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  41
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.37
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.88
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     35.00 =     726.17 FEET.

**********************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
======================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   106.64   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.30
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.37
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     36.00 =     832.81 FEET.

+----------------------------------------------------------------------+
| INTO DETENTION TANK                                                  |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

**********************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
======================================================================

**********************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  13
----------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
======================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  USER SPECIFIED Tc(MIN.) =    5.000
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.566
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8502
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.60
  TOTAL AREA(ACRES) =      0.45   TOTAL RUNOFF(CFS) =      0.60

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   144.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.61
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.60
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    5.92
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     38.00 =     250.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.427
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8468
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    0.55
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.14
  TC(MIN.) =    5.92

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   144.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.7 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.12
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.14
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    6.69
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     394.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.335
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8442
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    0.51
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       1.65
  TC(MIN.) =    6.69

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   132.82   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.41
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.65
  PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     40.00 =     527.46 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
        ASSUMED INITIAL SUBAREA UNIFORM
        DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   654.03
  UPSTREAM ELEVATION(FEET) =    568.15
  DOWNSTREAM ELEVATION(FEET) =    563.11
  ELEVATION DIFFERENCE(FEET) =      5.04
  TC = 0.323*[(  654.03**3)/(     5.04)]**.2 =   11.420
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.995
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8323
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.08
  TOTAL AREA(ACRES) =      1.31   TOTAL RUNOFF(CFS) =      1.08

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     9.76   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.08
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.08
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =     663.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     1 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.993
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8323
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       1.26
  TC(MIN.) =   11.45

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.74   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.1 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.32
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.26
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.50
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =     677.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.26    11.50       0.991        1.53
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =     677.53 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.65     7.34       1.268        1.35
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     44.00 =     527.46 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.46       7.34        1.268
      2       2.55      11.50        0.991

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.55   Tc(MIN.) =   11.50
  TOTAL AREA(ACRES) =        2.9

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| INTO MWS UNIT                                                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    34.40   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.55
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     711.93 FEET.

+--------------------------------------------------------------------------+
| INTO DETENTION TANK                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.46      7.43       1.260        2.88
      2        2.55     11.58       0.987        2.88
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     46.00 =     711.93 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.12      6.95       1.307        3.65
      2        4.16      7.28       1.274        3.65
      3        4.15      7.57       1.247        3.65
      4        4.08      7.84       1.223        3.65
      5        3.94      8.52       1.168        3.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     46.00 =     836.13 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       6.42       6.95        1.307
      2       6.57       7.28        1.274
      3       6.57       7.43        1.260
      4       6.58       7.57        1.247
      5       6.46       7.84        1.223
      6       6.22       8.52        1.168
      7       5.88      11.58        0.987
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.58   Tc(MIN.) =    7.57
  TOTAL AREA(ACRES) =        6.5

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.42     6.95       1.307        6.52
      2        6.57     7.28       1.274        6.52
      3        6.57     7.43       1.260        6.52
      4        6.58     7.57       1.247        6.52
      5        6.46     7.84       1.223        6.52
      6        6.22     8.52       1.168        6.52
      7        5.88    11.58       0.987        6.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     46.00 =     836.13 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.23     6.67       1.337        2.33
      2        2.26     6.82       1.321        2.33
      3        2.37     9.17       1.122        2.33
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     46.00 =     832.81 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.39       6.67        1.337
      2       8.56       6.82        1.321
      3       8.66       6.95        1.307
      4       8.75       7.28        1.274
      5       8.73       7.43        1.260
      6       8.72       7.57        1.247
      7       8.56       7.84        1.223
      8       8.43       8.52        1.168
      9       8.35       9.17        1.122
     10       7.97      11.58        0.987

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.75   Tc(MIN.) =    7.28
  TOTAL AREA(ACRES) =        8.8

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

```
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    68.55   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    7.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =     904.68 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0229
  FLOW LENGTH(FEET) =     4.36   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.30
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =     909.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   222.70   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =    8.32
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     49.00 =    1131.74 FEET.

+----------------------------------------------------------------------+
| INTO EXISTING CATCH BASIN                                            |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0290
  FLOW LENGTH(FEET) =     3.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   6.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.17
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.33
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    1135.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    75.68   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  13.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.69
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     51.00 =    1210.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0250
  FLOW LENGTH(FEET) =     4.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   6.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.71
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.60
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     52.00 =    1214.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0264
  FLOW LENGTH(FEET) =    37.34   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     53.00 =    1252.26 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.8  TC(MIN.) =      8.67
  PEAK FLOW RATE(CFS)   =       8.75
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1        8.39       8.07
  2        8.56       8.22
  3        8.66       8.35
  4        8.75       8.67
  5        8.73       8.82
  6        8.72       8.96
  7        8.56       9.24
  8        8.43       9.92
  9        8.35      10.57
 10        7.97      13.01
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

FF
```

```
**************************************************************************
           RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM BASED ON
        RIVERSIDE COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT
                    (RCFC&WCD)  1978 HYDROLOGY MANUAL
         (c) Copyright 1982-2016 Advanced Engineering Software (aes)
                    (Rational Tabling Version 23.0)
                Release Date: 07/01/2016  License ID 1681

                          Analysis prepared by:

                              KHR Associates
                            17530 Von Karman Avenue
                                Irvine, CA 92626


 ************************* DESCRIPTION OF STUDY *************************
* Independence at Canyon Springs                                        *
* Post-development Hydrology                                            *
* 2-Year Storm Event                                                    *
 ************************************************************************

  FILE NAME: LMCR-PSD.DAT
  TIME/DATE OF STUDY: 11:23 08/01/2025
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =    2.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   4.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  10-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  2.140
  10-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  0.800
  100-YEAR STORM 10-MINUTE INTENSITY(INCH/HOUR) =  3.210
  100-YEAR STORM 60-MINUTE INTENSITY(INCH/HOUR) =  1.200
  SLOPE OF 10-YEAR INTENSITY-DURATION CURVE =  0.5491525
  SLOPE OF 100-YEAR INTENSITY-DURATION CURVE =  0.5491524
  COMPUTED RAINFALL INTENSITY DATA:
  STORM EVENT =    2.00   1-HOUR INTENSITY(INCH/HOUR) =   0.520
  SLOPE OF INTENSITY DURATION CURVE = 0.5492
  RCFC&WCD HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: CONSIDER ALL CONFLUENCE STREAM COMBINATIONS
        FOR ALL DOWNSTREAM ANALYSES
  *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

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
```

```
    1. Relative Flow-Depth =  0.00 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.*

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   151.05
  UPSTREAM ELEVATION(FEET) =    575.72
  DOWNSTREAM ELEVATION(FEET) =    573.33
  ELEVATION DIFFERENCE(FEET) =      2.39
  TC = 0.323*[(  151.05**3)/(     2.39)]**.2 =    5.503
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.933
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8574
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.02
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      1.02

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0150
  FLOW LENGTH(FEET) =     5.00   MANNING'S N =  0.009
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.18
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     156.05 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0181
  FLOW LENGTH(FEET) =   142.15   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   3.7 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.02
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =    5.89
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     298.20 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   151.07
  UPSTREAM ELEVATION(FEET) =    572.96
  DOWNSTREAM ELEVATION(FEET) =    570.79
  ELEVATION DIFFERENCE(FEET) =      2.17
  TC = 0.323*[(  151.07**3)/(     2.17)]**.2 =    5.611
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.912
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8571
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.99
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      0.99

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      4.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0815
  FLOW LENGTH(FEET) =     8.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.13
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.99
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.62
```

```
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =     159.57 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.99     5.62       1.910        0.61
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      4.00 =     159.57 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.02     5.89       1.862        0.61
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =     298.20 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.96       5.62        1.910
      2       1.99       5.89        1.862

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.99   Tc(MIN.) =    5.89
  TOTAL AREA(ACRES) =        1.2

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.10 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0181
  FLOW LENGTH(FEET) =    64.06   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   4.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.52
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.03
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.10 =     362.26 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      4.10 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    64.12   MANNING'S N =  0.009
  DEPTH OF FLOW IN  10.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.99
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.21
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     426.38 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   156.28
  UPSTREAM ELEVATION(FEET) =    570.33
  DOWNSTREAM ELEVATION(FEET) =    567.75
  ELEVATION DIFFERENCE(FEET) =      2.58
  TC = 0.323*[(  156.28**3)/(     2.58)]**.2 =    5.531
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.927
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8573
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
================================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.927
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8573
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.42
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.00
  TC(MIN.) =    5.53

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      7.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =    17.50   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.01
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.00
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    5.63
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE      7.00 =     173.78 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.00     5.63       1.909        0.60
  LONGEST FLOWPATH FROM NODE      8.00 TO NODE      7.00 =     173.78 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.96     5.94       1.852        1.22
      2        1.99     6.21       1.808        1.22
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      7.00 =     426.38 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.86       5.63        1.909
      2       2.93       5.94        1.852
      3       2.93       6.21        1.808
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.93   Tc(MIN.) =    5.94
  TOTAL AREA(ACRES) =        1.8

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      7.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    47.85   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.93
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.10
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =     474.23 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   345.49
  UPSTREAM ELEVATION(FEET) =    574.97
  DOWNSTREAM ELEVATION(FEET) =    568.23
  ELEVATION DIFFERENCE(FEET) =      6.74
  TC = 0.323*[(  345.49**3)/(     6.74)]**.2 =    7.347
```

```
   2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.649
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8520
 SOIL CLASSIFICATION IS "C"
 SUBAREA RUNOFF(CFS) =      0.53
 TOTAL AREA(ACRES) =      0.38   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
 FLOW PROCESS FROM NODE     12.00 TO NODE     10.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0100
 FLOW LENGTH(FEET) =     4.29   MANNING'S N =  0.009
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.31
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.53
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.36
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     10.00 =     349.78 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        0.53     7.36       1.647        0.38
 LONGEST FLOWPATH FROM NODE     11.00 TO NODE     10.00 =     349.78 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        2.86     5.79       1.880        1.82
     2        2.93     6.10       1.826        1.82
     3        2.93     6.37       1.784        1.82
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =     474.23 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1       3.27       5.79        1.880
     2       3.37       6.10        1.826
     3       3.39       6.37        1.784
     4       3.23       7.36        1.647

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       3.39   Tc(MIN.) =    6.37
  TOTAL AREA(ACRES) =        2.2

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     13.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    60.46   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.90
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.39
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    6.57
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     13.00 =     534.69 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.753
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8541
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    0.88
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       4.27
  TC(MIN.) =    6.57

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    78.75   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.15
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.27
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    6.83
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =     613.44 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.58
  UPSTREAM ELEVATION(FEET) =    570.24
  DOWNSTREAM ELEVATION(FEET) =    567.49
  ELEVATION DIFFERENCE(FEET) =      2.75
  TC = 0.323*[(  245.58**3)/(     2.75)]**.2 =    7.162
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.672
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8525
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     14.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0319
  FLOW LENGTH(FEET) =     7.77   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   1.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.62
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.28
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.19
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.00 =     253.35 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  11
----------------------------------------------------------------------------
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.28     7.19       1.669        0.19
  LONGEST FLOWPATH FROM NODE     15.00 TO NODE     14.00 =     253.35 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.20     6.25       1.802        2.79
      2        4.27     6.56       1.754        2.79
      3        4.27     6.83       1.716        2.79
      4        4.05     7.83       1.592        2.79
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     14.00 =     613.44 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       4.44       6.25        1.802
      2       4.53       6.56        1.754
      3       4.53       6.83        1.716
      4       4.43       7.19        1.669
      5       4.31       7.83        1.592

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.53   Tc(MIN.) =    6.83
  TOTAL AREA(ACRES) =        3.0

********************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  12
--------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     17.00 IS CODE =  41
--------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
================================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    67.22   MANNING'S N =  0.010
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.53
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    7.04
```

```
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     17.00 =     680.66 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.688
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8528
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.47
 TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       5.00
 TC(MIN.) =    7.04

****************************************************************************
 FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 REPRESENTATIVE SLOPE =  0.0050
 FLOW LENGTH(FEET) =   112.47   MANNING'S N =  0.010
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.31
 GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.00
 PIPE TRAVEL TIME(MIN.) =   0.35    Tc(MIN.) =    7.40
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     18.00 =     793.13 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.643
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8519
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    0.47
 TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       5.47
 TC(MIN.) =    7.40
 ** PEAK FLOW RATE TABLE **
 STREAM   RUNOFF       Tc
 NUMBER    (CFS)     (MIN.)
    1        5.43       6.82
    2        5.49       7.13
    3        5.47       7.40
    4        5.34       7.76
    5        5.18       8.40
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =       5.49  Tc(MIN.) =    7.13
```

```
+----------------------------------------------------------------------------+
| INTO MWS UNIT                                                              |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0617
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.37
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.49
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     19.00 =     836.13 FEET.

+----------------------------------------------------------------------------+
| INTO DETENTION TANK                                                        |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
          ASSUMED INITIAL SUBAREA UNIFORM
          DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   308.13
  UPSTREAM ELEVATION(FEET) =    572.22
```

```
  DOWNSTREAM ELEVATION(FEET) =    567.97
  ELEVATION DIFFERENCE(FEET) =      4.25
  TC = 0.323*[(  308.13**3)/(     4.25)]**.2 =    7.522
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.628
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8516
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.03
  TOTAL AREA(ACRES) =      0.74   TOTAL RUNOFF(CFS) =      1.03

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0130
  FLOW LENGTH(FEET) =    49.20   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.74
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       1.03
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    7.70
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =     357.33 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.607
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8511
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.54
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       1.57
  TC(MIN.) =    7.70

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   170.87   MANNING'S N =  0.009
  DEPTH OF FLOW IN   8.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.54
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.57
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    8.21
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     528.20 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   117.24
  UPSTREAM ELEVATION(FEET) =    567.99
  DOWNSTREAM ELEVATION(FEET) =    566.85
  ELEVATION DIFFERENCE(FEET) =      1.14
  TC = 0.323*[(  117.24**3)/(     1.14)]**.2 =    5.481
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.937
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8575
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0288
  FLOW LENGTH(FEET) =     7.29   MANNING'S N =  0.009
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.07
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    5.50
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     124.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     23.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    62.88   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.09
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    5.84
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     23.00 =     187.41 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.44     5.84       1.870        0.26
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     23.00 =     187.41 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.57     8.21       1.551        1.14
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =     528.20 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       1.56       5.84        1.870
      2       1.94       8.21        1.551

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.94   Tc(MIN.) =    8.21
  TOTAL AREA(ACRES) =        1.4

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     27.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    20.25   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.62
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.94
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.28
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     27.00 =     548.45 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.544
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8497
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.36
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       2.30
  TC(MIN.) =    8.28

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     30.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0050
  FLOW LENGTH(FEET) =    73.72   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.30
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    8.54
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     30.00 =     622.17 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.518
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8491
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.18
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       2.48
  TC(MIN.) =    8.54
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.38
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    8.71
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     687.17 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   207.00
  UPSTREAM ELEVATION(FEET) =    567.07
  DOWNSTREAM ELEVATION(FEET) =    563.88
  ELEVATION DIFFERENCE(FEET) =      3.19
  TC = 0.323*[(  207.00**3)/(     3.19)]**.2 =    6.275
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.798
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8550
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     31.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

```
==============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        0.78      6.28       1.798        0.50
  LONGEST FLOWPATH FROM NODE     32.00 TO NODE     31.00 =     207.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY     AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.21      6.36       1.785        1.82
      2        2.48      8.71       1.502        1.82
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =     687.17 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       2.96       6.28        1.798
      2       2.99       6.36        1.785
      3       3.13       8.71        1.502

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.13   Tc(MIN.) =    8.71
  TOTAL AREA(ACRES) =        2.3

******************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  12
------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==============================================================================

******************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     34.00 IS CODE =  41
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
==============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.13
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.77
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     34.00 =     710.17 FEET.

+------------------------------------------------------------------------------+
| INTO MWS UNIT                                                                |
|                                                                              |
```

```
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    16.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.13
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     35.00 =     726.17 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =   106.64   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.73
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.13
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =    9.07
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     36.00 =     832.81 FEET.

+----------------------------------------------------------------------------+
| INTO DETENTION TANK                                                        |
|                                                                            |
|                                                                            |
+----------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =  22
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  USER SPECIFIED Tc(MIN.) =    5.000
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.037
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8591
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.45   TOTAL RUNOFF(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   144.00   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.83
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.78
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    5.85
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     38.00 =     250.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.869
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8563
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    0.72
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       1.51
  TC(MIN.) =    5.85

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   144.00   MANNING'S N =  0.009
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.51
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =    6.57
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     39.00 =     394.64 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     39.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.754
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8542
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    0.68
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       2.18
  TC(MIN.) =    6.57

****************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0025
  FLOW LENGTH(FEET) =   132.82   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.60
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.18
  PIPE TRAVEL TIME(MIN.) =   0.61    Tc(MIN.) =    7.18
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     40.00 =     527.46 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
============================================================================
         ASSUMED INITIAL SUBAREA UNIFORM
         DEVELOPMENT IS APARTMENT
  TC = K*[(LENGTH**3)/(ELEVATION CHANGE)]**.2
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   654.03
  UPSTREAM ELEVATION(FEET) =    568.15
  DOWNSTREAM ELEVATION(FEET) =    563.11
  ELEVATION DIFFERENCE(FEET) =      5.04
  TC = 0.323*[(  654.03**3)/(     5.04)]**.2 =   11.420
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.294
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8430
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.42
  TOTAL AREA(ACRES) =      1.31   TOTAL RUNOFF(CFS) =      1.42

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =     9.76   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.51
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.42
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =     663.79 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     2 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.292
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8430
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.24
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       1.66
  TC(MIN.) =   11.45

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    13.74   MANNING'S N =  0.009
```

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.74
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.66
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.49
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =     677.53 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.66    11.49       1.290        1.53
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =     677.53 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.18     7.18       1.669        1.35
  LONGEST FLOWPATH FROM NODE     37.00 TO NODE     44.00 =     527.46 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.23       7.18        1.669
      2       3.35      11.49        1.290

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.35   Tc(MIN.) =   11.49
  TOTAL AREA(ACRES) =        2.9

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

+--------------------------------------------------------------------------+
| INTO MWS UNIT                                                            |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0100
  FLOW LENGTH(FEET) =    34.40   MANNING'S N =  0.009
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   11.57
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =     711.93 FEET.

+--------------------------------------------------------------------------+
| INTO DETENTION TANK                                                      |
|                                                                          |
|                                                                          |
+--------------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        3.23     7.27       1.659        2.88
      2        3.35    11.57       1.285        2.88
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     46.00 =     711.93 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.43     6.87       1.711        3.65
      2        5.49     7.18       1.670        3.65
      3        5.47     7.44       1.637        3.65
      4        5.34     7.80       1.595        3.65
      5        5.18     8.45       1.527        3.65
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     46.00 =     836.13 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       8.48       6.87        1.711
      2       8.67       7.18        1.670
      3       8.67       7.27        1.659
      4       8.66       7.44        1.637
      5       8.45       7.80        1.595
      6       8.15       8.45        1.527
```

```
      7       7.71      11.57        1.285

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.67   Tc(MIN.) =    7.27
  TOTAL AREA(ACRES) =        6.5

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        8.48     6.87       1.711        6.52
      2        8.67     7.18       1.670        6.52
      3        8.67     7.27       1.659        6.52
      4        8.66     7.44       1.637        6.52
      5        8.45     7.80       1.595        6.52
      6        8.15     8.45       1.527        6.52
      7        7.71    11.57       1.285        6.52
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     46.00 =     836.13 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.96     6.64       1.743        2.33
      2        2.99     6.72       1.731        2.33
      3        3.13     9.07       1.469        2.33
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     46.00 =     832.81 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      11.16       6.64        1.743
      2      11.29       6.72        1.731
      3      11.43       6.87        1.711
      4      11.55       7.18        1.670
      5      11.53       7.27        1.659
      6      11.48       7.44        1.637
      7      11.20       7.80        1.595
      8      11.07       8.45        1.527
      9      10.97       9.07        1.469
     10      10.45      11.57        1.285

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.55   Tc(MIN.) =    7.18
  TOTAL AREA(ACRES) =        8.8
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    68.55   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =     904.68 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0229
  FLOW LENGTH(FEET) =     4.36   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS   7.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.02
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     48.00 =     909.04 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =   222.70   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    8.16
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     49.00 =    1131.74 FEET.

+----------------------------------------------------------------------+
| INTO EXISTING CATCH BASIN                                            |
|                                                                      |
|                                                                      |
+----------------------------------------------------------------------+

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0290
  FLOW LENGTH(FEET) =     3.50   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   7.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.96
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     50.00 =    1135.24 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0040
  FLOW LENGTH(FEET) =    75.68   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.96
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    8.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     51.00 =    1210.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0250
```

```
  FLOW LENGTH(FEET) =     4.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.45
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.43
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     52.00 =    1214.92 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  REPRESENTATIVE SLOPE =  0.0264
  FLOW LENGTH(FEET) =    37.34   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.22
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.55
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    8.49
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     53.00 =    1252.26 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.8  TC(MIN.) =      8.49
  PEAK FLOW RATE(CFS)   =      11.55
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       11.16       7.96
  2       11.29       8.04
  3       11.43       8.18
  4       11.55       8.49
  5       11.53       8.58
  6       11.48       8.76
  7       11.20       9.12
  8       11.07       9.77
  9       10.97      10.40
 10       10.45      12.91
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS

FF
```