```
**************************************************************************
           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                                            *
* 10-Year Storm Event                                                   *
 ************************************************************************

  FILE NAME: LMCR-PSD.DAT
  TIME/DATE OF STUDY: 11:22 08/01/2025
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =   10.00
  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 =   10.00   1-HOUR INTENSITY(INCH/HOUR) =   0.808
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.60
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      1.60

****************************************************************************
  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.) =   8.16
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.51
  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   4.9 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.60
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    5.85
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.969
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8698
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      1.56

****************************************************************************
  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   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.39
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.56
  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        1.56     5.62       2.965        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        1.60     5.85       2.902        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       3.11       5.62        2.965
     2       3.13       5.85        2.902

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.13   Tc(MIN.) =    5.85
 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   6.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.35
 GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.13
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    5.97
 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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.75
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.13
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.16
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.992
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.91
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      0.91

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

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.992
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.66
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       1.57
  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   6.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.57
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.62
  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        1.57     5.62       2.967        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        3.11     5.94       2.878        1.22
      2        3.13     6.16       2.820        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       4.51       5.62        2.967
      2       4.63       5.94        2.878
      3       4.63       6.16        2.820
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.63   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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.89
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.63
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.07
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.560
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8659
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.83
  TOTAL AREA(ACRES) =      0.38   TOTAL RUNOFF(CFS) =      0.83

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.24
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.83
  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        0.83     7.36       2.557        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        4.51     5.76       2.927        1.82
      2        4.63     6.07       2.842        1.82
      3        4.63     6.30       2.787        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       5.16       5.76        2.927
      2       5.32       6.07        2.842
      3       5.34       6.30        2.787
```

```
      4       5.08       7.36        2.557

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.34   Tc(MIN.) =    6.30
  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  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.34
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.48
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.742
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8677
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    1.40
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =       6.74
  TC(MIN.) =    6.48

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.74
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    6.72
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.596
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8663
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.44
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
  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   2.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.33
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.18
  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        0.44     7.18       2.592        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        6.63     6.19       2.813        2.79
      2        6.75     6.50       2.738        2.79
      3        6.74     6.72       2.688        2.79
      4        6.37     7.81       2.476        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       7.01       6.19        2.813
      2       7.14       6.50        2.738
      3       7.15       6.72        2.688
      4       6.94       7.18        2.592
      5       6.78       7.81        2.476

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.15   Tc(MIN.) =    6.72
  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
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.83
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.15
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.91
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.647
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8668
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    0.75
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =       7.90
  TC(MIN.) =    6.91

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.44
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.90
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    7.21
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.587
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8662
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    0.75
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =       8.65
  TC(MIN.) =    7.21
  ** PEAK FLOW RATE TABLE **
  STREAM   RUNOFF       Tc
  NUMBER    (CFS)     (MIN.)
     1        8.58       6.68
```

```
     2        8.67       6.98
     3        8.65       7.21
     4        8.39       7.68
     5        8.17       8.32
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =       8.67  Tc(MIN.) =    6.98

+----------------------------------------------------------------------+
| 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   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.15
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.67
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.03
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.527
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8655
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.63
  TOTAL AREA(ACRES) =      0.74   TOTAL RUNOFF(CFS) =      1.63

****************************************************************************
  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   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.17
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       1.63
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    7.68
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.498
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8652
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    0.86
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       2.48
  TC(MIN.) =    7.68

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

```
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.11
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.48
  PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =    8.08
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.007
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8701
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.69
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      0.69

****************************************************************************
  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   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.88
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       0.69
  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   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.50
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.69
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    5.80
  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        0.69      5.80        2.916        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        2.48      8.08        2.430        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       2.47        5.80         2.916
      2       3.06        8.08         2.430

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.06   Tc(MIN.) =    8.08
  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   8.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.07
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.06
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    8.15
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.419
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8643
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       3.63
  TC(MIN.) =    8.15

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.63
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.63
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.41
  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<<<<<
```

```
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.376
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8638
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.29
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       3.93
  TC(MIN.) =    8.41

****************************************************************************
  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   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.93
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    8.57
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.792
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8682
```

```
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.22

****************************************************************************
  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        1.22     6.28       2.792        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        3.51     6.26       2.794        1.82
      2        3.93     8.57       2.353        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       4.74       6.26        2.794
      2       4.74       6.28        2.792
      3       4.96       8.57        2.353

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.96   Tc(MIN.) =    8.57
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.62
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.66
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.28
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.96
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    8.90
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.163
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8713
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.23
  TOTAL AREA(ACRES) =      0.45   TOTAL RUNOFF(CFS) =      1.23

********************************************************************************
  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   5.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.18
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.23
  PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =    5.75
  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<<<<<
================================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.928
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8694
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       2.39
  TC(MIN.) =    5.75
```

```
****************************************************************************
  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   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.39
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    6.41
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.758
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8679
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    1.08
  TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       3.47
  TC(MIN.) =    6.41

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.41
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.47
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    6.92
  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
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.009
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8587
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.25
  TOTAL AREA(ACRES) =      1.31   TOTAL RUNOFF(CFS) =      2.25

****************************************************************************
  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   5.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.25
  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<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.007
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8586
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.38
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       2.63
  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   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.46
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.63
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   11.48
  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        2.63    11.48       2.003        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        3.47     6.92       2.647        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       5.05       6.92        2.647
      2       5.26      11.48        2.003

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.26   Tc(MIN.) =   11.48
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.26
  PIPE TRAVEL TIME(MIN.) =   0.09    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        5.05     7.01       2.628        2.88
      2        5.26    11.57       1.995        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        8.58     6.72       2.688        3.65
      2        8.67     7.03       2.624        3.65
      3        8.65     7.25       2.579        3.65
      4        8.39     7.72       2.491        3.65
      5        8.17     8.36       2.385        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      13.43       6.72        2.688
     2      13.70       7.01        2.628
     3      13.72       7.03        2.624
     4      13.61       7.25        2.579
     5      13.18       7.72        2.491
     6      12.75       8.36        2.385
     7      12.09      11.57        1.995

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.72   Tc(MIN.) =    7.03
 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       13.43     6.72       2.688        6.52
     2       13.70     7.01       2.628        6.52
     3       13.72     7.03       2.624        6.52
     4       13.61     7.25       2.579        6.52
     5       13.18     7.72       2.491        6.52
     6       12.75     8.36       2.385        6.52
     7       12.09    11.57       1.995        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        4.74     6.60       2.716        2.33
     2        4.74     6.61       2.713        2.33
     3        4.96     8.90       2.304        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      17.92       6.60        2.716
     2      17.94       6.61        2.713
     3      18.12       6.72        2.688
     4      18.29       7.01        2.628
     5      18.30       7.03        2.624
```

```
      6      18.11       7.25        2.579
      7      17.52       7.72        2.491
      8      17.41       8.36        2.385
      9      17.28       8.90        2.304
     10      16.38      11.57        1.995

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.30   Tc(MIN.) =    7.03
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.22
  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   9.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.33
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
```

```
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.23
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    7.87
  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   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.40
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.87
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.82
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    8.09
  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   9.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.81
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.09
  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  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.38
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.30
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    8.15
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     53.00 =    1252.26 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        8.8  TC(MIN.) =      8.15
  PEAK FLOW RATE(CFS)   =      18.30
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       17.92       7.74
  2       17.94       7.75
  3       18.12       7.85
  4       18.29       8.13
  5       18.30       8.15
  6       18.11       8.38
  7       17.52       8.89
  8       17.41       9.54
  9       17.28      10.09
```

 10   16.38   12.82
==
==
  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                                            *
* 100-Year Storm Event                                                  *
 ************************************************************************

  FILE NAME: LMCR-PSD.DAT
  TIME/DATE OF STUDY: 11:22 08/01/2025
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  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 =  100.00   1-HOUR INTENSITY(INCH/HOUR) =   1.200
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.456
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8787
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.40
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      2.40

****************************************************************************
  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.) =  12.24
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.51
  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
  ASSUME FULL-FLOWING PIPELINE
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.89
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.40
  PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    5.85
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.409
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8785
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.35
  TOTAL AREA(ACRES) =      0.61   TOTAL RUNOFF(CFS) =      2.35

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       2.35
  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        2.35     5.62       4.404        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        2.40     5.85       4.307        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       4.66       5.62        4.404
      2       4.70       5.85        4.307

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       4.70   Tc(MIN.) =    5.85
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       4.70
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    5.98
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.62
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  10.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.70
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.10
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.444
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8786
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.37
  TOTAL AREA(ACRES) =      0.35   TOTAL RUNOFF(CFS) =      1.37
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.444
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8786
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.25   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.6   TOTAL RUNOFF(CFS) =       2.35
  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   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.35
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.61
  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        2.35     5.61       4.409        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        4.66     5.87       4.300        1.22
      2        4.70     6.10       4.210        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       6.80       5.61        4.409
      2       6.95       5.87        4.300
      3       6.95       6.10        4.210

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.95   Tc(MIN.) =    5.87
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.85
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.95
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.96
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.802
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8755
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.25
  TOTAL AREA(ACRES) =      0.38   TOTAL RUNOFF(CFS) =      1.25

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.25
  PIPE TRAVEL TIME(MIN.) =   0.01    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        1.25      7.36        3.799        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        6.80      5.70        4.369        1.82
      2        6.95      5.96        4.264        1.82
      3        6.95      6.19        4.177        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       7.77       5.70        4.369
      2       7.97       5.96        4.264
      3       8.00       6.19        4.177
      4       7.57       7.36        3.799

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       8.00   Tc(MIN.) =    6.19
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.52
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.00
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.35
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.120
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8772
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.59   SUBAREA RUNOFF(CFS) =    2.13
  TOTAL AREA(ACRES) =        2.8   TOTAL RUNOFF(CFS) =      10.13
  TC(MIN.) =    6.35

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.13
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =    6.51
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.856
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8758
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      0.66
  TOTAL AREA(ACRES) =      0.19   TOTAL RUNOFF(CFS) =      0.66

****************************************************************************
  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   2.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
```

```
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.66
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    7.18
  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        0.66     7.18       3.850        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       10.00     6.02       4.240        2.79
      2       10.14     6.28       4.145        2.79
      3       10.13     6.51       4.065        2.79
      4        9.51     7.69       3.708        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      10.56       6.02        4.240
      2      10.72       6.28        4.145
      3      10.73       6.51        4.065
      4      10.26       7.18        3.850
      5      10.14       7.69        3.708

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.73   Tc(MIN.) =    6.51
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.74
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.73
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.63
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.022
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8767
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.33   SUBAREA RUNOFF(CFS) =    1.15
  TOTAL AREA(ACRES) =        3.3   TOTAL RUNOFF(CFS) =      11.88
  TC(MIN.) =    6.63
  ** PEAK FLOW RATE TABLE **
  STREAM   RUNOFF       Tc
  NUMBER    (CFS)     (MIN.)
     1       11.75       6.15
     2       11.89       6.41
     3       11.88       6.63
     4       11.35       7.31
     5       11.19       7.83
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      11.89  Tc(MIN.) =    6.41

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.89
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    6.60
  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<<<<<
======================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.033
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8767
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.34   SUBAREA RUNOFF(CFS) =    1.19
  TOTAL AREA(ACRES) =        3.6   TOTAL RUNOFF(CFS) =      13.08
  TC(MIN.) =    6.60

+--------------------------------------------------------------------------+
| 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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.65
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.08
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.64
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.753
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8752
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      2.44
  TOTAL AREA(ACRES) =      0.74   TOTAL RUNOFF(CFS) =      2.44

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   2
  PIPE-FLOW(CFS) =       2.44
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    7.65
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.718
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8750
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.40   SUBAREA RUNOFF(CFS) =    1.29
  TOTAL AREA(ACRES) =        1.1   TOTAL RUNOFF(CFS) =       3.73
  TC(MIN.) =    7.65

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.69
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   8.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.73
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    7.92
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.466
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8787
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.04
  TOTAL AREA(ACRES) =      0.26   TOTAL RUNOFF(CFS) =      1.04

****************************************************************************
  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   4.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.53
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  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   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.93
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.04
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.76
  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        1.04     5.76       4.344        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        3.73     7.92       3.648        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       3.76       5.76        4.344
      2       4.61       7.92        3.648

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =       4.61   Tc(MIN.) =    7.92
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.61
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.98
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.634
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8745
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.27   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =        1.7   TOTAL RUNOFF(CFS) =       5.48
  TC(MIN.) =    7.98

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.48
```

```
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    8.15
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.591
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8743
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.14   SUBAREA RUNOFF(CFS) =    0.45
  TOTAL AREA(ACRES) =        1.8   TOTAL RUNOFF(CFS) =       5.92
  TC(MIN.) =    8.15

****************************************************************************
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.54
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.92
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.30
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.146
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8773
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.84
  TOTAL AREA(ACRES) =      0.50   TOTAL RUNOFF(CFS) =      1.84

****************************************************************************
  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        1.84     6.28       4.146        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        5.32     6.20       4.175        1.82
      2        5.92     8.30       3.556        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       7.14       6.20        4.175
      2       7.12       6.28        4.146
      3       7.50       8.30        3.556

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.50   Tc(MIN.) =    8.30
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.50
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    8.34
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.50
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    8.37
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.55
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.50
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    8.55
```

```
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.697
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8796
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      1.85
  TOTAL AREA(ACRES) =      0.45   TOTAL RUNOFF(CFS) =      1.85

****************************************************************************
  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   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.49
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.85
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =    5.69
  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<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.376
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8783
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    1.74
 TOTAL AREA(ACRES) =        0.9   TOTAL RUNOFF(CFS) =       3.59
 TC(MIN.) =    5.69

****************************************************************************
 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
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.57
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.59
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    6.21
 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<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.169
 APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8774
 SOIL CLASSIFICATION IS "C"
 SUBAREA AREA(ACRES) =    0.45   SUBAREA RUNOFF(CFS) =    1.65
 TOTAL AREA(ACRES) =        1.4   TOTAL RUNOFF(CFS) =       5.24
 TC(MIN.) =    6.21

****************************************************************************
 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
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.67
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
```

```
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.24
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.54
  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
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.984
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8699
  SOIL CLASSIFICATION IS "C"
  SUBAREA RUNOFF(CFS) =      3.39
  TOTAL AREA(ACRES) =      1.31   TOTAL RUNOFF(CFS) =      3.39

****************************************************************************
  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   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.39
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.44
  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<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.981
  APARTMENT DEVELOPMENT RUNOFF COEFFICIENT = .8699
  SOIL CLASSIFICATION IS "C"
  SUBAREA AREA(ACRES) =    0.22   SUBAREA RUNOFF(CFS) =    0.57
  TOTAL AREA(ACRES) =        1.5   TOTAL RUNOFF(CFS) =       3.96
  TC(MIN.) =   11.44

****************************************************************************
  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   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.07
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.96
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.48
  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        3.96    11.48       2.976        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        5.24     6.54       4.052        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       7.50       6.54        4.052
```

```
      2       7.81      11.48        2.976

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.81   Tc(MIN.) =   11.48
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.81
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.53
  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        7.50     6.60       4.031        2.88
```

```
     2        7.81    11.53       2.968        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       12.97     6.39       4.104        3.65
      2       13.08     6.64       4.019        3.65
      3       13.05     6.87       3.945        3.65
      4       12.45     7.56       3.744        3.65
      5       12.25     8.07       3.611        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      20.23       6.39        4.104
      2      20.51       6.60        4.031
      3      20.56       6.64        4.019
      4      20.38       6.87        3.945
      5      19.41       7.56        3.744
      6      18.97       8.07        3.611
      7      17.88      11.53        2.968

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.56   Tc(MIN.) =    6.64
  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       20.23     6.39       4.104        6.52
      2       20.51     6.60       4.031        6.52
      3       20.56     6.64       4.019        6.52
      4       20.38     6.87       3.945        6.52
      5       19.41     7.56       3.744        6.52
      6       18.97     8.07       3.611        6.52
      7       17.88    11.53       2.968        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        7.14     6.46       4.080        2.33
```

```
     2        7.12     6.54       4.052        2.33
     3        7.50     8.55       3.498        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      27.29       6.39        4.104
     2      27.24       6.46        4.080
     3      27.44       6.54        4.052
     4      27.59       6.60        4.031
     5      27.62       6.64        4.019
     6      27.32       6.87        3.945
     7      26.04       7.56        3.744
     8      26.05       8.07        3.611
     9      25.88       8.55        3.498
    10      24.25      11.53        2.968

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.62   Tc(MIN.) =    6.64
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    6.77
  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  11.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.64
  GIVEN PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.78
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =    7.20
  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  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.84
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =    7.20
```

```
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.79
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.35
  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  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.18
  GIVEN PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    7.35
  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
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.48
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.62
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.41
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     53.00 =    1252.26 FEET.
============================================================================
  END OF STUDY SUMMARY:
```

```
  TOTAL AREA(ACRES)     =        8.8  TC(MIN.) =      7.41
  PEAK FLOW RATE(CFS)   =      27.62
  *** PEAK FLOW RATE TABLE ***
         Q(CFS)   Tc(MIN.)
  1       27.29       7.17
  2       27.24       7.24
  3       27.44       7.31
  4       27.59       7.37
  5       27.62       7.41
  6       27.32       7.64
  7       26.04       8.37
  8       26.05       8.88
  9       25.88       9.37
 10       24.25      12.40
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FF

Appendix 2.2

Post-Development Hydraulic Calculations: Street and Pipe Hydraulics

On-Site Flow Rates: Surface Runoff (Post-Development Hydrology)

Type	Subarea	Notes	CB No.	Q100	Gutter Width (ft)	Opening Length (ft)		Gutter Elevation	Flowline Elevation	Inlet Elevation
Curb-Opening Inlet	**A1**	*flow-by*	*1*	0.50	1.5	3.50		573.64	573.51	573.33
	A2	*flow-by*	*2*	0.49	1.5	3.50		571.09	570.98	570.79
	A5	*flow-by*	*4*	1.25	1.5	3.50		568.53	568.40	568.23
	A7	*flow-by*	*5*	0.66	1.5	3.50		567.78	567.65	567.48
	A10	*flow-by*	*6*	0.88	1.5	3.50		568.25	568.14	567.97
	A12	*sump*	*7*	0.32	1.5	3.50		566.97	566.85	566.68
	A13	*sump*	*8*	0.22	1.5	3.50		565.80	565.67	565.50
	A14	*flow-by*	*9*	0.45	1.5	3.50		566.45	566.33	566.16
	A15	*flow-by*	*10*	0.88	1.5	3.50		564.21	564.05	563.88
	A20	*sump*	*11*	3.39	1.5	7.00		563.24	563.11	562.94
				Q100	**Gutter Width (ft)**	**Grate Length (ft)**	**Grate Width (ft)**	**Gutter Elevation**	**Flowline Elevation**	**Inlet Elevation**
Grate Inlet	**A3**	*on-grade*	*3*	1.37	3.625	3.45	2.375	567.77	567.66	567.49

									Product of Velocity x Depth (<6)		
Elevation Difference	**Gutter Cross Slope (S_x)**	**Road Cross Slope (S_y)**	**Longitudinal Slope (S)**	**Local Depression (ft)**	**Bypass Flow (i)**		**Q + Bypass Flow (ii)**		Velocity (fps)	Depth (ft)	Product
0.13	0.083	0.035	0.011	0.18	0.02				2.65	0.18	0.46
0.11	0.073	0.022	0.010	0.19	0.03				2.27	0.16	0.36
0.13	0.087	0.012	0.014	0.17	**0.49**	a2>a5	1.28		2.76	0.21	0.58
0.13	0.087	0.005	0.011	0.17	0.12				1.94	0.18	0.34
0.11	0.073	0.045	0.011	0.17	0.19	a1>a10	0.90		2.93	0.20	0.59
0.12	0.080	0.010	0.036	0.17		a10>a12	0.51				0.00
0.13	0.087	0.010	0.024	0.17							0.00
0.12	0.080	0.012	0.010	0.17	0.02				2.12	0.16	0.34
0.16	0.104	0.010	0.021	0.17	0.31	a14>a15	0.90		3.01	0.18	0.53
0.13	0.087	0.005	0.020	0.17		a5+a7>a20	4.00				0.00
Elevation Difference	**Gutter Cross Slope (S_x)**	**Road Cross Slope (S_y)**	**Longitudinal Slope (S)**	**Local Depression (ft)**							
0.11	0.030	0.012	0.013	0.17							

Q100: Curb Inlet On Grade

Label	Efficiency (%)	Curb Opening Length (ft)	Local Depression (in)	Local Depression Width (in)	Discharge (cfs)	Slope (ft/ft)	Gutter Width (ft)	Gutter Cross Slope (ft/ft)
Curb Inlet On Grade - A1	95.43	3.5	2.0	2.0	0.50	0.011	1.50	0.087
Curb Inlet On Grade - A2	93.20	3.5	2.0	2.0	0.49	0.010	1.50	0.073
Curb Inlet On Grade - A5	61.71	3.5	2.0	2.0	1.28	0.014	1.50	0.087
Curb Inlet On Grade - A7	81.93	3.5	2.0	2.0	0.66	0.011	1.50	0.087
Curb Inlet On Grade - A10	78.82	3.5	2.0	2.0	0.90	0.011	1.50	0.073
Curb Inlet On Grade - A15	66.09	3.5	2.0	2.0	0.90	0.021	1.50	0.080
Curb Inlet On Grade - A14	95.31	3.5	2.0	2.0	0.45	0.010	1.50	0.080

Road Cross Slope (ft/ft)	Manning Coefficient	Intercepted Flow (cfs)	Bypass Flow (cfs)	Spread (ft)	Depth (in)	Flow Area (ft^2)	Gutter Depression (in)	Total Depression (in)
0.035	0.013	0.48	0.02	2.7	2.1	0.2	0.9	2.9
0.022	0.013	0.46	0.03	3.8	1.9	0.2	0.9	2.9
0.012	0.013	0.79	0.49	8.0	2.5	0.5	1.4	3.4
0.005	0.013	0.54	0.12	9.9	2.1	0.3	1.5	3.5
0.045	0.013	0.71	0.19	3.5	2.4	0.3	0.5	2.5
0.010	0.013	0.59	0.31	6.6	2.1	0.3	1.3	3.3
0.012	0.013	0.43	0.02	4.8	1.9	0.2	1.2	3.2

Velocity (ft/s)	Equivalent Cross Slope (ft/ft)	Length Factor	Total Interception Length (ft)	Notes
2.65	0.189	0.820	4.3	A1 Bypass flow > A10 Q
2.27	0.162	0.775	4.5	A2 Bypass flow > A5 Q
2.76	0.131	0.413	8.5	A5 Bypass flow > A20 Q

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Q100: Curb Inlet On Grade

Velocity (ft/s)	Equivalent Cross Slope (ft/ft)	Length Factor	Total Interception Length (ft)	Notes
1.94	0.141	0.614	5.7	A7 Bypass flow > A20 Q
2.93	0.159	0.578	6.1	A10 Bypass flow > A12 Q
3.01	0.146	0.452	7.7	A15 Bypass flow > Off-site CB Q
2.12	0.166	0.817	4.3	A14 Bypass flow > A15 Q

Q100: Curb Inlet In Sump

Label	Discharge (cfs)	Spread (ft)	Gutter Width (ft)	Gutter Cross Slope (ft/ft)	Road Cross Slope (ft/ft)	Curb Opening Length (ft)	Opening Height (ft)	Curb Throat Type
Curb Inlet In Sump - A12	0.51	10.9	1.50	0.080	0.010	3.5	0.5	Horizontal
Curb Inlet In Sump - A13	0.22	6.2	1.50	0.087	0.010	3.5	0.5	Horizontal
Curb Inlet In Sump - A20	4.00	24.1	1.50	0.087	0.010	12.0	0.5	Horizontal

Local Depression (in)	Local Depression Width (in)	Throat Incline Angle (degrees)	Depth (in)	Gutter Depression (in)	Total Depression (in)	Notes
2.0	2.0	90.00	2.6	1.3	3.3	+ A10 Bypass flow
2.0	2.0	90.00	2.1	1.4	3.4	
2.0	2.0	90.00	4.3	1.4	3.4	+ A5 & A7 Bypass flows

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Q100: Grate Inlet - A3

Project Description	
Solve For	Spread

Input Data	
Discharge	1.37 cfs
Gutter Width	3.63 ft
Gutter Cross Slope	0.030 ft/ft
Road Cross Slope	0.012 ft/ft
Grate Width	2.38 ft
Grate Length	3.5 ft
Local Depression	2.0 in
Local Depression Width	2.0 in
Grate Type	P-50 mm (P-1 -7/8")
Clogging	50.0 %

Results	
Spread	11.3 ft
Depth	2.4 in
Gutter Depression	0.8 in
Total Depression	2.8 in
Open Grate Area	3.7 ft²
Active Grate Weir Length	5.8 ft

Curb-Gutter **Product of Velocity x Depth (<6)**

Subarea	Gutter No.	Q100	Velocity (fps)	Depth (ft)	Product
A1	*1*	0.50	2.65	0.18	0.46
A2	*2*	0.49	2.27	0.16	0.36
A3	*3*	1.37	2.19	0.20	0.44
A5	*4*	1.25	2.66	0.21	0.55
A7	*5*	0.66	2.12	0.17	0.35
A10	*6*	0.88	3.11	0.19	0.60
A12	*7*	0.32	2.40	0.14	0.34
A13	*8*	0.22	2.44	0.13	0.31
A14	*9*	0.45	2.42	0.15	0.36
A15	*10*	0.88	2.70	0.21	0.56
A20	*11*	3.39	3.01	0.23	0.68

Q100: Curb-Gutter Capacity

Label	Channel Slope (ft/ft)	Discharge (cfs)	Gutter Width (ft)	Gutter Cross Slope (ft/ft)	Road Cross Slope (ft/ft)	Spread (ft)	Manning Coefficient	Flow Area (ft²)	Depth (in)	Gutter Depression (in)	Velocity (ft/s)
Gutter - A1	0.011	0.50	1.5	0.087	0.035	2.7	0.013	0.2	2.1	0.9	2.65
Gutter - A2	0.010	0.49	1.5	0.073	0.022	3.8	0.013	0.2	1.9	0.9	2.27
Gutter - A3	0.013	1.37	1.5	0.087	0.005	14.6	0.013	0.6	2.4	1.5	2.19
Gutter - A5	0.013	1.25	1.5	0.087	0.012	8.0	0.013	0.5	2.5	1.4	2.66
Gutter - A7	0.013	0.66	1.5	0.087	0.005	9.4	0.013	0.3	2.0	1.5	2.12
Gutter - A10	0.013	0.88	1.5	0.073	0.045	3.3	0.013	0.3	2.3	0.5	3.11
Gutter - A12	0.013	0.32	1.5	0.080	0.010	3.3	0.013	0.1	1.7	1.3	2.40
Gutter - A13	0.013	0.22	1.5	0.087	0.010	1.4	0.013	0.1	1.5	1.4	2.44
Gutter - A14	0.013	0.45	1.5	0.080	0.012	4.3	0.013	0.2	1.8	1.2	2.42
Gutter - A15	0.013	0.88	1.5	0.107	0.010	6.6	0.013	0.3	2.5	1.7	2.70
Gutter - A20	0.020	3.39	1.5	0.087	0.005	20.3	0.013	1.1	2.7	1.5	3.01

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Program Package Serial Number: 7379

WATER SURFACE PROFILE LISTING Date: 1- 7-2026 Time: 4:38:54

INDEPENDENCE AT CANYON SPRINGS
HYDRAULIC GRADE LINE
LINE A - 100-YR STORM EVENT

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
100.000	551.060	.487	551.547	4.18	7.66	.91	552.46	.06	.75	1.57	1.750	.000	.00	1 .0
6.299	.0265					.0240	.15	.55	2.29	.48	.013	.00	.00	PIPE
106.299	551.227	.490	551.717	4.18	7.57	.89	552.61	.06	.75	1.57	1.750	.000	.00	1 .0
14.611	.0265					.0221	.32	.55	2.25	.48	.013	.00	.00	PIPE
120.910	551.614	.507	552.121	4.18	7.22	.81	552.93	.05	.75	1.59	1.750	.000	.00	1 .0
7.788	.0265					.0194	.15	.56	2.11	.48	.013	.00	.00	PIPE
128.698	551.821	.525	552.346	4.18	6.88	.74	553.08	.05	.75	1.60	1.750	.000	.00	1 .0
5.118	.0265					.0170	.09	.57	1.97	.48	.013	.00	.00	PIPE
133.817	551.957	.543	552.500	4.18	6.56	.67	553.17	.05	.75	1.62	1.750	.000	.00	1 .0
3.523	.0265					.0149	.05	.59	1.84	.48	.013	.00	.00	PIPE
137.340	552.050	.563	552.613	4.18	6.26	.61	553.22	.00	.75	1.63	1.750	.000	.00	1 .0
JUNCT STR	.0265					.0097	.04	.61	1.72		.013	.00	.00	PIPE
141.340	552.156	.783	552.939	4.18	4.48	.31	553.25	.01	.78	1.50	1.500	.000	.00	1 .0
1.099	.0038					.0051	.01	.80	1.00	.88	.013	.00	.00	PIPE
142.439	552.160	.813	552.973	4.18	4.27	.28	553.26	.01	.78	1.49	1.500	.000	.00	1 .0
8.601	.0038					.0045	.04	.82	.93	.88	.013	.00	.00	PIPE
151.040	552.193	.845	553.038	4.18	4.07	.26	553.30	.01	.78	1.49	1.500	.000	.00	1 .0
20.220	.0038					.0041	.08	.86	.86	.88	.013	.00	.00	PIPE

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INDEPENDENCE AT CANYON SPRINGS
HYDRAULIC GRADE LINE
LINE A - 100-YR STORM EVENT

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
171.260	552.270	.867	553.137	4.18	3.95	.24	553.38	.00	.78	1.48	1.500	.000	.00	1 .0
21.210	.0038					.0039	.08	.87	.82	.88	.013	.00	.00	PIPE
192.470	552.351	.873	553.224	4.18	3.92	.24	553.46	.00	.78	1.48	1.500	.000	.00	1 .0
16.794	.0040					.0039	.07	.87	.81	.86	.013	.00	.00	PIPE
209.264	552.419	.864	553.283	4.18	3.96	.24	553.53	.00	.78	1.48	1.500	.000	.00	1 .0
HYDRAULIC JUMP														
209.264	552.419	.703	553.122	4.18	5.14	.41	553.53	.00	.78	1.50	1.500	.000	.00	1 .0
.346	.0040					.0079	.00	.70	1.23	.86	.013	.00	.00	PIPE
209.610	552.420	.703	553.123	4.18	5.13	.41	553.53	.00	.78	1.50	1.500	.000	.00	1 .0
3.628	.0040					.0084	.03	.70	1.23	.86	.013	.00	.00	PIPE
213.237	552.435	.678	553.113	4.18	5.39	.45	553.56	.00	.78	1.49	1.500	.000	.00	1 .0
3.783	.0040					.0096	.04	.68	1.32	.86	.013	.00	.00	PIPE
217.020	552.450	.654	553.104	4.18	5.65	.50	553.60	.00	.78	1.49	1.500	.000	.00	1 .0
1.963	.0187					.0097	.02	.65	1.41	.55	.013	.00	.00	PIPE
218.983	552.487	.674	553.161	4.18	5.43	.46	553.62	.00	.78	1.49	1.500	.000	.00	1 .0
1.643	.0187					.0086	.01	.67	1.33	.55	.013	.00	.00	PIPE
220.626	552.517	.699	553.216	4.18	5.17	.42	553.63	.00	.78	1.50	1.500	.000	.00	1 .0
1.060	.0187					.0076	.01	.70	1.24	.55	.013	.00	.00	PIPE

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INDEPENDENCE AT CANYON SPRINGS
HYDRAULIC GRADE LINE
LINE A - 100-YR STORM EVENT

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
221.686	552.537	.725	553.262	4.18	4.93	.38	553.64	.00	.78	1.50	1.500	.000	.00	1 .0
.528	.0187					.0067	.00	.73	1.16	.55	.013	.00	.00	PIPE
222.214	552.547	.753	553.300	4.18	4.70	.34	553.64	.00	.78	1.50	1.500	.000	.00	1 .0
.156	.0187					.0059	.00	.75	1.08	.55	.013	.00	.00	PIPE
222.370	552.550	.783	553.333	4.18	4.48	.31	553.64	.00	.78	1.50	1.500	.000	.00	1 .0
1.112	.0038					.0051	.01	.78	1.00	.88	.013	.00	.00	PIPE
223.482	552.554	.813	553.367	4.18	4.27	.28	553.65	.00	.78	1.49	1.500	.000	.00	1 .0
8.786	.0038					.0045	.04	.81	.93	.88	.013	.00	.00	PIPE
232.268	552.588	.845	553.433	4.18	4.07	.26	553.69	.00	.78	1.49	1.500	.000	.00	1 .0
13.632	.0038					.0041	.06	.85	.86	.88	.013	.00	.00	PIPE
245.900	552.640	.861	553.501	4.18	3.98	.25	553.75	.00	.78	1.48	1.500	.000	.00	1 .0
68.582	.0040					.0040	.27	.86	.83	.86	.013	.00	.00	PIPE
314.482	552.914	.863	553.777	4.18	3.97	.25	554.02	.00	.78	1.48	1.500	.000	.00	1 .0
120.213	.0040					.0040	.48	.86	.83	.86	.013	.00	.00	PIPE
434.694	553.395	.863	554.258	4.18	3.97	.25	554.50	.00	.78	1.48	1.500	.000	.00	1 .0
HYDRAULIC JUMP														
434.694	553.395	.691	554.087	4.18	5.26	.43	554.52	.00	.78	1.50	1.500	.000	.00	1 .0
2.494	.0040					.0084	.02	.69	1.27	.86	.013	.00	.00	PIPE

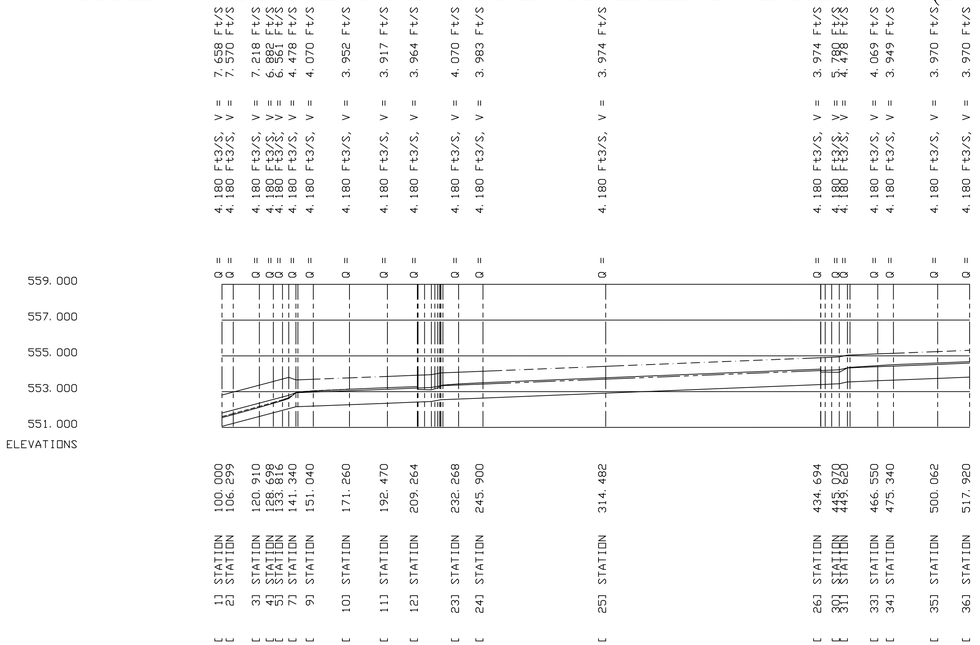
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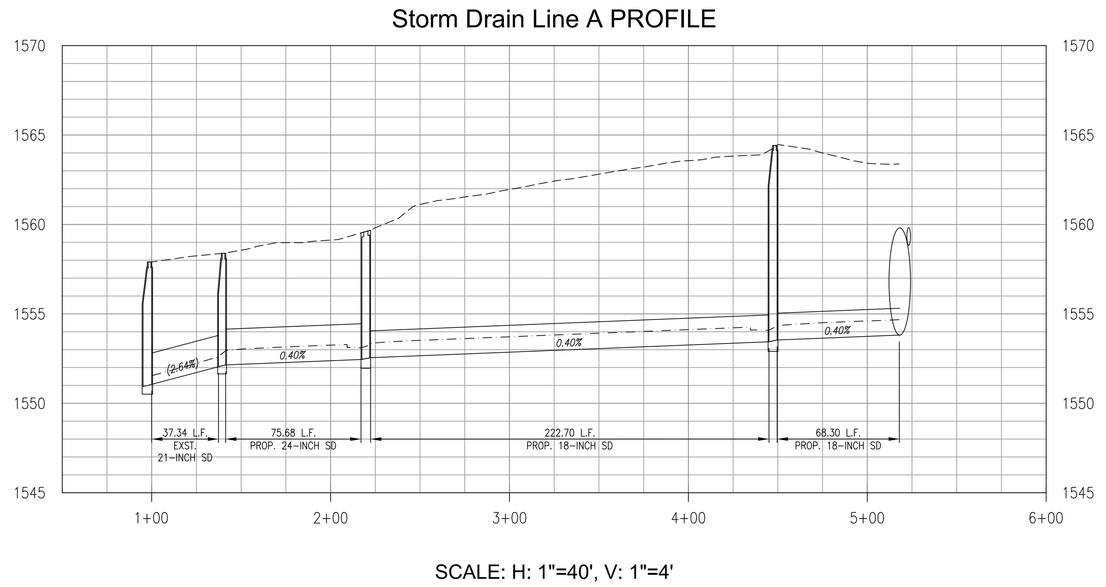
INDEPENDENCE AT CANYON SPRINGS
HYDRAULIC GRADE LINE
LINE A - 100-YR STORM EVENT

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/ Dia.-FT	Base Wt or I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
437.189	553.405	.691	554.096	4.18	5.26	.43	554.53	.00	.78	1.50	1.500	.000	.00	1 .0
3.641	.0040					.0090	.03	.69	1.27	.86	.013	.00	.00	PIPE
440.830	553.420	.666	554.086	4.18	5.51	.47	554.56	.00	.78	1.49	1.500	.000	.00	1 .0
4.240	.0047					.0102	.04	.67	1.36	.82	.013	.00	.00	PIPE
445.070	553.440	.643	554.083	4.18	5.78	.52	554.60	.00	.78	1.48	1.500	.000	.00	1 .0
JUNCT STR	.0220					.0082	.04	.64	1.46		.013	.00	.00	PIPE
449.620	553.540	.783	554.323	4.18	4.48	.31	554.63	.00	.78	1.50	1.500	.000	.00	1 .0
1.451	.0041					.0051	.01	.78	1.00	.85	.013	.00	.00	PIPE
451.071	553.546	.813	554.359	4.18	4.27	.28	554.64	.00	.78	1.49	1.500	.000	.00	1 .0
15.479	.0041					.0045	.07	.81	.93	.85	.013	.00	.00	PIPE
466.550	553.610	.846	554.456	4.18	4.07	.26	554.71	.00	.78	1.49	1.500	.000	.00	1 .0
8.790	.0034					.0041	.04	.85	.86	.91	.013	.00	.00	PIPE
475.340	553.640	.867	554.507	4.18	3.95	.24	554.75	.00	.78	1.48	1.500	.000	.00	1 .0
24.722	.0040					.0039	.10	.87	.82	.86	.013	.00	.00	PIPE
500.062	553.739	.863	554.602	4.18	3.97	.24	554.85	.00	.78	1.48	1.500	.000	.00	1 .0
17.858	.0040					.0040	.07	.86	.83	.86	.013	.00	.00	PIPE
517.920	553.810	.863	554.673	4.18	3.97	.24	554.92	.00	.78	1.48	1.500	.000	.00	1 .0

WATER SURFACE PRESSURE GRADIENT ANALYSIS (PLAN & PROFILE)



NOTE:
ELEVATIONS +1,000 FT.



SCALE: H: 1"=40', V: 1"=4'

NOTE:

FINAL STORM DRAIN PLAN & PROFILE WILL BE PROVIDED ON CDs PHASE.

INDEPENDENCE AT CANYON SPRINGS

LS BTR DEVELOPMENT, LLC

RIVERSIDE, CALIFORNIA

KHR ASSOCIATES
CONSULTING ENGINEERS/SURVEYORS/PLANNERS
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