PRELIMINARY HYDROLOGY ANALYSIS FOR TENTATIVE TRACT 16466

Shea Properties/Baker Ranch

City of Lake Forest

PREPARED FOR:

SHEA PROPERTIES, INC.

130 VANTIS, SUITE 200

ALISO VIEJO, CA 92656

(949) 389-7116

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.

3 HUGHES

IRVINE, CA 92618

(949) 583-1p010

MARCH 09, 2011

W.O. #0789-26X

HYDROLOGY ANALYSIS

for

TENTATIVE TRACT 16466

Shea Properties/Baker Ranch

City of Lake Forest

PREPARED UNDER THE SUPERVISION OF:

Tu Trinh, R.C.E. 71555 Exp. 12/31/11 Date

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SECTION 1

PROJECT LOCATION

The project site is Tentative Tract Map (T.T.M.) 16466, known as Baker Ranch, in the City of Lake Forest (see attached Vicinity Map). The site is bordered on the south by Bake Parkway, on the southwest by Commercentre Drive, on the northwest by Borrego Channel, and on the northeast by Foothill Transportation Corridor.

STUDY PURPOSE

This hydrology report is to only support the submittal of an updated T.T.M. 16466 and is subject to change in the final design.

In August 2010 the City of Lake Forest and its Consultant Engineering firm, Willdan, have approved a hydrology study for an early version of the T.T.M. 16466 and a hydraulic study for the extension of Alton Parkway. In these reports, per Willdan's request, we have made an assumption in which all soil type "D" was used for the proposed condition and all soil type "A" was used for the existing condition, to be conservative, and proved that the proposed retention basin has enough capacity to retain the excess flows produced in the 100-year storm.

A more detailed hydrology and hydraulic studies will be submitted at a later time to support the submittal of a Rough Grading Plan and a Storm Drain Improvement Plan.

METHODOLOGY

The methodology used to determine the peak discharges for T.T. 16466 is based upon the criteria set forth in the *Orange County Flood Control District Hydrology Manual* dated 1986 as incorporated in the Advanced Engineering Software (AES) "RATSC" Program. The hydrologic soil types were determined from the Hydrologic Classification of Soils map contained in the *Orange County Hydrology Manual.*

The results of the study and the hydrological calculations are presented in this report.

DISCUSSION

In the proposed condition, the site consists of five drainage areas. Each area has been tabled for a 25-year peak discharge.

AREA (acre)

AREA	EX. COND.	APPROVED COND.	PROPOSED COND.	FACILITY
A	65.4	50.2	49.2	F19P11, 48" RCP
B	121.3	91.4	90.5	EX. SWALE
C	189.0	233.1	227.2	BORREGO CHANNEL
D	0.9	0.5	0.6	24" LINE "L"
E	9.3	2.0	6.0	F19P06, 90" RCP

25-YEAR STORM RUNOFF cfs)

AREA	EXIST. COND.	APP'D COND.	PRO. COND.	FACILITY
A	132.0	131.1	130.3	F19P11, 48" RCP
B	210.5	228.7	198.5	EX. SWALE
C	308.4	579.0	555.9	BORREGO CHANNEL
D	2.2	1.8	2.1	24" LINE "L"
E	22.2	6.6	15.4	F19P06, 90" RCP

In the proposed condition, approximately 130.3cfs is produced from drainage area "A" at node 36. This proposed runoff is conveyed to an existing 48" RCP constructed per the approved O.C.E.M.A. improvement plans for Facility No. F19P11, prepared by R.B.F., and then eventually drains to Serrano Creek.

Approximately 198.5cfs is produced from drainage area "B" at node 69 in the developed condition. This proposed runoff is conveyed to a proposed 48" RCP storm drain, line "E", designed by R.B.F. with a capacity of 258cfs.

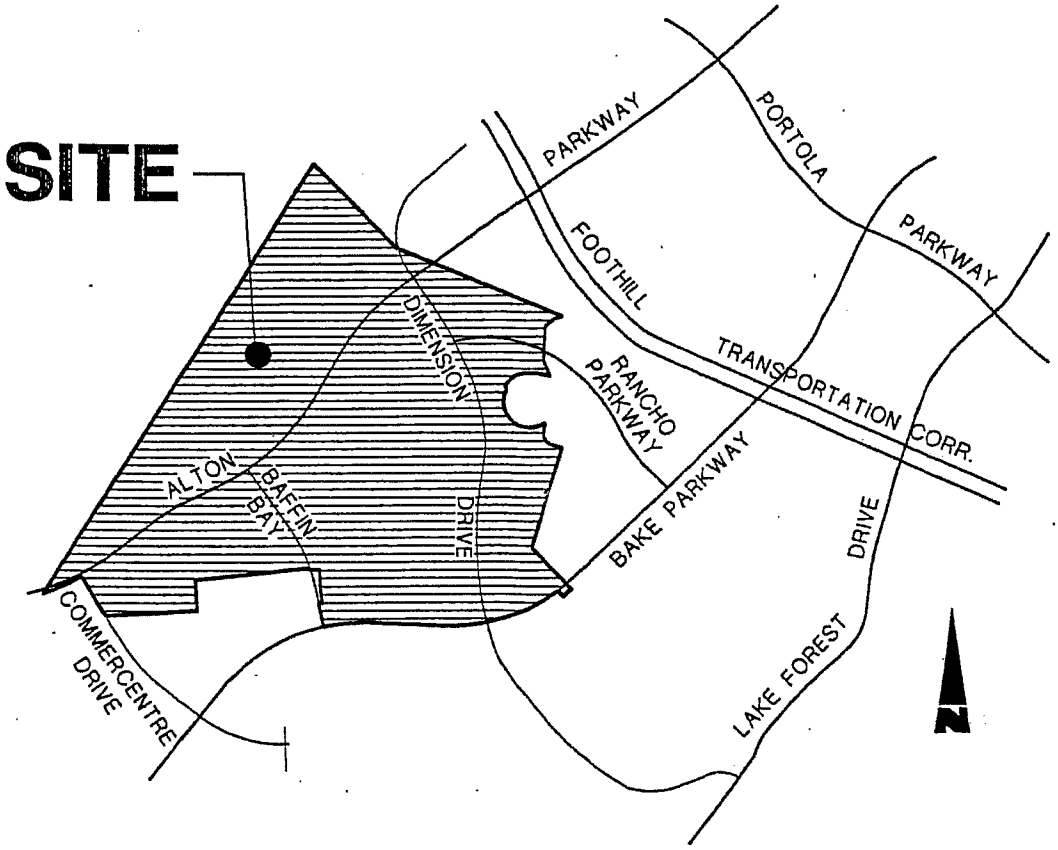
Approximately 555.9cfs is produced from drainage area "C" at node 166. This proposed runoff is conveyed by a proposed storm drain system to a proposed retention basin to retain the excess flow to the existing level or below, which is 308.4cfs, before discharged into Borrego Canyon Wash.

Approximately 2.1cfs is produced from drainage area "D" at node 52. This proposed storm runoff is conveyed to an existing 24" RCP, Line "L", constructed per the approved improvement plan for Bake Parkway, prepared by R.B.F., and then eventually drains to Serrano Creek.

Approximately 6.6cfs is produced from drainage area "E" at node 66 in the developed condition. This proposed runoff is conveyed to an existing 90" RCP constructed per the approved O.C.E.M.A. improvement plans for Facility No.F19P06, prepared by R.B.F., and then eventually drains to Serrano Creek.

Low flows and dry weather flows produced from areas "B" and "C" will be treated at the proposed water quality/detention basin. Low flows and dry weather flows produced from areas "A", "D" and "E" will be treated with other treatment units to the satisfaction of the City of Lake Forest.

VICINITY MAP



SECTION 2

EXISTING CONDITION

AREA 'A'

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
                 (Reference: 1986 OCEMA HYDROLOGY CRITERION)
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              Ver. 8.0  Release Date: 01/01/2001  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                               Irvine, Inc.
                     Planning * Engineering * Surveying
            Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26X, BAKER RANCH EXISTING                                    *
* 25-YR STUDY                                                            *
* AREA 'A'                                                               *
 ************************************************************************

  FILE NAME: PRE-A.DAT
  TIME/DATE OF STUDY: 17:04 03/30/2010
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                      --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   22.0     17.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  2   32.0     27.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  3   42.0     37.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  4   43.0     38.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  5   53.0     48.0    0.017/0.017/0.020   0.67    1.83 0.0312 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    854.00  DOWNSTREAM(FEET) =    805.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.932
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.271
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "GRASS"                     C        1.60      0.25      1.00    79    9.93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA RUNOFF(CFS) =      4.35
  TOTAL AREA(ACRES) =      1.60   PEAK FLOW RATE(CFS) =      4.35

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    805.00  DOWNSTREAM(FEET) =    770.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.1167
  CHANNEL FLOW THRU SUBAREA(CFS) =      4.35
  FLOW VELOCITY(FEET/SEC) =   3.12 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =  11.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =   600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        4.80      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =     4.80      SUBAREA RUNOFF(CFS) =   11.97
  EFFECTIVE AREA(ACRES) =     6.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     6.40       PEAK FLOW RATE(CFS) =      15.96

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
ELEVATION DATA: UPSTREAM(FEET) =    770.00  DOWNSTREAM(FEET) =    720.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   800.00   CHANNEL SLOPE =  0.0625
CHANNEL FLOW THRU SUBAREA(CFS) =     15.96
FLOW VELOCITY(FEET/SEC) =   7.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   1.89   Tc(MIN.) =  13.42
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =  1400.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  13.42
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.766
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"GRASS"                     C       21.20      0.25      1.00    79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
SUBAREA AREA(ACRES) =   21.20      SUBAREA RUNOFF(CFS) =   48.01
EFFECTIVE AREA(ACRES) =    27.60   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    27.60       PEAK FLOW RATE(CFS) =      62.51

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    720.00  DOWNSTREAM(FEET) =    695.20
CHANNEL LENGTH THRU SUBAREA(FEET) =  1030.00   CHANNEL SLOPE =  0.0241
CHANNEL FLOW THRU SUBAREA(CFS) =     62.51
FLOW VELOCITY(FEET/SEC) =   6.41 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   2.68   Tc(MIN.) =  16.10
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =  2430.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  16.10
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.493
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"GRASS"                     C       37.80      0.25      1.00    79
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
SUBAREA AREA(ACRES) =   37.80      SUBAREA RUNOFF(CFS) =   76.30
EFFECTIVE AREA(ACRES) =    65.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =    65.40       PEAK FLOW RATE(CFS) =     132.02
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =     65.40  TC(MIN.) =     16.10
EFFECTIVE AREA(ACRES) =     65.40  AREA-AVERAGED Fm(INCH/HR)=  0.25
AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
PEAK FLOW RATE(CFS)    =    132.02
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

AREA 'B'

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                               Irvine, Inc.
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26X, BAKER RANCH EXISTING                                    *
* 25-YR STUDY                                                            *
* AREA 'B'                                                               *
 ************************************************************************

  FILE NAME: PRE-B.DAT
  TIME/DATE OF STUDY: 15:01 08/25/2010
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   22.0     17.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  2   32.0     27.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  3   42.0     37.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  4   43.0     38.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  5   53.0     48.0    0.017/0.017/0.020   0.67    1.83 0.0312 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    784.00  DOWNSTREAM(FEET) =    775.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.939
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.700
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "GRASS"                     C        0.50      0.25      1.00    79   13.94
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA RUNOFF(CFS) =      1.10
  TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      1.10

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    745.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   440.00   CHANNEL SLOPE =  0.0682
  CHANNEL FLOW THRU SUBAREA(CFS) =      1.10
  FLOW VELOCITY(FEET/SEC) =   3.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.84   Tc(MIN.) =  15.78
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =   740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  15.78
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.522
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        1.90      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =     1.90      SUBAREA RUNOFF(CFS) =     3.88
  EFFECTIVE AREA(ACRES) =     2.40   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     2.40       PEAK FLOW RATE(CFS) =       4.91

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    745.00  DOWNSTREAM(FEET) =    700.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.1406
  NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.91
  FLOW VELOCITY(FEET/SEC) =   6.64 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.80   Tc(MIN.) =  16.58
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =  1060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  16.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.451
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        3.90      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =     3.90      SUBAREA RUNOFF(CFS) =     7.73
  EFFECTIVE AREA(ACRES) =      6.30   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =      6.30       PEAK FLOW RATE(CFS) =      12.48

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    700.00  DOWNSTREAM(FEET) =    690.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   320.00   CHANNEL SLOPE =  0.0309
  CHANNEL FLOW THRU SUBAREA(CFS) =      12.48
  FLOW VELOCITY(FEET/SEC) =   4.65 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.15   Tc(MIN.) =  17.73
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =  1380.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  17.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.355
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        8.80      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =     8.80      SUBAREA RUNOFF(CFS) =    16.67
  EFFECTIVE AREA(ACRES) =    15.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     15.10       PEAK FLOW RATE(CFS) =      28.60

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   690.10  DOWNSTREAM(FEET) =   635.90
  FLOW LENGTH(FEET) =  1430.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.35
  GIVEN PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.60
  PIPE TRAVEL TIME(MIN.) =   1.66    Tc(MIN.) =  19.39
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =  2810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  19.39
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.242
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                   B       12.40      0.30      0.10    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.10
  SUBAREA AREA(ACRES) =    12.40      SUBAREA RUNOFF(CFS) =    24.68
  EFFECTIVE AREA(ACRES) =     27.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =     27.50       PEAK FLOW RATE(CFS) =      51.75

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.90  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0628
  CHANNEL BASE(FEET) =     5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      51.75
  FLOW VELOCITY(FEET/SEC) =   9.19   FLOW DEPTH(FEET) =   0.84
  TRAVEL TIME(MIN.) =   1.90   Tc(MIN.) =  21.29
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     17.00 =  3860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN) =  21.29
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.128
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C       14.50      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =   14.50      SUBAREA RUNOFF(CFS) =   24.50
  EFFECTIVE AREA(ACRES) =    42.00   AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =    42.00       PEAK FLOW RATE(CFS) =      73.43

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  21.29
  RAINFALL INTENSITY(INCH/HR) =   2.13
  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  0.73
  EFFECTIVE STREAM AREA(ACRES) =   42.00
  TOTAL STREAM AREA(ACRES) =   42.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     73.43

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    809.00  DOWNSTREAM(FEET) =    748.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.506
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.373
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "GRASS"                     C        1.10      0.25      1.00    79    9.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA RUNOFF(CFS) =       3.09
  TOTAL AREA(ACRES) =       1.10   PEAK FLOW RATE(CFS) =       3.09

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  53
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL MOUNTAIN CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    748.00  DOWNSTREAM(FEET) =    715.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.1100
  CHANNEL FLOW THRU SUBAREA(CFS) =       3.09
  FLOW VELOCITY(FEET/SEC) =   2.70 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.85   Tc(MIN.) =  11.36
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =   600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  11.36
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.049
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        3.00      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.56
  EFFECTIVE AREA(ACRES) =     4.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     4.10       PEAK FLOW RATE(CFS) =      10.33

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    677.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   510.00   CHANNEL SLOPE =  0.0745
  CHANNEL FLOW THRU SUBAREA(CFS) =      10.33
  FLOW VELOCITY(FEET/SEC) =   6.88 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.24   Tc(MIN.) =  12.59
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     24.00 =  1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  12.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.860
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        6.50      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =    6.50      SUBAREA RUNOFF(CFS) =   15.27
```

```
  EFFECTIVE AREA(ACRES) =     10.60   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     10.60       PEAK FLOW RATE(CFS) =      24.90

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    677.00  DOWNSTREAM(FEET) =    635.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.0350
  CHANNEL FLOW THRU SUBAREA(CFS) =     24.90
  FLOW VELOCITY(FEET/SEC) =   5.95 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =  15.95
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     25.00 =  2310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  15.95
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.506
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C       22.50      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =   22.50       SUBAREA RUNOFF(CFS) =   45.69
  EFFECTIVE AREA(ACRES) =    33.10   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    33.10       PEAK FLOW RATE(CFS) =      67.21

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     17.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    635.00  DOWNSTREAM(FEET) =    570.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1920.00   CHANNEL SLOPE =  0.0339
  CHANNEL FLOW THRU SUBAREA(CFS) =     67.21
  FLOW VELOCITY(FEET/SEC) =   7.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.12   Tc(MIN.) =  20.07
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     17.00 =  4230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  20.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.196
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C       46.20      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =   46.20       SUBAREA RUNOFF(CFS) =   80.91
  EFFECTIVE AREA(ACRES) =    79.30   AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =    79.30       PEAK FLOW RATE(CFS) =     138.87

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  20.07
  RAINFALL INTENSITY(INCH/HR) =   2.20
  AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =   79.30
  TOTAL STREAM AREA(ACRES) =   79.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    138.87

  ** CONFLUENCE DATA **
   STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER   (CFS)  (MIN.) (INCH/HR)  (INCH/HR)        (ACRES)    NODE
      1     73.43  21.29    2.128  0.25( 0.19) 0.73    42.0      11.00
      2    138.87  20.07    2.196  0.25( 0.25) 1.00    79.3      21.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM     Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER   (CFS)  (MIN.) (INCH/HR)  (INCH/HR)        (ACRES)    NODE
      1    210.54  20.07    2.196  0.25( 0.23) 0.91   118.9      21.00
      2    207.45  21.29    2.128  0.25( 0.23) 0.91   121.3      11.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    210.54    Tc(MIN.) =    20.07
  EFFECTIVE AREA(ACRES) =   118.90   AREA-AVERAGED Fm(INCH/HR) =  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.91
  TOTAL AREA(ACRES) =    121.30
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     17.00 =  4230.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    121.30  TC(MIN.) =     20.07
  EFFECTIVE AREA(ACRES) =    118.90  AREA-AVERAGED Fm(INCH/HR)=  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.91
  PEAK FLOW RATE(CFS)    =    210.54
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	210.54	20.07	2.196	0.25(0.23)	0.91	118.9	21.00
2	207.45	21.29	2.128	0.25(0.23)	0.91	121.3	11.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

AREA 'C'

```
****************************************************************************
              RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
                 (Reference: 1986 OCEMA HYDROLOGY CRITERION)
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              Ver. 8.0  Release Date: 01/01/2001  License ID 1239

                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                                Irvine, Inc.
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26X, BAKER RANCH EXISTING                                    *
* 25-YR STUDY                                                            *
* AREA 'C'                                                               *
 ************************************************************************

  FILE NAME: PRE-C.DAT
  TIME/DATE OF STUDY: 16:57 03/30/2010
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   22.0     17.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  2   32.0     27.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  3   42.0     37.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  4   43.0     38.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  5   53.0     48.0    0.017/0.017/0.020   0.67    1.83 0.0312 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    775.00  DOWNSTREAM(FEET) =    765.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.415
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.372
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.20      0.20      0.90    75    9.41
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA RUNOFF(CFS) =       0.57
  TOTAL AREA(ACRES) =       0.20   PEAK FLOW RATE(CFS) =       0.57

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      2.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    740.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   410.00   CHANNEL SLOPE =  0.0610
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.57
  FLOW VELOCITY(FEET/SEC) =   4.68   FLOW DEPTH(FEET) =   0.10
  TRAVEL TIME(MIN.) =   1.46   Tc(MIN.) =  10.88
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      2.00 =   710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      2.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.123
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.60      0.20      0.90    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA AREA(ACRES) =     0.60      SUBAREA RUNOFF(CFS) =     1.59
  EFFECTIVE AREA(ACRES) =     0.80    AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20   AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =     0.80        PEAK FLOW RATE(CFS) =       2.12

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    740.00  DOWNSTREAM(FEET) =    727.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   810.00   CHANNEL SLOPE =  0.0160
CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
CHANNEL FLOW THRU SUBAREA(CFS) =      2.12
FLOW VELOCITY(FEET/SEC) =   4.37   FLOW DEPTH(FEET) =   0.30
TRAVEL TIME(MIN.) =   3.09   Tc(MIN.) =  13.97
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =  1520.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
MAINLINE Tc(MIN) =  13.97
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.706
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
".4 DWELLING/ACRE"          D        3.80      0.20       0.90    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
SUBAREA AREA(ACRES) =     3.80      SUBAREA RUNOFF(CFS) =     8.64
EFFECTIVE AREA(ACRES) =     4.60   AREA-AVERAGED Fm(INCH/HR) =  0.18
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
TOTAL AREA(ACRES) =     4.60       PEAK FLOW RATE(CFS) =      10.46

****************************************************************************
FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    727.00  DOWNSTREAM(FEET) =    715.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   540.00   CHANNEL SLOPE =  0.0222
CHANNEL FLOW THRU SUBAREA(CFS) =     10.46
FLOW VELOCITY(FEET/SEC) =   3.77 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   2.39   Tc(MIN.) =  16.35
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =  2060.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
MAINLINE Tc(MIN) =  16.35
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.471
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                D       10.10      0.20       1.00    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
SUBAREA AREA(ACRES) =    10.10      SUBAREA RUNOFF(CFS) =    20.64
EFFECTIVE AREA(ACRES) =    14.70   AREA-AVERAGED Fm(INCH/HR) =  0.19
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.97
TOTAL AREA(ACRES) =    14.70       PEAK FLOW RATE(CFS) =      30.13

****************************************************************************
FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    715.00  DOWNSTREAM(FEET) =    670.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.0500
CHANNEL FLOW THRU SUBAREA(CFS) =     30.13
FLOW VELOCITY(FEET/SEC) =   7.50 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   2.00   Tc(MIN.) =  18.36
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =  2960.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
MAINLINE Tc(MIN) =  18.36
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.312
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
".4 DWELLING/ACRE"          D       22.90      0.20       0.90    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
SUBAREA AREA(ACRES) =    22.90      SUBAREA RUNOFF(CFS) =    43.94
EFFECTIVE AREA(ACRES) =    37.60   AREA-AVERAGED Fm(INCH/HR) =  0.19
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.93
TOTAL AREA(ACRES) =    37.60       PEAK FLOW RATE(CFS) =      71.96

****************************************************************************
FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    670.00  DOWNSTREAM(FEET) =    625.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1700.00   CHANNEL SLOPE =  0.0265
CHANNEL FLOW THRU SUBAREA(CFS) =     71.96
FLOW VELOCITY(FEET/SEC) =   7.00 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   4.05   Tc(MIN.) =  22.40
LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =  4660.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
```

```
  MAINLINE Tc(MIN) =  22.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.065
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          C       34.90      0.25      0.90    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA AREA(ACRES) =   34.90      SUBAREA RUNOFF(CFS) =   57.81
  EFFECTIVE AREA(ACRES) =    72.50   AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.91
  TOTAL AREA(ACRES) =    72.50       PEAK FLOW RATE(CFS) =     121.43

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    733.90  DOWNSTREAM(FEET) =    726.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.026
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.256
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.70      0.20      0.90    75   10.03
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA RUNOFF(CFS) =       1.94
  TOTAL AREA(ACRES) =       0.70   PEAK FLOW RATE(CFS) =       1.94

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    726.60  DOWNSTREAM(FEET) =    670.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   930.00   CHANNEL SLOPE =  0.0609
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       1.94
  FLOW VELOCITY(FEET/SEC) =   6.87   FLOW DEPTH(FEET) =   0.20
  TRAVEL TIME(MIN.) =   2.26   Tc(MIN.) =  12.28
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =  1230.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  12.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.904
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        5.60      0.20      0.90    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA AREA(ACRES) =    5.60      SUBAREA RUNOFF(CFS) =   13.73
  EFFECTIVE AREA(ACRES) =     6.30   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =     6.30       PEAK FLOW RATE(CFS) =      15.44

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.28
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.90
  EFFECTIVE STREAM AREA(ACRES) =    6.30
  TOTAL STREAM AREA(ACRES) =    6.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.44

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =   5.00   RAINFALL INTENSITY(INCH/HR) =  4.82
  EFFECTIVE AREA(ACRES) =     4.00
  TOTAL AREA(ACRES) =     4.00        PEAK FLOW RATE(CFS) =     10.10
  AREA-AVERAGED Fm(INCH/HR) =   0.02  AREA-AVERAGED Fp(INCH/HR) =   0.20
  AREA-AVERAGED Ap =  0.10
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   5.00
RAINFALL INTENSITY(INCH/HR) =   4.82
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =    4.00
TOTAL STREAM AREA(ACRES) =    4.00
PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.10

** CONFLUENCE DATA **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
    1     15.44  12.28    2.904  0.20( 0.18) 0.90     6.3       7.00
    2     10.10   5.00    4.820  0.20( 0.02) 0.10     4.0       9.00

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

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
    1     20.81   5.00    4.820  0.20( 0.08) 0.41     6.6       9.00
    2     21.51  12.28    2.904  0.20( 0.12) 0.59    10.3       7.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     21.51    Tc(MIN.) =    12.28
EFFECTIVE AREA(ACRES) =    10.30   AREA-AVERAGED Fm(INCH/HR) =  0.12
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.59
TOTAL AREA(ACRES) =     10.30
LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =  1230.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    670.00  DOWNSTREAM(FEET) =    657.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   370.00   CHANNEL SLOPE =  0.0351
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
CHANNEL FLOW THRU SUBAREA(CFS) =     21.51
FLOW VELOCITY(FEET/SEC) =   4.86   FLOW DEPTH(FEET) =   0.41
TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =  13.55
LONGEST FLOWPATH FROM NODE      7.00 TO NODE     10.00 =  1600.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =  13.55
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.752
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       4.40      0.20       1.00    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
SUBAREA AREA(ACRES) =    4.40      SUBAREA RUNOFF(CFS) =   10.11
EFFECTIVE AREA(ACRES) =    14.70   AREA-AVERAGED Fm(INCH/HR) =  0.14
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
TOTAL AREA(ACRES) =    14.70       PEAK FLOW RATE(CFS) =      34.53

** PEAK FLOW RATE TABLE **
 STREAM     Q     Tc   Intensity   Fp(Fm)     Ap   Ae     HEADWATER
 NUMBER   (CFS) (MIN.) (INCH/HR) (INCH/HR)       (ACRES)    NODE
    1     41.26   6.29    4.311  0.20( 0.13) 0.65    11.0       9.00
    2     34.53  13.55    2.752  0.20( 0.14) 0.71    14.7       7.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) =     41.26  Tc(MIN.) =   6.29
AREA-AVERAGED Fm(INCH/HR) =  0.13  AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.65  EFFECTIVE AREA(ACRES) =     10.96

****************************************************************************
FLOW PROCESS FROM NODE     10.00 TO NODE      6.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    657.00  DOWNSTREAM(FEET) =    625.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1080.00   CHANNEL SLOPE =  0.0296
CHANNEL FLOW THRU SUBAREA(CFS) =     41.26
FLOW VELOCITY(FEET/SEC) =   6.31 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   2.85   Tc(MIN.) =   9.14
LONGEST FLOWPATH FROM NODE      7.00 TO NODE      6.00 =  2680.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN) =   9.14
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.456
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
NATURAL FAIR COVER
"OPEN BRUSH"                 D       6.40      0.20       1.00    83
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
SUBAREA AREA(ACRES) =    6.40      SUBAREA RUNOFF(CFS) =   18.76
EFFECTIVE AREA(ACRES) =    17.36   AREA-AVERAGED Fm(INCH/HR) =  0.16
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.78
TOTAL AREA(ACRES) =    21.10       PEAK FLOW RATE(CFS) =      51.58

****************************************************************************
FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  11
----------------------------------------------------------------------------
```

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

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1      51.58   9.14    3.456  0.20( 0.16) 0.78    17.4        9.00
      2      43.55  16.55    2.453  0.20( 0.16) 0.80    21.1        7.00
  LONGEST FLOWPATH FROM NODE       7.00 TO NODE       6.00 =  2680.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     121.43  22.40    2.065  0.22( 0.20) 0.91    72.5        1.00
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       6.00 =  4660.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     138.15   9.14    3.456  0.22( 0.19) 0.86    46.9        9.00
      2     151.98  16.55    2.453  0.22( 0.19) 0.88    74.7        7.00
      3     157.62  22.40    2.065  0.22( 0.19) 0.89    93.6        1.00
    TOTAL AREA(ACRES) =      93.60

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      157.62  Tc(MIN.) =   22.402
  EFFECTIVE AREA(ACRES) =     93.60  AREA-AVERAGED Fm(INCH/HR) =  0.19
  AREA-AVERAGED Fp(INCH/HR) =  0.22  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =     93.60
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       6.00 =  4660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       6.00 TO NODE       6.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE       6.00 TO NODE      11.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    625.00  DOWNSTREAM(FEET) =    565.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2600.00   CHANNEL SLOPE =  0.0231
  CHANNEL FLOW THRU SUBAREA(CFS) =    157.62
  FLOW VELOCITY(FEET/SEC) =   8.28 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   5.23   Tc(MIN.) =  27.64
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      11.00 =  7260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      11.00 TO NODE      11.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  27.64
```

```
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  1.835
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C       95.40      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =   95.40      SUBAREA RUNOFF(CFS) =  136.10
  EFFECTIVE AREA(ACRES) =   189.00   AREA-AVERAGED Fm(INCH/HR) =  0.22
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  0.94
  TOTAL AREA(ACRES) =   189.00       PEAK FLOW RATE(CFS) =     274.31

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     308.35  14.59    2.636  0.24( 0.23) 0.96   142.3        9.00
      2     286.55  21.85    2.097  0.24( 0.22) 0.95   170.1        7.00
      3     274.31  27.64    1.835  0.24( 0.22) 0.94   189.0        1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =    308.35  Tc(MIN.) =  14.59
  AREA-AVERAGED Fm(INCH/HR) =  0.23  AREA-AVERAGED Fp(INCH/HR) =  0.24
  AREA-AVERAGED Ap =  0.96  EFFECTIVE AREA(ACRES) =    142.34
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =    189.00  TC(MIN.) =     14.59
  EFFECTIVE AREA(ACRES) =    142.34  AREA-AVERAGED Fm(INCH/HR)=  0.23
  AREA-AVERAGED Fp(INCH/HR) =  0.24  AREA-AVERAGED Ap =  0.96
  PEAK FLOW RATE(CFS)    =    308.35

  ** PEAK FLOW RATE TABLE **
   STREAM      Q      Tc   Intensity   Fp(Fm)      Ap   Ae      HEADWATER
   NUMBER    (CFS) (MIN.) (INCH/HR) (INCH/HR)        (ACRES)     NODE
      1     308.35  14.59    2.636  0.24( 0.23) 0.96   142.3        9.00
      2     286.55  21.85    2.097  0.24( 0.22) 0.95   170.1        7.00
      3     274.31  27.64    1.835  0.24( 0.22) 0.94   189.0        1.00
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

AREA 'D'

```
****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                               Irvine, Inc.
                     Planning * Engineering * Surveying
           Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* W.O. #789-26X, BAKER RANCH EXISTING                                      *
* 25-YR STUDY                                                              *
* AREA 'D'                                                                 *
 ****************************************************************************

  FILE NAME: PRE-D.DAT
  TIME/DATE OF STUDY: 17:14 03/30/2010
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   22.0     17.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  2   32.0     27.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  3   42.0     37.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  4   43.0     38.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  5   53.0     48.0    0.017/0.017/0.020   0.67    1.83 0.0312 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    725.00  DOWNSTREAM(FEET) =    721.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.682
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          C        0.20      0.25      0.90    69   11.68
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.90
  SUBAREA RUNOFF(CFS) =       0.50
  TOTAL AREA(ACRES) =       0.20   PEAK FLOW RATE(CFS) =       0.50

****************************************************************************
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    721.60  DOWNSTREAM(FEET) =    689.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   240.00   CHANNEL SLOPE =  0.1350
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.50
  FLOW VELOCITY(FEET/SEC) =   7.03   FLOW DEPTH(FEET) =   0.19
  TRAVEL TIME(MIN.) =   0.57   Tc(MIN.) =  12.25
  LONGEST FLOWPATH FROM NODE     31.00 TO NODE     33.00 =   540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  12.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.909
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        C        0.70      0.25      0.50    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.50
  SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =     1.75
  EFFECTIVE AREA(ACRES) =     0.90    AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25   AREA-AVERAGED Ap =  0.59
  TOTAL AREA(ACRES) =      0.90       PEAK FLOW RATE(CFS) =       2.24
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      0.90  TC(MIN.) =      12.25
  EFFECTIVE AREA(ACRES) =      0.90  AREA-AVERAGED Fm(INCH/HR)=  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.25  AREA-AVERAGED Ap =  0.59
```

```
  PEAK FLOW RATE(CFS)    =       2.24
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

AREA 'E'

```
****************************************************************************
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                          Analysis prepared by:

                          HUNSAKER & ASSOCIATES
                               Irvine, Inc.
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26X, BAKER RANCH EXISTING                                    *
* 25-YR STUDY                                                            *
* AREA 'E'                                                               *
 ************************************************************************

  FILE NAME: PRE-E.DAT
  TIME/DATE OF STUDY: 17:16 03/30/2010
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
    HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
    WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.  (FT)    (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   22.0     17.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  2   32.0     27.0    0.017/0.017/0.020   0.50    1.38 0.0312 0.125 0.0150
  3   42.0     37.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  4   43.0     38.0    0.017/0.017/0.020   0.67    1.83 0.0312 0.167 0.0150
  5   53.0     48.0    0.017/0.017/0.020   0.67    1.83 0.0312 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    797.00  DOWNSTREAM(FEET) =    760.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.862
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.284
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL FAIR COVER
  "GRASS"                     C        0.40      0.25      1.00    79    9.86
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA RUNOFF(CFS) =      1.09
  TOTAL AREA(ACRES) =      0.40   PEAK FLOW RATE(CFS) =      1.09

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    760.00  DOWNSTREAM(FEET) =    740.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   250.00   CHANNEL SLOPE =  0.0800
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      1.09
  FLOW VELOCITY(FEET/SEC) =   6.99   FLOW DEPTH(FEET) =   0.28
  TRAVEL TIME(MIN.) =   0.60   Tc(MIN.) =  10.46
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =   520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN) =  10.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.189
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                     C        1.10      0.25      1.00    79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.25
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =     1.10      SUBAREA RUNOFF(CFS) =     2.91
  EFFECTIVE AREA(ACRES) =     1.50    AREA-AVERAGED Fm(INCH/HR) =  0.25
  AREA-AVERAGED Fp(INCH/HR) =  0.25   AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     1.50        PEAK FLOW RATE(CFS) =       3.97

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    740.00  DOWNSTREAM(FEET) =    695.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   550.00   CHANNEL SLOPE =  0.0818
  CHANNEL FLOW THRU SUBAREA(CFS) =      3.97
  FLOW VELOCITY(FEET/SEC) =   5.72 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =  12.06
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =  1070.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN) =  12.06
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.938
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL FAIR COVER
  "GRASS"                    B        7.80      0.30      1.00    69
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.00
  SUBAREA AREA(ACRES) =    7.80      SUBAREA RUNOFF(CFS) =   18.52
  EFFECTIVE AREA(ACRES) =     9.30   AREA-AVERAGED Fm(INCH/HR) =  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =     9.30       PEAK FLOW RATE(CFS) =      22.15
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =      9.30  TC(MIN.) =     12.06
  EFFECTIVE AREA(ACRES) =       9.30  AREA-AVERAGED Fm(INCH/HR)=  0.29
  AREA-AVERAGED Fp(INCH/HR) =  0.29  AREA-AVERAGED Ap =  1.00
  PEAK FLOW RATE(CFS)    =     22.15
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 3

PROPOSED CONDITION

AREA 'A'

```
****************************************************************************
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                          Analysis prepared by:

                     THIS IS HUNSAKER & ASSOCIATES
                              Irvine, Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26, BAKER RANCH                                             *
* 25-YR STUDY                                                           *
* AREA 'A'                                                              *
 ************************************************************************

  FILE NAME: BR_A25.DAT
  TIME/DATE OF STUDY: 12:00 03/07/2011
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   66.0     61.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   56.0     51.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  3   54.0     49.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  4   42.0     37.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  5   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   18.0     13.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  7   15.0     10.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  8   14.0      9.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    842.00  DOWNSTREAM(FEET) =    811.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.890
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.023
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.90      0.20     0.900    75    6.89
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =       6.57
  TOTAL AREA(ACRES) =       1.90   PEAK FLOW RATE(CFS) =       6.57

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    811.00  DOWNSTREAM(FEET) =    765.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   560.00   CHANNEL SLOPE =  0.0821
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =    2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.792
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.22      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.29
  AVERAGE FLOW DEPTH(FEET) =   0.64   TRAVEL TIME(MIN.) =   0.76
  Tc(MIN.) =    7.65
  SUBAREA AREA(ACRES) =     2.22       SUBAREA RUNOFF(CFS) =    7.22
  EFFECTIVE AREA(ACRES) =      4.12     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        4.1         PEAK FLOW RATE(CFS) =      13.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =  13.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      5.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   765.00  DOWNSTREAM(FEET) =   760.50
  FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       13.39
  PIPE TRAVEL TIME(MIN.) =   1.08    Tc(MIN.) =    8.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    8.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.519
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        0.94     0.20      0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    0.94       SUBAREA RUNOFF(CFS) =    2.83
  EFFECTIVE AREA(ACRES) =       5.06   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.89
  TOTAL AREA(ACRES) =         5.1       PEAK FLOW RATE(CFS) =      15.21

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   760.50  DOWNSTREAM(FEET) =   759.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.61
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       15.21
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.82
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.82
  RAINFALL INTENSITY(INCH/HR) =   3.50
  AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.89
  EFFECTIVE STREAM AREA(ACRES) =       5.06
  TOTAL STREAM AREA(ACRES) =       5.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      15.21

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    789.00  DOWNSTREAM(FEET) =    774.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.240
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.636
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.35     0.20      0.900    75    8.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =       4.20
  TOTAL AREA(ACRES) =       1.35   PEAK FLOW RATE(CFS) =       4.20

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   774.00  DOWNSTREAM(FEET) =   771.00
  FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        4.20
  PIPE TRAVEL TIME(MIN.) =   1.03    Tc(MIN.) =    9.27
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      8.00 =     600.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    9.27
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.401
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.37     0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
```

```
  SUBAREA AREA(ACRES) =     0.37      SUBAREA RUNOFF(CFS) =     1.07
  EFFECTIVE AREA(ACRES) =       1.72   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =         1.7       PEAK FLOW RATE(CFS) =       4.99

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   771.00  DOWNSTREAM(FEET) =   760.00
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.99
  PIPE TRAVEL TIME(MIN.) =   0.79    Tc(MIN.) =   10.06
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE      9.00 =     990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.06
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.247
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                D        2.34      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     2.34      SUBAREA RUNOFF(CFS) =     6.48
  EFFECTIVE AREA(ACRES) =       4.06   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =         4.1       PEAK FLOW RATE(CFS) =      11.23

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   760.00  DOWNSTREAM(FEET) =   759.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.85
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.23
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.18
  LONGEST FLOWPATH FROM NODE      6.00 TO NODE     10.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.18
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =       4.06
  TOTAL STREAM AREA(ACRES) =       4.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.23

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       15.21    8.82    3.499  0.20( 0.18) 0.89       5.1       1.00
      2       11.23   10.18    3.225  0.20( 0.17) 0.87       4.1       6.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       25.81    8.82    3.499  0.20( 0.18) 0.88       8.6       1.00
      2       25.19   10.18    3.225  0.20( 0.18) 0.88       9.1       6.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      25.81    Tc(MIN.) =     8.82
  EFFECTIVE AREA(ACRES) =       8.58   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.88
  TOTAL AREA(ACRES) =         9.1
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    1325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   759.50  DOWNSTREAM(FEET) =   741.00
  FLOW LENGTH(FEET) =   755.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.79
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.81
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    9.88
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    2080.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =    9.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.280
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        1.33      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.33      SUBAREA RUNOFF(CFS) =    3.90
  EFFECTIVE AREA(ACRES) =      9.91   AREA-AVERAGED Fm(INCH/HR) =  0.16
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.78
  TOTAL AREA(ACRES) =       10.4       PEAK FLOW RATE(CFS) =      27.86

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    9.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.280
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        1.09      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.09      SUBAREA RUNOFF(CFS) =    3.20
  EFFECTIVE AREA(ACRES) =     11.00   AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.71
  TOTAL AREA(ACRES) =       11.5       PEAK FLOW RATE(CFS) =      31.05

******************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     42.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   741.00  DOWNSTREAM(FEET) =   739.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      31.05
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.91
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     42.00 =    2105.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.91
  RAINFALL INTENSITY(INCH/HR) =   3.28
  AREA-AVERAGED Fm(INCH/HR) =  0.14
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.71
  EFFECTIVE STREAM AREA(ACRES) =      11.00
  TOTAL STREAM AREA(ACRES) =      11.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      31.05

******************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
------------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
  ELEVATION DATA: UPSTREAM(FEET) =    764.00  DOWNSTREAM(FEET) =    761.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.808
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.748
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.37      0.20      0.200    75    7.81
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =       1.23
  TOTAL AREA(ACRES) =       0.37   PEAK FLOW RATE(CFS) =       1.23

******************************************************************************
  FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
------------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  761.00  DOWNSTREAM ELEVATION(FEET) =  752.50
  STREET LENGTH(FEET) =    735.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.22
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.57
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
  STREET FLOW TRAVEL TIME(MIN.) =   4.77   Tc(MIN.) =   12.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.861
```

```
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        2.37      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     2.37      SUBAREA RUNOFF(CFS) =     5.89
EFFECTIVE AREA(ACRES) =       2.74    AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
TOTAL AREA(ACRES) =         2.7        PEAK FLOW RATE(CFS) =       6.83

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  16.22
FLOW VELOCITY(FEET/SEC.) =  2.90   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =    1025.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.58
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.861
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        2.87      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     2.87      SUBAREA RUNOFF(CFS) =     7.13
EFFECTIVE AREA(ACRES) =       5.61    AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
TOTAL AREA(ACRES) =         5.6        PEAK FLOW RATE(CFS) =      13.96

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   752.50  DOWNSTREAM(FEET) =   740.00
FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  15.25
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      13.96
PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   12.77
LONGEST FLOWPATH FROM NODE     38.00 TO NODE     41.00 =    1200.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.77
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.837
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
PUBLIC PARK                  D        1.00      0.20      0.850    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     2.40
EFFECTIVE AREA(ACRES) =       6.61    AREA-AVERAGED Fm(INCH/HR) =  0.11
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
TOTAL AREA(ACRES) =         6.6        PEAK FLOW RATE(CFS) =      16.24

****************************************************************************
FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   740.00  DOWNSTREAM(FEET) =   739.50
FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      16.24
PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   12.93
LONGEST FLOWPATH FROM NODE     38.00 TO NODE     42.00 =    1265.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     42.00 TO NODE     42.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   12.93
RAINFALL INTENSITY(INCH/HR) =   2.82
AREA-AVERAGED Fm(INCH/HR) =  0.11
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.54
EFFECTIVE STREAM AREA(ACRES) =       6.61
TOTAL STREAM AREA(ACRES) =       6.61
PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.24

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       31.05    9.91    3.276  0.20( 0.14) 0.71      11.0       1.00
    1       30.16   11.28    3.044  0.20( 0.14) 0.72      11.5       6.00
    2       16.24   12.93    2.817  0.20( 0.11) 0.54       6.6      38.00

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

```
** PEAK FLOW RATE TABLE **
 STREAM      Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER    (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      45.60    9.91    3.276  0.20( 0.13) 0.66      16.1       1.00
    2      45.51   11.28    3.044  0.20( 0.13) 0.66      17.3       6.00
    3      44.04   12.93    2.817  0.20( 0.13) 0.65      18.1      38.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      45.60    Tc(MIN.) =     9.91
EFFECTIVE AREA(ACRES) =      16.06   AREA-AVERAGED Fm(INCH/HR) =  0.13
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.66
TOTAL AREA(ACRES) =       18.1
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     42.00 =    2105.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     42.00 TO NODE     12.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   739.50  DOWNSTREAM(FEET) =   727.00
FLOW LENGTH(FEET) =   440.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.13
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      45.60
PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   10.43
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    2545.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   10.43
RAINFALL INTENSITY(INCH/HR) =   3.18
AREA-AVERAGED Fm(INCH/HR) =  0.13
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.66
EFFECTIVE STREAM AREA(ACRES) =      16.06
TOTAL STREAM AREA(ACRES) =      18.15
PEAK FLOW RATE(CFS) AT CONFLUENCE =      45.60

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   230.00
ELEVATION DATA: UPSTREAM(FEET) =    741.00  DOWNSTREAM(FEET) =    734.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.381
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.627
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 D       0.22      0.20      0.100    75    5.38
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      0.91
TOTAL AREA(ACRES) =      0.22   PEAK FLOW RATE(CFS) =      0.91

****************************************************************************
FLOW PROCESS FROM NODE     43.00 TO NODE     12.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  734.00  DOWNSTREAM ELEVATION(FEET) =  727.00
STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 20.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.29
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.23
  HALFSTREET FLOOD WIDTH(FEET) =    5.76
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.19
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =    6.35
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.215
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 D       0.20      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.76
EFFECTIVE AREA(ACRES) =      0.42    AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       1.59

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   6.46
FLOW VELOCITY(FEET/SEC.) =  3.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.80
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     12.00 =     415.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     12.00 TO NODE     12.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.35
  RAINFALL INTENSITY(INCH/HR) =   4.21
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.42
  TOTAL STREAM AREA(ACRES) =       0.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.59

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       45.60   10.43    3.182  0.20( 0.13) 0.66      16.1       1.00
      1       45.51   11.80    2.967  0.20( 0.13) 0.66      17.3       6.00
      1       44.04   13.45    2.755  0.20( 0.13) 0.65      18.1      38.00
      2        1.59    6.35    4.215  0.20( 0.02) 0.10       0.4      11.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.73    6.35    4.215  0.20( 0.13) 0.63      10.2      11.00
      2       46.80   10.43    3.182  0.20( 0.13) 0.64      16.5       1.00
      3       46.62   11.80    2.967  0.20( 0.13) 0.64      17.7       6.00
      4       45.07   13.45    2.755  0.20( 0.13) 0.64      18.6      38.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.80    Tc(MIN.) =    10.43
  EFFECTIVE AREA(ACRES) =      16.48   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.64
  TOTAL AREA(ACRES) =       18.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     12.00 =    2545.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   727.00  DOWNSTREAM(FEET) =   725.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.40
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.80
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   10.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2595.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
==============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
  ELEVATION DATA: UPSTREAM(FEET) =    772.40  DOWNSTREAM(FEET) =    769.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.700
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.778
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                D       1.14      0.20     0.350    75    7.70
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =       3.80
  TOTAL AREA(ACRES) =       1.14   PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  769.50  DOWNSTREAM ELEVATION(FEET) =  759.00
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.17
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =   10.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.54
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.44
  STREET FLOW TRAVEL TIME(MIN.) =   0.84   Tc(MIN.) =    8.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
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```
  CONDOMINIUMS                D        0.87      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     0.87      SUBAREA RUNOFF(CFS) =     2.73
  EFFECTIVE AREA(ACRES) =       2.01    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =         2.0        PEAK FLOW RATE(CFS) =       6.32

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  4.80   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     15.00 =     465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.562
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.24      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.24      SUBAREA RUNOFF(CFS) =     0.77
  EFFECTIVE AREA(ACRES) =       2.25   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         2.2        PEAK FLOW RATE(CFS) =       7.08

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   759.00  DOWNSTREAM(FEET) =   755.00
  FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.09
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        7.08
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     16.00 =     870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.324
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        1.60      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.60      SUBAREA RUNOFF(CFS) =     4.69
  EFFECTIVE AREA(ACRES) =       3.85   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =         3.8        PEAK FLOW RATE(CFS) =      11.29

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.65
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.324
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.24      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.24      SUBAREA RUNOFF(CFS) =     0.71
  EFFECTIVE AREA(ACRES) =       4.09   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         4.1        PEAK FLOW RATE(CFS) =      12.00

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   755.00  DOWNSTREAM(FEET) =   754.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       12.00
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    9.77
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     17.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.301
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        1.25      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.25      SUBAREA RUNOFF(CFS) =     3.64
  EFFECTIVE AREA(ACRES) =       5.34   AREA-AVERAGED Fm(INCH/HR) =  0.07
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  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        5.3       PEAK FLOW RATE(CFS) =      15.55

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.301
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        1.85      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    1.85      SUBAREA RUNOFF(CFS) =    5.38
  EFFECTIVE AREA(ACRES) =      7.19   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      20.93

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   754.50  DOWNSTREAM(FEET) =   727.50
  FLOW LENGTH(FEET) =   745.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.99
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.93
  PIPE TRAVEL TIME(MIN.) =   0.96    Tc(MIN.) =   10.73
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     18.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.131
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        3.50      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.50      SUBAREA RUNOFF(CFS) =    9.64
  EFFECTIVE AREA(ACRES) =     10.69   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       10.7       PEAK FLOW RATE(CFS) =      29.48

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.73
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.131
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.37      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.37      SUBAREA RUNOFF(CFS) =    3.81
  EFFECTIVE AREA(ACRES) =     12.06   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =       12.1       PEAK FLOW RATE(CFS) =      33.29

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   727.50  DOWNSTREAM(FEET) =   727.30
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      33.29
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     19.00 =    1705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.83
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.115
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        3.57      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.57      SUBAREA RUNOFF(CFS) =    9.78
  EFFECTIVE AREA(ACRES) =     15.63   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       15.6       PEAK FLOW RATE(CFS) =      42.90

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   727.30  DOWNSTREAM(FEET) =   726.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.92
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.90
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   11.11
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    1855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.11
  RAINFALL INTENSITY(INCH/HR) =   3.07
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.33
  EFFECTIVE STREAM AREA(ACRES) =      15.63
  TOTAL STREAM AREA(ACRES) =      15.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.90

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
  ELEVATION DATA: UPSTREAM(FEET) =    727.50  DOWNSTREAM(FEET) =    726.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.351
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.18      0.20      0.100    75    6.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.70
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.70

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.00
  RAINFALL INTENSITY(INCH/HR) =   4.35
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.70

  ** CONFLUENCE DATA **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.90   11.11    3.071  0.20( 0.07) 0.33      15.6      13.00
      2        0.70    6.00    4.351  0.20( 0.02) 0.10       0.2      18.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.75    6.00    4.351  0.20( 0.06) 0.32       8.6      18.00
      2       43.39   11.11    3.071  0.20( 0.07) 0.33      15.8      13.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.39    Tc(MIN.) =    11.11
  EFFECTIVE AREA(ACRES) =      15.81   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       15.8
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     20.00 =    1855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   726.00  DOWNSTREAM(FEET) =   725.00
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.17
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.39
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   11.13
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    1880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       33.75    6.03    4.340  0.20( 0.06) 0.32       8.6      18.00
      2       43.39   11.13    3.066  0.20( 0.07) 0.33      15.8      13.00
  LONGEST FLOWPATH FROM NODE     13.00 TO NODE     21.00 =    1880.00 FEET.
```

```
** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        38.73    6.40    4.195  0.20( 0.13) 0.63      10.2      11.00
    2        46.80   10.48    3.174  0.20( 0.13) 0.64      16.5       1.00
    3        46.62   11.85    2.960  0.20( 0.13) 0.64      17.7       6.00
    4        45.07   13.50    2.749  0.20( 0.13) 0.64      18.6      38.00
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2595.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1        71.53    6.03    4.340  0.20( 0.10) 0.49      18.2      18.00
    2        73.19    6.40    4.195  0.20( 0.10) 0.49      19.3      11.00
    3        88.95   10.48    3.174  0.20( 0.10) 0.49      31.4       1.00
    4        90.10   11.13    3.066  0.20( 0.10) 0.49      32.9      13.00
    5        88.48   11.85    2.960  0.20( 0.10) 0.49      33.5       6.00
    6        83.87   13.50    2.749  0.20( 0.10) 0.50      34.4      38.00
  TOTAL AREA(ACRES) =        34.4

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       90.10  Tc(MIN.) =   11.132
EFFECTIVE AREA(ACRES) =     32.88  AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
TOTAL AREA(ACRES) =       34.4
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     21.00 =    2595.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     21.00 TO NODE     21.00 IS CODE =  12
----------------------------------------------------------------------------
>>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE     21.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   725.00  DOWNSTREAM(FEET) =   712.00
FLOW LENGTH(FEET) =   430.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  17.36
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      90.10
PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   11.54
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3025.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   11.54
RAINFALL INTENSITY(INCH/HR) =   3.00
AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.49
EFFECTIVE STREAM AREA(ACRES) =      32.88
TOTAL STREAM AREA(ACRES) =      34.38
PEAK FLOW RATE(CFS) AT CONFLUENCE =      90.10

****************************************************************************
FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
ELEVATION DATA: UPSTREAM(FEET) =    731.50  DOWNSTREAM(FEET) =    727.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.559
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.818
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        0.62      0.20      0.400    75    7.56
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA RUNOFF(CFS) =       2.09
TOTAL AREA(ACRES) =       0.62   PEAK FLOW RATE(CFS) =       2.09

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     24.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  727.40  DOWNSTREAM ELEVATION(FEET) =  723.80
STREET LENGTH(FEET) =   175.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.30
  HALFSTREET FLOOD WIDTH(FEET) =   10.13
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.93
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.89
```

```
STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =    8.55
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.560
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        0.53      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     0.53      SUBAREA RUNOFF(CFS) =     1.66
EFFECTIVE AREA(ACRES) =       1.15    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =         1.1        PEAK FLOW RATE(CFS) =       3.60

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =  11.04
FLOW VELOCITY(FEET/SEC.) =  3.11   DEPTH*VELOCITY(FT*FT/SEC.) =   0.99
LONGEST FLOWPATH FROM NODE     22.00 TO NODE     24.00 =     415.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     24.00 TO NODE     24.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    8.55
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.560
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.01      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     1.01      SUBAREA RUNOFF(CFS) =     3.16
EFFECTIVE AREA(ACRES) =       2.16    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =         2.2        PEAK FLOW RATE(CFS) =       6.76

****************************************************************************
FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   723.80  DOWNSTREAM(FEET) =   722.70
FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.55
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        6.76
PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    8.78
LONGEST FLOWPATH FROM NODE     22.00 TO NODE     25.00 =     505.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    8.78
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.507
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 D        0.12      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     0.12      SUBAREA RUNOFF(CFS) =     0.38
EFFECTIVE AREA(ACRES) =       2.28    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =         2.3        PEAK FLOW RATE(CFS) =       7.04

****************************************************************************
FLOW PROCESS FROM NODE     25.00 TO NODE     29.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   722.70  DOWNSTREAM(FEET) =   721.70
FLOW LENGTH(FEET) =   185.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.72
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        7.04
PIPE TRAVEL TIME(MIN.) =   0.65    Tc(MIN.) =    9.43
LONGEST FLOWPATH FROM NODE     22.00 TO NODE     29.00 =     690.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.43
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.18      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     1.18      SUBAREA RUNOFF(CFS) =     3.49
EFFECTIVE AREA(ACRES) =       3.46    AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =         3.5        PEAK FLOW RATE(CFS) =      10.24

****************************************************************************
FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.43
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.368
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       D        1.11      0.20      0.400    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    1.11      SUBAREA RUNOFF(CFS) =    3.28
 EFFECTIVE AREA(ACRES) =       4.57   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =         4.6       PEAK FLOW RATE(CFS) =      13.53

****************************************************************************
 FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   721.70  DOWNSTREAM(FEET) =   720.80
 FLOW LENGTH(FEET) =   175.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       13.53
 PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    9.96
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     30.00 =     865.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.96
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.265
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       D        0.59      0.20      0.400    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    0.59      SUBAREA RUNOFF(CFS) =    1.69
 EFFECTIVE AREA(ACRES) =       5.16   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
 TOTAL AREA(ACRES) =         5.2       PEAK FLOW RATE(CFS) =      14.80

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.96
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.265
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  D        0.22      0.20      0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.22      SUBAREA RUNOFF(CFS) =    0.64
 EFFECTIVE AREA(ACRES) =       5.38   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =         5.4       PEAK FLOW RATE(CFS) =      15.44

****************************************************************************
 FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   720.80  DOWNSTREAM(FEET) =   720.40
 FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.08
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       15.44
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.14
 LONGEST FLOWPATH FROM NODE     22.00 TO NODE     31.00 =     930.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.14
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.233
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       D        1.06      0.20      0.400    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
 SUBAREA AREA(ACRES) =    1.06      SUBAREA RUNOFF(CFS) =    3.01
 EFFECTIVE AREA(ACRES) =       6.44   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
 TOTAL AREA(ACRES) =         6.4       PEAK FLOW RATE(CFS) =      18.29

****************************************************************************
 FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.14
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.233
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 "8-10 DWELLINGS/ACRE"       D        1.02      0.20      0.400    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
```

```
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     1.02      SUBAREA RUNOFF(CFS) =     2.89
EFFECTIVE AREA(ACRES) =       7.46   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =         7.5       PEAK FLOW RATE(CFS) =      21.19

****************************************************************************
FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   720.40  DOWNSTREAM(FEET) =   712.00
FLOW LENGTH(FEET) =   455.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.12
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      21.19
PIPE TRAVEL TIME(MIN.) =   0.75    Tc(MIN.) =   10.89
LONGEST FLOWPATH FROM NODE     22.00 TO NODE     32.00 =    1385.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.89
RAINFALL INTENSITY(INCH/HR) =   3.10
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.39
EFFECTIVE STREAM AREA(ACRES) =       7.46
TOTAL STREAM AREA(ACRES) =       7.46
PEAK FLOW RATE(CFS) AT CONFLUENCE =      21.19

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       71.53    6.46    4.171  0.20( 0.10) 0.49      18.2      18.00
    1       73.19    6.84    4.041  0.20( 0.10) 0.49      19.3      11.00
    1       88.95   10.89    3.105  0.20( 0.10) 0.49      31.4       1.00
    1       90.10   11.54    3.004  0.20( 0.10) 0.49      32.9      13.00
    1       88.48   12.26    2.903  0.20( 0.10) 0.49      33.5       6.00
    1       83.87   13.93    2.701  0.20( 0.10) 0.50      34.4      38.00
    2       21.19   10.89    3.105  0.20( 0.08) 0.39       7.5      22.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       88.53    6.46    4.171  0.20( 0.09) 0.47      22.7      18.00
    2       90.60    6.84    4.041  0.20( 0.09) 0.47      24.0      11.00
    3      110.13   10.89    3.105  0.20( 0.09) 0.47      38.8      22.00
    4      110.13   10.89    3.105  0.20( 0.09) 0.47      38.8       1.00
    5      110.58   11.54    3.004  0.20( 0.09) 0.47      40.3      13.00
    6      108.25   12.26    2.903  0.20( 0.09) 0.47      41.0       6.00
    7      102.23   13.93    2.701  0.20( 0.10) 0.48      41.8      38.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     110.58    Tc(MIN.) =    11.54
EFFECTIVE AREA(ACRES) =      40.34   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
TOTAL AREA(ACRES) =       41.8
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    3025.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   712.00  DOWNSTREAM(FEET) =   709.00
FLOW LENGTH(FEET) =   115.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  17.19
ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     110.58
PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.66
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3140.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   11.66
RAINFALL INTENSITY(INCH/HR) =   2.99
AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.47
EFFECTIVE STREAM AREA(ACRES) =      40.34
TOTAL STREAM AREA(ACRES) =      41.84
PEAK FLOW RATE(CFS) AT CONFLUENCE =     110.58

****************************************************************************
FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   240.00
ELEVATION DATA: UPSTREAM(FEET) =    729.00  DOWNSTREAM(FEET) =    727.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.512
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.831
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.17      0.20      0.100    75    7.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =       0.58
 TOTAL AREA(ACRES) =       0.17   PEAK FLOW RATE(CFS) =       0.58

****************************************************************************
 FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  727.50  DOWNSTREAM ELEVATION(FEET) =  724.00
 STREET LENGTH(FEET) =   295.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 18.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.81
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.32
   HALFSTREET FLOOD WIDTH(FEET) =   11.25
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.35
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.76
 STREET FLOW TRAVEL TIME(MIN.) =   2.09.  Tc(MIN.) =    9.60
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.334
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 PUBLIC PARK                 D        1.00      0.20      0.850    75
 CONDOMINIUMS                D        0.54      0.20      0.350    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.675
 SUBAREA AREA(ACRES) =    1.54      SUBAREA RUNOFF(CFS) =    4.43
 EFFECTIVE AREA(ACRES) =      1.71    AREA-AVERAGED Fm(INCH/HR) =  0.12
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.62
 TOTAL AREA(ACRES) =        1.7        PEAK FLOW RATE(CFS) =       4.94

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.37   HALFSTREET FLOOD WIDTH(FEET) =  14.19
 FLOW VELOCITY(FEET/SEC.) =  2.69   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     35.00 =     535.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    9.60
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.334
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS                D        2.75      0.20      0.350    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    2.75      SUBAREA RUNOFF(CFS) =    8.08
 EFFECTIVE AREA(ACRES) =      4.46   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
 TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      13.02

****************************************************************************
 FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   724.00  DOWNSTREAM(FEET) =   709.00
 FLOW LENGTH(FEET) =   325.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.70
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.02
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   10.03
 LONGEST FLOWPATH FROM NODE     33.00 TO NODE     36.00 =     860.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.03
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.253
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  D        1.44      0.20      0.100    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    1.44      SUBAREA RUNOFF(CFS) =    4.19
 EFFECTIVE AREA(ACRES) =      5.90   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.37
 TOTAL AREA(ACRES) =        5.9       PEAK FLOW RATE(CFS) =      16.88

****************************************************************************
 FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   10.03
```

```
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.253
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        1.51      0.20      0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =     1.51       SUBAREA RUNOFF(CFS) =     4.37
EFFECTIVE AREA(ACRES) =       7.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =         7.4        PEAK FLOW RATE(CFS) =      21.25

****************************************************************************
FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.03
RAINFALL INTENSITY(INCH/HR) =   3.25
AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.33
EFFECTIVE STREAM AREA(ACRES) =        7.41
TOTAL STREAM AREA(ACRES) =        7.41
PEAK FLOW RATE(CFS) AT CONFLUENCE =       21.25

** CONFLUENCE DATA **
 STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)    NODE
    1       88.53    6.58     4.128   0.20( 0.09) 0.47      22.7      18.00
    1       90.60    6.95     4.002   0.20( 0.09) 0.47      24.0      11.00
    1      110.13   11.00     3.087   0.20( 0.09) 0.47      38.8      22.00
    1      110.13   11.00     3.087   0.20( 0.09) 0.47      38.8       1.00
    1      110.58   11.66     2.988   0.20( 0.09) 0.47      40.3      13.00
    1      108.25   12.37     2.888   0.20( 0.09) 0.47      41.0       6.00
    1      102.23   14.05     2.688   0.20( 0.10) 0.48      41.8      38.00
    2       21.25   10.03     3.253   0.20( 0.07) 0.33       7.4      33.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)    NODE
    1      106.31    6.58     4.128   0.20( 0.09) 0.44      27.5      18.00
    2      108.80    6.95     4.002   0.20( 0.09) 0.44      29.2      11.00
    3      126.70   10.03     3.253   0.20( 0.09) 0.45      42.7      33.00
    4      130.28   11.00     3.087   0.20( 0.09) 0.45      46.2      22.00
    5      130.28   11.00     3.087   0.20( 0.09) 0.45      46.2       1.00
    6      130.06   11.66     2.988   0.20( 0.09) 0.45      47.8      13.00
    7      127.07   12.37     2.888   0.20( 0.09) 0.45      48.4       6.00
    8      119.71   14.05     2.688   0.20( 0.09) 0.45      49.2      38.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     130.28    Tc(MIN.) =    11.00
EFFECTIVE AREA(ACRES) =      46.24   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
TOTAL AREA(ACRES) =       49.2
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     36.00 =    3140.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =       49.2  TC(MIN.) =     11.00
EFFECTIVE AREA(ACRES) =     46.24  AREA-AVERAGED Fm(INCH/HR)=  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.449
PEAK FLOW RATE(CFS)    =     130.28

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)    NODE
    1      106.31    6.58     4.128   0.20( 0.09) 0.44      27.5      18.00
    2      108.80    6.95     4.002   0.20( 0.09) 0.44      29.2      11.00
    3      126.70   10.03     3.253   0.20( 0.09) 0.45      42.7      33.00
    4      130.28   11.00     3.087   0.20( 0.09) 0.45      46.2      22.00
    5      130.28   11.00     3.087   0.20( 0.09) 0.45      46.2       1.00
    6      130.06   11.66     2.988   0.20( 0.09) 0.45      47.8      13.00
    7      127.07   12.37     2.888   0.20( 0.09) 0.45      48.4       6.00
    8      119.71   14.05     2.688   0.20( 0.09) 0.45      49.2      38.00
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

AREA ‘B’

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

                     THIS IS HUNSAKER & ASSOCIATES
                              Irvine, Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* W.O. #789-26, BAKER RANCH                                                *
* 25-YR STUDY                                                              *
* AREA 'B'                                                                 *
 ****************************************************************************

  FILE NAME: BR_B25.DAT
  TIME/DATE OF STUDY: 18:58 03/08/2011
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   66.0     61.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   56.0     51.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  3   54.0     49.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  4   42.0     37.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  5   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   18.0     13.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  7   15.0     10.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  8   14.0      9.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   270.00
  ELEVATION DATA: UPSTREAM(FEET) =    748.00  DOWNSTREAM(FEET) =    742.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.512
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.154
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.88      0.20      0.200    75    6.51
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =       3.26
  TOTAL AREA(ACRES) =       0.88   PEAK FLOW RATE(CFS) =       3.26

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  742.00  DOWNSTREAM ELEVATION(FEET) =  729.00
  STREET LENGTH(FEET) =  1095.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   17.34
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.03
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   6.02   Tc(MIN.) =   12.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.868
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.87      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.87      SUBAREA RUNOFF(CFS) =    9.64
```

```
  EFFECTIVE AREA(ACRES) =       4.75    AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =         4.8        PEAK FLOW RATE(CFS) =       11.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =    1365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      3.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.53
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.868
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.83      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.83      SUBAREA RUNOFF(CFS) =    7.05
  EFFECTIVE AREA(ACRES) =      7.58   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =         7.6       PEAK FLOW RATE(CFS) =       18.93

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   729.00  DOWNSTREAM(FEET) =   728.00
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.93
  PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =   12.85
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.827
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.19      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.19      SUBAREA RUNOFF(CFS) =    5.37
  EFFECTIVE AREA(ACRES) =      9.77   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =         9.8       PEAK FLOW RATE(CFS) =       24.02

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.827
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.59      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.59      SUBAREA RUNOFF(CFS) =    8.81
  EFFECTIVE AREA(ACRES) =     13.36   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        13.4       PEAK FLOW RATE(CFS) =       32.83

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   728.00  DOWNSTREAM(FEET) =   725.30
  FLOW LENGTH(FEET) =   720.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.15
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.83
  PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =   14.80
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    2220.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.89      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.89      SUBAREA RUNOFF(CFS) =    4.27
  EFFECTIVE AREA(ACRES) =     15.25   AREA-AVERAGED Fm(INCH/HR) =  0.10
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        15.3       PEAK FLOW RATE(CFS) =       34.49

****************************************************************************
  FLOW PROCESS FROM NODE       5.00 TO NODE       5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.609
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.52      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     1.52      SUBAREA RUNOFF(CFS) =     3.43
  EFFECTIVE AREA(ACRES) =      16.77   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        16.8       PEAK FLOW RATE(CFS) =       37.92

****************************************************************************
  FLOW PROCESS FROM NODE       5.00 TO NODE       6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   725.30  DOWNSTREAM(FEET) =   725.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.24
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       37.92
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   14.89
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       6.00 =    2260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       6.00 TO NODE       6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.89
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.601
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.57      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     0.57      SUBAREA RUNOFF(CFS) =     1.29
  EFFECTIVE AREA(ACRES) =      17.34   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        17.3       PEAK FLOW RATE(CFS) =       39.10

****************************************************************************
  FLOW PROCESS FROM NODE       6.00 TO NODE       7.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   725.00  DOWNSTREAM(FEET) =   724.50
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  25.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.85
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       39.10
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   15.04
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       7.00 =    2335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       7.00 TO NODE       7.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.04
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.586
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.09      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     2.09      SUBAREA RUNOFF(CFS) =     4.68
  EFFECTIVE AREA(ACRES) =      19.43   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
  TOTAL AREA(ACRES) =        19.4       PEAK FLOW RATE(CFS) =       43.53

****************************************************************************
  FLOW PROCESS FROM NODE       7.00 TO NODE       8.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   724.50  DOWNSTREAM(FEET) =   721.00
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.86
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       43.53
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   15.24
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE       8.00 =    2485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE       8.00 TO NODE       8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.24
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.567
```

```
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.67      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     1.67      SUBAREA RUNOFF(CFS) =     3.71
EFFECTIVE AREA(ACRES) =      21.10   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.48
TOTAL AREA(ACRES) =        21.1       PEAK FLOW RATE(CFS) =       46.91

****************************************************************************
FLOW PROCESS FROM NODE       8.00 TO NODE       8.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   15.24
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.567
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.98      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     1.98      SUBAREA RUNOFF(CFS) =     4.40
EFFECTIVE AREA(ACRES) =      23.08   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
TOTAL AREA(ACRES) =        23.1       PEAK FLOW RATE(CFS) =       51.30

****************************************************************************
FLOW PROCESS FROM NODE       8.00 TO NODE       9.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   721.00  DOWNSTREAM(FEET) =   719.50
FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  15.36
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       51.30
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   15.29
LONGEST FLOWPATH FROM NODE       1.00 TO NODE       9.00 =    2530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE       9.00 TO NODE       9.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   15.29
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        1.46      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     1.46      SUBAREA RUNOFF(CFS) =     3.34
EFFECTIVE AREA(ACRES) =      24.54   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.46
TOTAL AREA(ACRES) =        24.5       PEAK FLOW RATE(CFS) =       54.55

****************************************************************************
FLOW PROCESS FROM NODE       9.00 TO NODE       9.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   15.29
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.562
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        0.70      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     0.70      SUBAREA RUNOFF(CFS) =     1.60
EFFECTIVE AREA(ACRES) =      25.24   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
TOTAL AREA(ACRES) =        25.2       PEAK FLOW RATE(CFS) =       56.15

****************************************************************************
FLOW PROCESS FROM NODE       9.00 TO NODE      10.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   719.50  DOWNSTREAM(FEET) =   706.50
FLOW LENGTH(FEET) =   490.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  14.58
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       56.15
PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =   15.85
LONGEST FLOWPATH FROM NODE       1.00 TO NODE      10.00 =    3020.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      10.00 TO NODE      10.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   15.85
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.511
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        0.84      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     0.84      SUBAREA RUNOFF(CFS) =     1.88
EFFECTIVE AREA(ACRES) =      26.08   AREA-AVERAGED Fm(INCH/HR) =  0.09
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        26.1        PEAK FLOW RATE(CFS) =       56.86

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   15.85
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.511
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.51      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.51      SUBAREA RUNOFF(CFS) =     1.14
  EFFECTIVE AREA(ACRES) =      26.59   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =        26.6        PEAK FLOW RATE(CFS) =       58.00

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   706.50  DOWNSTREAM(FEET) =   705.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.25
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       58.00
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   15.92
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    3080.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   15.92
  RAINFALL INTENSITY(INCH/HR) =   2.50
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.44
  EFFECTIVE STREAM AREA(ACRES) =      26.59
  TOTAL STREAM AREA(ACRES) =      26.59
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      58.00

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     12.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    724.50  DOWNSTREAM(FEET) =    721.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.091
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.674
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.50      0.20      0.400    75    8.09
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =       1.62
  TOTAL AREA(ACRES) =       0.50   PEAK FLOW RATE(CFS) =       1.62

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  721.00  DOWNSTREAM ELEVATION(FEET) =  719.10
  STREET LENGTH(FEET) =   210.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.70
  STREET FLOW TRAVEL TIME(MIN.) =   1.65   Tc(MIN.) =    9.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.308
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.78      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     2.27
  EFFECTIVE AREA(ACRES) =       1.28    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =         1.3        PEAK FLOW RATE(CFS) =       3.72
```

```
END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
FLOW VELOCITY(FEET/SEC.) =  2.26   DEPTH*VELOCITY(FT*FT/SEC.) =   0.81
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     13.00 =     465.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     13.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.74
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.308
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        0.96      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =    0.96      SUBAREA RUNOFF(CFS) =    2.79
EFFECTIVE AREA(ACRES) =      2.24   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =        2.2       PEAK FLOW RATE(CFS) =       6.51

****************************************************************************
FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   719.10  DOWNSTREAM(FEET) =   717.00
FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.83
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       6.51
PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   10.10
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     14.00 =     615.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.10
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.239
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        0.41      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.41      SUBAREA RUNOFF(CFS) =    1.19
EFFECTIVE AREA(ACRES) =      2.65   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        2.7       PEAK FLOW RATE(CFS) =       7.56

****************************************************************************
FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   717.00  DOWNSTREAM(FEET) =   714.90
FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.37
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       7.56
PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =   10.41
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     15.00 =     750.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     15.00 TO NODE     15.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.41
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.185
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
PUBLIC PARK                 D        1.15      0.20      0.850    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
SUBAREA AREA(ACRES) =    1.15      SUBAREA RUNOFF(CFS) =    3.12
EFFECTIVE AREA(ACRES) =      3.80   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =      10.55

****************************************************************************
FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   714.90  DOWNSTREAM(FEET) =   714.50
FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      10.55
PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.54
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     16.00 =     800.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
==============================================================================
  MAINLINE Tc(MIN.) =   10.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.162
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.80      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.25
  EFFECTIVE AREA(ACRES) =       4.60   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =         4.6       PEAK FLOW RATE(CFS) =      12.72

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     16.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.162
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        1.73      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     1.73      SUBAREA RUNOFF(CFS) =     4.80
  EFFECTIVE AREA(ACRES) =       6.33   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =         6.3       PEAK FLOW RATE(CFS) =      17.52

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   714.50  DOWNSTREAM(FEET) =   711.00
  FLOW LENGTH(FEET) =   340.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.71
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.52
  PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   11.28
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     17.00 =    1140.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.044
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.34      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.34      SUBAREA RUNOFF(CFS) =     0.93
  EFFECTIVE AREA(ACRES) =       6.67   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =         6.7       PEAK FLOW RATE(CFS) =      17.77

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.044
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.58      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     1.58      SUBAREA RUNOFF(CFS) =     4.27
  EFFECTIVE AREA(ACRES) =       8.25   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =         8.3       PEAK FLOW RATE(CFS) =      22.04

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   711.00  DOWNSTREAM(FEET) =   706.00
  FLOW LENGTH(FEET) =   285.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.99
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.04
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   11.76
  LONGEST FLOWPATH FROM NODE     11.00 TO NODE     18.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.973
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
"11+ DWELLINGS/ACRE"        D        2.96      0.20      0.200     75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =     2.96      SUBAREA RUNOFF(CFS) =     7.81
EFFECTIVE AREA(ACRES) =      11.21   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =        11.2       PEAK FLOW RATE(CFS) =      29.33

****************************************************************************
FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   11.76
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.973
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        2.84      0.20      0.200     75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =     2.84      SUBAREA RUNOFF(CFS) =     7.50
EFFECTIVE AREA(ACRES) =      14.05   AREA-AVERAGED Fm(INCH/HR) =  0.06
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
TOTAL AREA(ACRES) =        14.1       PEAK FLOW RATE(CFS) =      36.83

****************************************************************************
FLOW PROCESS FROM NODE     18.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   706.00  DOWNSTREAM(FEET) =   705.00
FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.87
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      36.83
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.85
LONGEST FLOWPATH FROM NODE     11.00 TO NODE     20.00 =    1485.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   11.85
RAINFALL INTENSITY(INCH/HR) =   2.96
AREA-AVERAGED Fm(INCH/HR) =  0.06
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.30
EFFECTIVE STREAM AREA(ACRES) =      14.05
TOTAL STREAM AREA(ACRES) =      14.05
PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.83

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1       58.00   15.92    2.505  0.20( 0.09) 0.44      26.6       1.00
    2       36.83   11.85    2.960  0.20( 0.06) 0.30      14.1      11.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1       88.14   11.85    2.960  0.20( 0.08) 0.38      33.8      11.00
    2       89.04   15.92    2.505  0.20( 0.08) 0.39      40.6       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      89.04    Tc(MIN.) =    15.92
EFFECTIVE AREA(ACRES) =      40.64   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =       40.6
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    3080.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   705.00  DOWNSTREAM(FEET) =   655.00
FLOW LENGTH(FEET) =   930.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  20.95
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      89.04
PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =   16.66
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    4010.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   16.66
RAINFALL INTENSITY(INCH/HR) =   2.44
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.39
EFFECTIVE STREAM AREA(ACRES) =      40.64
TOTAL STREAM AREA(ACRES) =      40.64
PEAK FLOW RATE(CFS) AT CONFLUENCE =      89.04
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    706.50  DOWNSTREAM(FEET) =    697.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.002
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.350
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.37     0.20      0.100    75    6.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =       1.44
  TOTAL AREA(ACRES) =       0.37   PEAK FLOW RATE(CFS) =       1.44

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  697.50  DOWNSTREAM ELEVATION(FEET) =  655.00
  STREET LENGTH(FEET) =   665.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    7.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.12
  STREET FLOW TRAVEL TIME(MIN.) =   2.49   Tc(MIN.) =    8.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D       0.65     0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CFS) =    2.08
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   8.22
  FLOW VELOCITY(FEET/SEC.) =  4.69   DEPTH*VELOCITY(FT*FT/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     965.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.574
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D       1.02     0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.02      SUBAREA RUNOFF(CFS) =    3.26
  EFFECTIVE AREA(ACRES) =      2.04    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       6.52

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.49
  RAINFALL INTENSITY(INCH/HR) =   3.57
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       2.04
  TOTAL STREAM AREA(ACRES) =       2.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.52

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       88.14   12.59    2.861  0.20( 0.08) 0.38      33.8      11.00
      1       89.04   16.66    2.441  0.20( 0.08) 0.39      40.6       1.00
      2        6.52    8.49    3.574  0.20( 0.02) 0.10       2.0      21.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
```

```
     1       81.23    8.49    3.574  0.20( 0.07) 0.36      24.9      21.00
     2       93.35   12.59    2.861  0.20( 0.07) 0.36      35.9      11.00
     3       93.49   16.66    2.441  0.20( 0.08) 0.38      42.7       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.49    Tc(MIN.) =    16.66
  EFFECTIVE AREA(ACRES) =      42.68   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       42.7
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    4010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     25.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   655.00  DOWNSTREAM(FEET) =   652.30
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.29
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.49
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   16.73
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     25.00 =    4090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.73
  RAINFALL INTENSITY(INCH/HR) =   2.43
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =      42.68
  TOTAL STREAM AREA(ACRES) =      42.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      93.49

****************************************************************************
  FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   130.00
  ELEVATION DATA: UPSTREAM(FEET) =    657.00  DOWNSTREAM(FEET) =    652.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D       0.18      0.20      0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.78
  TOTAL AREA(ACRES) =      0.18   PEAK FLOW RATE(CFS) =      0.78

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     25.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.18
  TOTAL STREAM AREA(ACRES) =       0.18
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.78

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       81.23    8.57    3.556  0.20( 0.07) 0.36      24.9      21.00
      1       93.35   12.66    2.851  0.20( 0.07) 0.36      35.9      11.00
      1       93.49   16.73    2.435  0.20( 0.08) 0.38      42.7       1.00
      2        0.78    5.00    4.824  0.20( 0.02) 0.10       0.2      24.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       65.42    5.00    4.824  0.20( 0.07) 0.35      14.7      24.00
      2       81.81    8.57    3.556  0.20( 0.07) 0.36      25.1      21.00
      3       93.81   12.66    2.851  0.20( 0.07) 0.36      36.1      11.00
      4       93.88   16.73    2.435  0.20( 0.07) 0.37      42.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      93.88    Tc(MIN.) =    16.73
  EFFECTIVE AREA(ACRES) =      42.86   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.37
  TOTAL AREA(ACRES) =       42.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     25.00 =    4090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   652.30  DOWNSTREAM(FEET) =   652.00
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  42.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.98
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      93.88
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   16.99
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     26.00 =    4200.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   16.99
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.414
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        3.05      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =    3.05      SUBAREA RUNOFF(CFS) =    6.16
  EFFECTIVE AREA(ACRES) =     45.91   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       45.9       PEAK FLOW RATE(CFS) =      96.37

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     27.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   652.00  DOWNSTREAM(FEET) =   651.70
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  39.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.66
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      96.37
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   17.19
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     27.00 =    4290.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.35      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.35      SUBAREA RUNOFF(CFS) =    0.74
  EFFECTIVE AREA(ACRES) =     46.26   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       46.3       PEAK FLOW RATE(CFS) =      96.46

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     27.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   17.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.398
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.47      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    0.47      SUBAREA RUNOFF(CFS) =    0.97
  EFFECTIVE AREA(ACRES) =     46.73   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       46.7       PEAK FLOW RATE(CFS) =      97.44

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       74.93    5.50    4.572  0.20( 0.09) 0.44      18.6      24.00
      2       87.65    9.04    3.449  0.20( 0.08) 0.41      28.9      21.00
      3       97.54   13.12    2.794  0.20( 0.08) 0.40      39.9      11.00
      4       97.44   17.19    2.398  0.20( 0.08) 0.41      46.7       1.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      97.54  Tc(MIN.) =   13.12
  AREA-AVERAGED Fm(INCH/HR) =  0.08  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40  EFFECTIVE AREA(ACRES) =      39.93

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   651.70  DOWNSTREAM(FEET) =   651.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  30.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.20
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      97.54
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   13.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     30.00 =    4330.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
MAINLINE Tc(MIN.) =   13.17
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.789
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.66      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =    1.66      SUBAREA RUNOFF(CFS) =    4.02
EFFECTIVE AREA(ACRES) =     41.59   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =       48.4       PEAK FLOW RATE(CFS) =     101.35

****************************************************************************
FLOW PROCESS FROM NODE     30.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   651.00  DOWNSTREAM(FEET) =   650.40
FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  57.0 INCH PIPE IS  41.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.33
ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     101.35
PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =   13.64
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    4540.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   13.64
RAINFALL INTENSITY(INCH/HR) =   2.73
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.40
EFFECTIVE STREAM AREA(ACRES) =      41.59
TOTAL STREAM AREA(ACRES) =      48.39
PEAK FLOW RATE(CFS) AT CONFLUENCE =     101.35

****************************************************************************
FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   235.00
ELEVATION DATA: UPSTREAM(FEET) =    657.00  DOWNSTREAM(FEET) =    650.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.516
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.563
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D        0.18      0.20      0.100    75    5.52
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =       0.74
TOTAL AREA(ACRES) =       0.18   PEAK FLOW RATE(CFS) =       0.74

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    5.52
RAINFALL INTENSITY(INCH/HR) =   4.56
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       0.18
TOTAL STREAM AREA(ACRES) =       0.18
PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.74

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       81.18    6.06    4.328  0.20( 0.09) 0.44      20.2      24.00
    1       92.37    9.58    3.338  0.20( 0.08) 0.41      30.6      21.00
    1      101.35   13.64    2.733  0.20( 0.08) 0.40      41.6      11.00
    1      100.71   17.71    2.357  0.20( 0.08) 0.41      48.4       1.00
    2        0.74    5.52    4.563  0.20( 0.02) 0.10       0.2      31.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       78.78    5.52    4.563  0.20( 0.09) 0.44      18.6      31.00
    2       81.88    6.06    4.328  0.20( 0.09) 0.44      20.4      24.00
    3       92.91    9.58    3.338  0.20( 0.08) 0.41      30.8      21.00
    4      101.79   13.64    2.733  0.20( 0.08) 0.40      41.8      11.00
    5      101.09   17.71    2.357  0.20( 0.08) 0.41      48.6       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     101.79    Tc(MIN.) =    13.64
EFFECTIVE AREA(ACRES) =      41.77   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =       48.6
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     32.00 =    4540.00 FEET.

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

```
  FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   650.40  DOWNSTREAM(FEET) =   646.90
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.13
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     101.79
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.67
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     33.00 =    4585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.730
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.86      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.86      SUBAREA RUNOFF(CFS) =    4.40
  EFFECTIVE AREA(ACRES) =     43.63   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       50.4       PEAK FLOW RATE(CFS) =     103.98

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     34.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   646.90  DOWNSTREAM(FEET) =   646.30
  FLOW LENGTH(FEET) =   190.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.51
  ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     103.98
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   14.09
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     34.00 =    4775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     34.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.683
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.21      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.21      SUBAREA RUNOFF(CFS) =    2.81
  EFFECTIVE AREA(ACRES) =     44.84   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       51.6       PEAK FLOW RATE(CFS) =     104.97

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   646.30  DOWNSTREAM(FEET) =   641.80
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  32.48
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     104.97
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   14.11
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     35.00 =    4805.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     35.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.682
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.71      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.71      SUBAREA RUNOFF(CFS) =    6.30
  EFFECTIVE AREA(ACRES) =     47.55   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       54.4       PEAK FLOW RATE(CFS) =     111.20

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   641.80  DOWNSTREAM(FEET) =   641.70
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.94
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =     111.20
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   14.17
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     37.00 =    4835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.17
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =      47.55
  TOTAL STREAM AREA(ACRES) =      54.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     111.20

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   175.00
  ELEVATION DATA: UPSTREAM(FEET) =    654.50  DOWNSTREAM(FEET) =    641.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.20      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      0.86
  TOTAL AREA(ACRES) =      0.20   PEAK FLOW RATE(CFS) =      0.86

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.20
  TOTAL STREAM AREA(ACRES) =       0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.86

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       93.44    6.07    4.322  0.20( 0.09) 0.45      24.4      31.00
      1       95.49    6.61    4.120  0.20( 0.09) 0.45      26.2      24.00
      1      104.04   10.12    3.237  0.20( 0.09) 0.43      36.5      21.00
      1      111.20   14.17    2.675  0.20( 0.08) 0.42      47.5      11.00
      1      109.54   18.24    2.318  0.20( 0.08) 0.42      54.4       1.00
      2        0.86    5.00    4.824  0.20( 0.02) 0.10       0.2      36.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       86.96    5.00    4.824  0.20( 0.09) 0.45      20.3      36.00*
      2       94.21    6.07    4.322  0.20( 0.09) 0.45      24.6      31.00
      3       96.23    6.61    4.120  0.20( 0.09) 0.45      26.4      24.00
      4      104.62   10.12    3.237  0.20( 0.08) 0.42      36.7      21.00
      5      111.68   14.17    2.675  0.20( 0.08) 0.41      47.7      11.00
      6      109.96   18.24    2.318  0.20( 0.08) 0.42      54.6       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     111.68    Tc(MIN.) =    14.17
  EFFECTIVE AREA(ACRES) =      47.75   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       54.6
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     37.00 =    4835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   641.70  DOWNSTREAM(FEET) =   641.20
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  44.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     111.68
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.53
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    5000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.53
  RAINFALL INTENSITY(INCH/HR) =   2.64
```

```
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.41
EFFECTIVE STREAM AREA(ACRES) =      47.75
TOTAL STREAM AREA(ACRES) =      54.55
PEAK FLOW RATE(CFS) AT CONFLUENCE =     111.68

****************************************************************************
FLOW PROCESS FROM NODE     38.00 TO NODE     39.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    662.00  DOWNSTREAM(FEET) =    659.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.567
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.341
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.54      0.20     0.500    75    9.57
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA RUNOFF(CFS) =       4.49
TOTAL AREA(ACRES) =       1.54   PEAK FLOW RATE(CFS) =       4.49

****************************************************************************
FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  659.00  DOWNSTREAM ELEVATION(FEET) =  655.00
STREET LENGTH(FEET) =   200.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.30
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   13.07
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.37
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.19
STREET FLOW TRAVEL TIME(MIN.) =   0.99   Tc(MIN.) =   10.56
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.160
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        0.59      0.20     0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     0.59      SUBAREA RUNOFF(CFS) =     1.62
EFFECTIVE AREA(ACRES) =       2.13    AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.87

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.68
FLOW VELOCITY(FEET/SEC.) =  3.42   DEPTH*VELOCITY(FT*FT/SEC.) =   1.24
LONGEST FLOWPATH FROM NODE     38.00 TO NODE     40.00 =     500.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.56
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.160
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        0.86      0.20     0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =     0.86      SUBAREA RUNOFF(CFS) =     2.37
EFFECTIVE AREA(ACRES) =       2.99   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       8.23

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   655.00  DOWNSTREAM(FEET) =   641.20
FLOW LENGTH(FEET) =    95.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  17.16
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       8.23
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.65
LONGEST FLOWPATH FROM NODE     38.00 TO NODE     41.00 =     595.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     41.00 TO NODE     41.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

```
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.65
RAINFALL INTENSITY(INCH/HR) =   3.14
AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.50
EFFECTIVE STREAM AREA(ACRES) =       2.99
TOTAL STREAM AREA(ACRES) =       2.99
PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.23

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       86.96    5.39    4.624  0.20( 0.09) 0.45      20.3      36.00
    1       94.21    6.45    4.178  0.20( 0.09) 0.45      24.6      31.00
    1       96.23    6.98    3.993  0.20( 0.09) 0.45      26.4      24.00
    1      104.62   10.48    3.173  0.20( 0.08) 0.42      36.7      21.00
    1      111.68   14.53    2.637  0.20( 0.08) 0.41      47.7      11.00
    1      109.96   18.61    2.293  0.20( 0.08) 0.42      54.6       1.00
    2        8.23   10.65    3.144  0.20( 0.10) 0.50       3.0      38.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       93.15    5.39    4.624  0.20( 0.09) 0.45      21.8      36.00
    2      100.89    6.45    4.178  0.20( 0.09) 0.45      26.4      31.00
    3      103.13    6.98    3.993  0.20( 0.09) 0.45      28.3      24.00
    4      112.80   10.48    3.173  0.20( 0.09) 0.43      39.7      21.00
    5      113.14   10.65    3.144  0.20( 0.09) 0.43      40.2      38.00
    6      118.54   14.53    2.637  0.20( 0.08) 0.42      50.7      11.00
    7      115.89   18.61    2.293  0.20( 0.08) 0.42      57.5       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     118.54    Tc(MIN.) =    14.53
EFFECTIVE AREA(ACRES) =      50.74   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =       57.5
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     41.00 =    5000.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     41.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   641.20  DOWNSTREAM(FEET) =   640.60
FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  60.0 INCH PIPE IS  44.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     118.54
PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =   14.99
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     43.00 =    5210.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   14.99
RAINFALL INTENSITY(INCH/HR) =   2.59
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.42
EFFECTIVE STREAM AREA(ACRES) =      50.74
TOTAL STREAM AREA(ACRES) =      57.54
PEAK FLOW RATE(CFS) AT CONFLUENCE =     118.54

****************************************************************************
FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    657.00  DOWNSTREAM(FEET) =    640.60

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.812
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.049
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"5-7 DWELLINGS/ACRE"       D        1.05      0.20     0.500    75    6.81
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA RUNOFF(CFS) =      3.73
TOTAL AREA(ACRES) =      1.05   PEAK FLOW RATE(CFS) =      3.73

****************************************************************************
FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    6.81
RAINFALL INTENSITY(INCH/HR) =   4.05
AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.50
EFFECTIVE STREAM AREA(ACRES) =       1.05
```

```
TOTAL STREAM AREA(ACRES) =        1.05
PEAK FLOW RATE(CFS) AT CONFLUENCE =        3.73

** CONFLUENCE DATA **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1        93.15    5.88    4.401  0.20( 0.09) 0.45      21.8      36.00
    1       100.89    6.92    4.012  0.20( 0.09) 0.45      26.4      31.00
    1       103.13    7.46    3.847  0.20( 0.09) 0.45      28.3      24.00
    1       112.80   10.96    3.094  0.20( 0.09) 0.43      39.7      21.00
    1       113.14   11.12    3.068  0.20( 0.09) 0.43      40.2      38.00
    1       118.54   14.99    2.591  0.20( 0.08) 0.42      50.7      11.00
    1       115.89   19.07    2.261  0.20( 0.08) 0.42      57.5       1.00
    2         3.73    6.81    4.049  0.20( 0.10) 0.50       1.0      42.00

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

** PEAK FLOW RATE TABLE **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1        96.65    5.88    4.401  0.20( 0.09) 0.46      22.7      36.00
    2       103.80    6.81    4.049  0.20( 0.09) 0.46      27.0      42.00
    3       104.59    6.92    4.012  0.20( 0.09) 0.46      27.4      31.00
    4       106.67    7.46    3.847  0.20( 0.09) 0.45      29.4      24.00
    5       115.63   10.96    3.094  0.20( 0.09) 0.43      40.7      21.00
    6       115.95   11.12    3.068  0.20( 0.09) 0.43      41.2      38.00
    7       120.89   14.99    2.591  0.20( 0.08) 0.42      51.8      11.00
    8       117.93   19.07    2.261  0.20( 0.08) 0.42      58.6       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      120.89    Tc(MIN.) =     14.99
EFFECTIVE AREA(ACRES) =       51.79   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =        58.6
LONGEST FLOWPATH FROM NODE       1.00 TO NODE      43.00 =     5210.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      43.00 TO NODE      47.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    640.60  DOWNSTREAM(FEET) =    640.50
FLOW LENGTH(FEET) =     40.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  60.0 INCH PIPE IS  48.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.17
ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      120.89
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   15.09
LONGEST FLOWPATH FROM NODE       1.00 TO NODE      47.00 =     5250.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      47.00 TO NODE      47.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    15.09
RAINFALL INTENSITY(INCH/HR) =   2.58
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.42
EFFECTIVE STREAM AREA(ACRES) =       51.79
TOTAL STREAM AREA(ACRES) =       58.59
PEAK FLOW RATE(CFS) AT CONFLUENCE =      120.89

****************************************************************************
FLOW PROCESS FROM NODE      44.00 TO NODE      45.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =    300.00
ELEVATION DATA: UPSTREAM(FEET) =     693.00  DOWNSTREAM(FEET) =     687.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =     6.509
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.155
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D       0.10      0.20      0.100    75    6.51
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =       0.37
TOTAL AREA(ACRES) =       0.10   PEAK FLOW RATE(CFS) =       0.37

****************************************************************************
FLOW PROCESS FROM NODE      45.00 TO NODE      46.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =     687.00  DOWNSTREAM(FEET) =     665.00
CHANNEL LENGTH THRU SUBAREA(FEET) =    885.00   CHANNEL SLOPE =  0.0249
CHANNEL BASE(FEET) =     0.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =    1.00
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.259
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       0.30      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.81
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.23
AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   3.49
Tc(MIN.) =   10.00
SUBAREA AREA(ACRES) =      0.30       SUBAREA RUNOFF(CFS) =     0.87
EFFECTIVE AREA(ACRES) =       0.40     AREA-AVERAGED Fm(INCH/HR) =   0.02
```

```
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
TOTAL AREA(ACRES) =        0.4          PEAK FLOW RATE(CFS) =       1.17

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   4.61
LONGEST FLOWPATH FROM NODE     44.00 TO NODE     46.00 =    1185.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   665.00  DOWNSTREAM(FEET) =   640.50
FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   9.66
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =        1.17
PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   10.29
LONGEST FLOWPATH FROM NODE     44.00 TO NODE     47.00 =    1355.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.29
RAINFALL INTENSITY(INCH/HR) =   3.21
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       0.40
TOTAL STREAM AREA(ACRES) =       0.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.17

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR)  (INCH/HR)           (ACRES)    NODE
    1       96.65    5.98    4.361  0.20( 0.09) 0.46      22.7      36.00
    1      103.80    6.91    4.017  0.20( 0.09) 0.46      27.0      42.00
    1      104.59    7.02    3.981  0.20( 0.09) 0.46      27.4      31.00
    1      106.67    7.55    3.819  0.20( 0.09) 0.45      29.4      24.00
    1      115.63   11.05    3.080  0.20( 0.09) 0.43      40.7      21.00
    1      115.95   11.21    3.054  0.20( 0.09) 0.43      41.2      38.00
    1      120.89   15.09    2.582  0.20( 0.08) 0.42      51.8      11.00
    1      117.93   19.16    2.255  0.20( 0.08) 0.42      58.6       1.00
    2        1.17   10.29    3.206  0.20( 0.02) 0.10       0.4      44.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR)  (INCH/HR)           (ACRES)    NODE
    1       97.58    5.98    4.361  0.20( 0.09) 0.45      22.9      36.00
    2      104.78    6.91    4.017  0.20( 0.09) 0.45      27.2      42.00
    3      105.58    7.02    3.981  0.20( 0.09) 0.45      27.7      31.00
    4      107.69    7.55    3.819  0.20( 0.09) 0.45      29.7      24.00
    5      114.85   10.29    3.206  0.20( 0.09) 0.43      38.7      44.00
    6      116.75   11.05    3.080  0.20( 0.09) 0.43      41.1      21.00
    7      117.06   11.21    3.054  0.20( 0.09) 0.43      41.6      38.00
    8      121.83   15.09    2.582  0.20( 0.08) 0.42      52.2      11.00
    9      118.75   19.16    2.255  0.20( 0.08) 0.42      59.0       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     121.83    Tc(MIN.) =    15.09
EFFECTIVE AREA(ACRES) =      52.19   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =       59.0
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     47.00 =    5250.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     47.00 TO NODE     49.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   640.50  DOWNSTREAM(FEET) =   639.20
FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.47
ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     121.83
PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   15.77
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     49.00 =    5595.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   15.77
RAINFALL INTENSITY(INCH/HR) =   2.52
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.42
EFFECTIVE STREAM AREA(ACRES) =      52.19
TOTAL STREAM AREA(ACRES) =      58.99
PEAK FLOW RATE(CFS) AT CONFLUENCE =     121.83

****************************************************************************
FLOW PROCESS FROM NODE     48.00 TO NODE     49.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
```

```
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    647.00  DOWNSTREAM(FEET) =    639.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.903
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.723
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.66      0.20      0.500    75    7.90
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       2.15
  TOTAL AREA(ACRES) =       0.66   PEAK FLOW RATE(CFS) =       2.15

******************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =  81
------------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =    7.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.723
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.33      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.33      SUBAREA RUNOFF(CFS) =    4.34
  EFFECTIVE AREA(ACRES) =      1.99   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.0       PEAK FLOW RATE(CFS) =       6.49

******************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     49.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.90
  RAINFALL INTENSITY(INCH/HR) =   3.72
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       1.99
  TOTAL STREAM AREA(ACRES) =       1.99
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       97.58    6.70    4.086  0.20( 0.09) 0.45      22.9      36.00
      1      104.78    7.61    3.802  0.20( 0.09) 0.45      27.2      42.00
      1      105.58    7.72    3.772  0.20( 0.09) 0.45      27.7      31.00
      1      107.69    8.26    3.631  0.20( 0.09) 0.45      29.7      24.00
      1      114.85   10.97    3.092  0.20( 0.09) 0.43      38.7      44.00
      1      116.75   11.73    2.977  0.20( 0.09) 0.43      41.1      21.00
      1      117.06   11.90    2.953  0.20( 0.09) 0.43      41.6      38.00
      1      121.83   15.77    2.518  0.20( 0.08) 0.42      52.2      11.00
      1      118.75   19.84    2.211  0.20( 0.08) 0.42      59.0       1.00
      2        6.49    7.90    3.723  0.20( 0.10) 0.50       2.0      48.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      103.63    6.70    4.086  0.20( 0.09) 0.45      24.6      36.00
      2      111.17    7.61    3.802  0.20( 0.09) 0.46      29.1      42.00
      3      112.00    7.72    3.772  0.20( 0.09) 0.46      29.7      31.00
      4      112.78    7.90    3.723  0.20( 0.09) 0.45      30.4      48.00
      5      114.02    8.26    3.631  0.20( 0.09) 0.45      31.7      24.00
      6      120.21   10.97    3.092  0.20( 0.09) 0.44      40.7      44.00
      7      121.90   11.73    2.977  0.20( 0.09) 0.43      43.1      21.00
      8      122.17   11.90    2.953  0.20( 0.09) 0.43      43.6      38.00
      9      126.16   15.77    2.518  0.20( 0.08) 0.42      54.2      11.00
     10      122.53   19.84    2.211  0.20( 0.08) 0.42      61.0       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     126.16    Tc(MIN.) =    15.77
  EFFECTIVE AREA(ACRES) =      54.18   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       61.0
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     49.00 =    5595.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     52.00 IS CODE =  31
------------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   639.20  DOWNSTREAM(FEET) =   632.00
  FLOW LENGTH(FEET) =   705.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  48.0 INCH PIPE IS  36.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.43
  ESTIMATED PIPE DIAMETER(INCH) =  48.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     126.16
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =   16.71
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     52.00 =    6300.00 FEET.

******************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
------------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   16.71
  RAINFALL INTENSITY(INCH/HR) =   2.44
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =       54.18
  TOTAL STREAM AREA(ACRES) =       60.98
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      126.16

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    642.00  DOWNSTREAM(FEET) =    637.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.638
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.540
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.87      0.20     0.500    75    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       2.69
  TOTAL AREA(ACRES) =       0.87   PEAK FLOW RATE(CFS) =       2.69

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  637.00  DOWNSTREAM ELEVATION(FEET) =  632.00
  STREET LENGTH(FEET) =   510.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.53
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   14.19
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.47
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
  STREET FLOW TRAVEL TIME(MIN.) =   3.44   Tc(MIN.) =   12.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.928
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.44      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.44      SUBAREA RUNOFF(CFS) =    3.67
  EFFECTIVE AREA(ACRES) =       2.31    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       5.88

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  15.82
  FLOW VELOCITY(FEET/SEC.) =  2.62   DEPTH*VELOCITY(FT*FT/SEC.) =   1.05
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =     810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.928
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.00      0.20     0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.00      SUBAREA RUNOFF(CFS) =    5.09
  EFFECTIVE AREA(ACRES) =       4.31   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      10.97

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.08
  RAINFALL INTENSITY(INCH/HR) =   2.93
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       4.31
  TOTAL STREAM AREA(ACRES) =       4.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.97
```

```
** CONFLUENCE DATA **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)            (ACRES)    NODE
    1       103.63    7.69    3.780  0.20( 0.09) 0.45      24.6      36.00
    1       111.17    8.60    3.550  0.20( 0.09) 0.46      29.1      42.00
    1       112.00    8.71    3.524  0.20( 0.09) 0.46      29.7      31.00
    1       112.78    8.89    3.484  0.20( 0.09) 0.45      30.4      48.00
    1       114.02    9.24    3.408  0.20( 0.09) 0.45      31.7      24.00
    1       120.21   11.92    2.949  0.20( 0.09) 0.44      40.7      44.00
    1       121.90   12.68    2.849  0.20( 0.09) 0.43      43.1      21.00
    1       122.17   12.85    2.828  0.20( 0.09) 0.43      43.6      38.00
    1       126.16   16.71    2.437  0.20( 0.08) 0.42      54.2      11.00
    1       122.53   20.79    2.153  0.20( 0.08) 0.42      61.0       1.00
    2        10.97   12.08    2.928  0.20( 0.10) 0.50       4.3      50.00

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

** PEAK FLOW RATE TABLE **
 STREAM        Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER      (CFS)   (MIN.) (INCH/HR) (INCH/HR)            (ACRES)    NODE
    1       112.73    7.69    3.780  0.20( 0.09) 0.46      27.4      36.00
    2       120.69    8.60    3.550  0.20( 0.09) 0.46      32.2      42.00
    3       121.57    8.71    3.524  0.20( 0.09) 0.46      32.8      31.00
    4       122.44    8.89    3.484  0.20( 0.09) 0.46      33.5      48.00
    5       123.83    9.24    3.408  0.20( 0.09) 0.46      35.0      24.00
    6       131.12   11.92    2.949  0.20( 0.09) 0.44      44.9      44.00
    7       131.52   12.08    2.928  0.20( 0.09) 0.44      45.5      50.00
    8       132.56   12.68    2.849  0.20( 0.09) 0.44      47.4      21.00
    9       132.75   12.85    2.828  0.20( 0.09) 0.44      47.9      38.00
   10       135.22   16.71    2.437  0.20( 0.09) 0.43      58.5      11.00
   11       130.50   20.79    2.153  0.20( 0.09) 0.43      65.3       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     135.22    Tc(MIN.) =    16.71
EFFECTIVE AREA(ACRES) =      58.49   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.43
TOTAL AREA(ACRES) =       65.3
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     52.00 =    6300.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     52.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   632.00  DOWNSTREAM(FEET) =   628.00
FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  30.00
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     135.22
PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   16.73
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     63.00 =    6340.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   16.73
RAINFALL INTENSITY(INCH/HR) =   2.43
AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.43
EFFECTIVE STREAM AREA(ACRES) =      58.49
TOTAL STREAM AREA(ACRES) =      65.29
PEAK FLOW RATE(CFS) AT CONFLUENCE =     135.22

****************************************************************************
FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    694.00  DOWNSTREAM(FEET) =    683.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.766
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.450
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D       2.25      0.20      0.100    75    5.77
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =       8.97
TOTAL AREA(ACRES) =       2.25   PEAK FLOW RATE(CFS) =       8.97

****************************************************************************
FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    683.00  DOWNSTREAM(FEET) =    665.00
CHANNEL LENGTH THRU SUBAREA(FEET) =  1050.00   CHANNEL SLOPE =  0.0171
CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.425
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       8.03      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      21.42
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.16
AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   3.39
```

```
Tc(MIN.) =    9.16
SUBAREA AREA(ACRES) =     8.03       SUBAREA RUNOFF(CFS) =   24.61
EFFECTIVE AREA(ACRES) =     10.28     AREA-AVERAGED Fm(INCH/HR) =   0.02
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.10
TOTAL AREA(ACRES) =       10.3         PEAK FLOW RATE(CFS) =      31.50

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   5.88
LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =    1350.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   665.00  DOWNSTREAM(FEET) =   633.00
FLOW LENGTH(FEET) =   675.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  15.50
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      31.50
PIPE TRAVEL TIME(MIN.) =   0.73    Tc(MIN.) =    9.88
LONGEST FLOWPATH FROM NODE     53.00 TO NODE     56.00 =    2025.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.88
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.280
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.49      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    4.26
EFFECTIVE AREA(ACRES) =     11.77   AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
TOTAL AREA(ACRES) =       11.8       PEAK FLOW RATE(CFS) =      34.43

****************************************************************************
FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.88
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.280
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        1.30      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.72
EFFECTIVE AREA(ACRES) =     13.07   AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
TOTAL AREA(ACRES) =       13.1       PEAK FLOW RATE(CFS) =      38.15

****************************************************************************
FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   633.00  DOWNSTREAM(FEET) =   632.60
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.27
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      38.15
PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    9.93
LONGEST FLOWPATH FROM NODE     53.00 TO NODE     57.00 =    2055.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     57.00 TO NODE     57.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.93
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.271
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        2.55      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =    2.55      SUBAREA RUNOFF(CFS) =    7.28
EFFECTIVE AREA(ACRES) =     15.62   AREA-AVERAGED Fm(INCH/HR) =  0.05
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.24
TOTAL AREA(ACRES) =       15.6       PEAK FLOW RATE(CFS) =      45.32

****************************************************************************
FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   632.60  DOWNSTREAM(FEET) =   629.00
FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.73
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      45.32
PIPE TRAVEL TIME(MIN.) =   0.40    Tc(MIN.) =   10.33
LONGEST FLOWPATH FROM NODE     53.00 TO NODE     58.00 =    2310.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.199
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.46      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     1.46      SUBAREA RUNOFF(CFS) =     4.07
  EFFECTIVE AREA(ACRES) =      17.08   AREA-AVERAGED Fm(INCH/HR) =  0.05
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =        17.1       PEAK FLOW RATE(CFS) =      48.38

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.199
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.93      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     1.93      SUBAREA RUNOFF(CFS) =     5.38
  EFFECTIVE AREA(ACRES) =      19.01   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =        19.0       PEAK FLOW RATE(CFS) =      53.77

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     63.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   628.00
  FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  31.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.43
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      53.77
  PIPE TRAVEL TIME(MIN.) =   0.47    Tc(MIN.) =   10.80
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     63.00 =    2520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     63.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.80
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =      19.01
  TOTAL STREAM AREA(ACRES) =      19.01
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      53.77

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      112.73    7.72    3.773  0.20( 0.09) 0.46      27.4      36.00
      1      120.69    8.62    3.544  0.20( 0.09) 0.46      32.2      42.00
      1      121.57    8.73    3.519  0.20( 0.09) 0.46      32.8      31.00
      1      122.44    8.91    3.479  0.20( 0.09) 0.46      33.5      48.00
      1      123.83    9.26    3.403  0.20( 0.09) 0.46      35.0      24.00
      1      131.12   11.95    2.946  0.20( 0.09) 0.44      44.9      44.00
      1      131.52   12.10    2.925  0.20( 0.09) 0.44      45.5      50.00
      1      132.56   12.70    2.846  0.20( 0.09) 0.44      47.4      21.00
      1      132.75   12.87    2.825  0.20( 0.09) 0.44      47.9      38.00
      1      135.22   16.73    2.435  0.20( 0.09) 0.43      58.5      11.00
      1      130.50   20.81    2.152  0.20( 0.09) 0.43      65.3       1.00
      2       53.77   10.80    3.119  0.20( 0.06) 0.28      19.0      53.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1      159.34    7.72    3.773  0.20( 0.08) 0.40      41.0      36.00
      2      169.55    8.62    3.544  0.20( 0.08) 0.40      47.4      42.00
      3      170.70    8.73    3.519  0.20( 0.08) 0.40      48.1      31.00
      4      171.99    8.91    3.479  0.20( 0.08) 0.40      49.2      48.00
      5      174.21    9.26    3.403  0.20( 0.08) 0.40      51.3      24.00
      6      181.77   10.80    3.119  0.20( 0.08) 0.40      59.7      53.00
      7      181.85   11.95    2.946  0.20( 0.08) 0.40      63.9      44.00
      8      181.88   12.10    2.925  0.20( 0.08) 0.39      64.5      50.00
      9      181.52   12.70    2.846  0.20( 0.08) 0.39      66.4      21.00
     10      181.35   12.87    2.825  0.20( 0.08) 0.39      66.9      38.00
     11      176.97   16.73    2.435  0.20( 0.08) 0.39      77.5      11.00
     12      167.28   20.81    2.152  0.20( 0.08) 0.40      84.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      181.88    Tc(MIN.) =    12.10
  EFFECTIVE AREA(ACRES) =      64.48   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =       84.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     63.00 =    6340.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.00  DOWNSTREAM(FEET) =   577.00
  FLOW LENGTH(FEET) =   360.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  26.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  36.21
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     181.88
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   12.27
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     66.00 =    6700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.27
  RAINFALL INTENSITY(INCH/HR) =   2.90
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =      64.48
  TOTAL STREAM AREA(ACRES) =      84.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     181.88

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    606.10  DOWNSTREAM(FEET) =    599.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.053
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.683
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.14      0.20      0.500    75    8.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       3.68
  TOTAL AREA(ACRES) =       1.14   PEAK FLOW RATE(CFS) =       3.68

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  599.00  DOWNSTREAM ELEVATION(FEET) =  577.00
  STREET LENGTH(FEET) =   710.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 54.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.24
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.68
  STREET FLOW TRAVEL TIME(MIN.) =   2.74   Tc(MIN.) =   10.79
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.121
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.61      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.61      SUBAREA RUNOFF(CFS) =    7.10
  EFFECTIVE AREA(ACRES) =      3.75    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      10.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  15.29
  FLOW VELOCITY(FEET/SEC.) =  4.67   DEPTH*VELOCITY(FT*FT/SEC.) =   1.98
  LONGEST FLOWPATH FROM NODE     64.00 TO NODE     66.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.79
  RAINFALL INTENSITY(INCH/HR) =   3.12
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.75
  TOTAL STREAM AREA(ACRES) =       3.75
```

```
PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.20

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      159.34    7.89    3.727  0.20( 0.08) 0.40      41.0      36.00
    1      169.55    8.79    3.506  0.20( 0.08) 0.40      47.4      42.00
    1      170.70    8.90    3.482  0.20( 0.08) 0.40      48.1      31.00
    1      171.99    9.08    3.442  0.20( 0.08) 0.40      49.2      48.00
    1      174.21    9.43    3.369  0.20( 0.08) 0.40      51.3      24.00
    1      181.77   10.97    3.093  0.20( 0.08) 0.40      59.7      53.00
    1      181.85   12.11    2.923  0.20( 0.08) 0.40      63.9      44.00
    1      181.88   12.27    2.903  0.20( 0.08) 0.39      64.5      50.00
    1      181.52   12.87    2.825  0.20( 0.08) 0.39      66.4      21.00
    1      181.35   13.03    2.805  0.20( 0.08) 0.39      66.9      38.00
    1      176.97   16.90    2.421  0.20( 0.08) 0.39      77.5      11.00
    1      167.28   20.98    2.142  0.20( 0.08) 0.40      84.3       1.00
    2       10.20   10.79    3.121  0.20( 0.10) 0.50       3.8      64.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      168.29    7.89    3.727  0.20( 0.08) 0.41      43.7      36.00
    2      178.91    8.79    3.506  0.20( 0.08) 0.41      50.4      42.00
    3      180.11    8.90    3.482  0.20( 0.08) 0.41      51.2      31.00
    4      181.48    9.08    3.442  0.20( 0.08) 0.41      52.4      48.00
    5      183.85    9.43    3.369  0.20( 0.08) 0.41      54.6      24.00
    6      191.10   10.79    3.121  0.20( 0.08) 0.40      62.5      64.00
    7      191.87   10.97    3.093  0.20( 0.08) 0.40      63.4      53.00
    8      191.37   12.11    2.923  0.20( 0.08) 0.40      67.7      44.00
    9      191.33   12.27    2.903  0.20( 0.08) 0.40      68.2      50.00
   10      190.72   12.87    2.825  0.20( 0.08) 0.40      70.2      21.00
   11      190.47   13.03    2.805  0.20( 0.08) 0.40      70.7      38.00
   12      184.80   16.90    2.421  0.20( 0.08) 0.40      81.2      11.00
   13      174.17   20.98    2.142  0.20( 0.08) 0.40      88.1       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     191.87    Tc(MIN.) =    10.97
EFFECTIVE AREA(ACRES) =      63.43   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
TOTAL AREA(ACRES) =       88.1
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     66.00 =    6700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     66.00 TO NODE     70.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   577.00  DOWNSTREAM(FEET) =   574.00
FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  22.05
ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     191.87
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.03
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    6785.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   11.03
RAINFALL INTENSITY(INCH/HR) =   3.08
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.40
EFFECTIVE STREAM AREA(ACRES) =      63.43
TOTAL STREAM AREA(ACRES) =      88.05
PEAK FLOW RATE(CFS) AT CONFLUENCE =     191.87

****************************************************************************
FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    606.10  DOWNSTREAM(FEET) =    598.50

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.208
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.267
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D       0.60      0.20      0.100    75    6.21
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      2.29
TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.29

****************************************************************************
FLOW PROCESS FROM NODE     68.00 TO NODE     70.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  598.50  DOWNSTREAM ELEVATION(FEET) =  574.00
STREET LENGTH(FEET) =   675.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 54.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.10
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   10.89
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.48
STREET FLOW TRAVEL TIME(MIN.) =   2.65   Tc(MIN.) =    8.86
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.489
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        1.80      0.20      0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    5.59
EFFECTIVE AREA(ACRES) =      2.40    AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
TOTAL AREA(ACRES) =         2.4         PEAK FLOW RATE(CFS) =       7.46

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.90
FLOW VELOCITY(FEET/SEC.) =  4.64   DEPTH*VELOCITY(FT*FT/SEC.) =   1.78
LONGEST FLOWPATH FROM NODE     67.00 TO NODE     70.00 =     975.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     70.00 TO NODE     70.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    8.86
RAINFALL INTENSITY(INCH/HR) =   3.49
AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.17
EFFECTIVE STREAM AREA(ACRES) =       2.40
TOTAL STREAM AREA(ACRES) =       2.40
PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.46

** CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      168.29    7.95    3.709  0.20( 0.08) 0.41      43.7      36.00
    1      178.91    8.85    3.491  0.20( 0.08) 0.41      50.4      42.00
    1      180.11    8.96    3.467  0.20( 0.08) 0.41      51.2      31.00
    1      181.48    9.14    3.428  0.20( 0.08) 0.41      52.4      48.00
    1      183.85    9.49    3.356  0.20( 0.08) 0.41      54.6      24.00
    1      191.10   10.85    3.111  0.20( 0.08) 0.40      62.5      64.00
    1      191.87   11.03    3.083  0.20( 0.08) 0.40      63.4      53.00
    1      191.37   12.18    2.915  0.20( 0.08) 0.40      67.7      44.00
    1      191.33   12.33    2.894  0.20( 0.08) 0.40      68.2      50.00
    1      190.72   12.93    2.817  0.20( 0.08) 0.40      70.2      21.00
    1      190.47   13.10    2.797  0.20( 0.08) 0.40      70.7      38.00
    1      184.80   16.96    2.416  0.20( 0.08) 0.40      81.2      11.00
    1      174.17   21.05    2.138  0.20( 0.08) 0.40      88.1       1.00
    2        7.46    8.86    3.489  0.20( 0.03) 0.17       2.4      67.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      175.41    7.95    3.709  0.20( 0.08) 0.40      45.8      36.00
    2      186.37    8.85    3.491  0.20( 0.08) 0.40      52.8      42.00
    3      186.47    8.86    3.489  0.20( 0.08) 0.40      52.9      67.00
    4      187.52    8.96    3.467  0.20( 0.08) 0.40      53.6      31.00
    5      188.81    9.14    3.428  0.20( 0.08) 0.40      54.8      48.00
    6      191.02    9.49    3.356  0.20( 0.08) 0.40      57.0      24.00
    7      197.74   10.85    3.111  0.20( 0.08) 0.40      64.9      64.00
    8      198.46   11.03    3.083  0.20( 0.08) 0.39      65.8      53.00
    9      197.59   12.18    2.915  0.20( 0.08) 0.39      70.1      44.00
   10      197.51   12.33    2.894  0.20( 0.08) 0.39      70.6      50.00
   11      196.73   12.93    2.817  0.20( 0.08) 0.39      72.6      21.00
   12      196.44   13.10    2.797  0.20( 0.08) 0.39      73.1      38.00
   13      189.95   16.96    2.416  0.20( 0.08) 0.39      83.6      11.00
   14      178.71   21.05    2.138  0.20( 0.08) 0.39      90.5       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     198.46    Tc(MIN.) =    11.03
EFFECTIVE AREA(ACRES) =      65.83   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =       90.5
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     70.00 =    6785.00 FEET.
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)      =       90.5  TC(MIN.) =     11.03
EFFECTIVE AREA(ACRES) =     65.83  AREA-AVERAGED Fm(INCH/HR)=  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.394
PEAK FLOW RATE(CFS)    =     198.46

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      175.41    7.95    3.709  0.20( 0.08) 0.40      45.8      36.00
    2      186.37    8.85    3.491  0.20( 0.08) 0.40      52.8      42.00
    3      186.47    8.86    3.489  0.20( 0.08) 0.40      52.9      67.00
    4      187.52    8.96    3.467  0.20( 0.08) 0.40      53.6      31.00
    5      188.81    9.14    3.428  0.20( 0.08) 0.40      54.8      48.00
    6      191.02    9.49    3.356  0.20( 0.08) 0.40      57.0      24.00
    7      197.74   10.85    3.111  0.20( 0.08) 0.40      64.9      64.00
    8      198.46   11.03    3.083  0.20( 0.08) 0.39      65.8      53.00
    9      197.59   12.18    2.915  0.20( 0.08) 0.39      70.1      44.00
   10      197.51   12.33    2.894  0.20( 0.08) 0.39      70.6      50.00
```

11	196.73	12.93	2.817	0.20(0.08)	0.39	72.6	21.00
12	196.44	13.10	2.797	0.20(0.08)	0.39	73.1	38.00
13	189.95	16.96	2.416	0.20(0.08)	0.39	83.6	11.00
14	178.71	21.05	2.138	0.20(0.08)	0.39	90.5	1.00

END OF RATIONAL METHOD ANALYSIS

AREA 'C'

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

                     THIS IS HUNSAKER & ASSOCIATES
                              Irvine, Inc
                     Planning * Engineering * Surveying
          Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* W.O. #789-26, BAKER RANCH                                                *
* 25-YR STUDY                                                              *
* AREA 'C'                                                                 *
 ****************************************************************************

  FILE NAME: BR_C25.DAT
  TIME/DATE OF STUDY: 17:07 03/08/2011
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ======  =====  =======
  1   66.0     61.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   56.0     51.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  3   54.0     49.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  4   42.0     37.0    0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  5   20.0     15.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   18.0     13.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  7   15.0     10.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  8   14.0      9.0    0.017/0.017/0.020   0.50    1.50 0.0313 0.125 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      2.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    777.00  DOWNSTREAM(FEET) =    765.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.077
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.442
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.21      0.20     0.900    75    9.08
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =       0.62
  TOTAL AREA(ACRES) =       0.21   PEAK FLOW RATE(CFS) =       0.62

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    765.00  DOWNSTREAM(FEET) =    735.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.0600
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.231
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.43      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.78
  AVERAGE FLOW DEPTH(FEET) =   0.41   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =   10.15
  SUBAREA AREA(ACRES) =     1.43       SUBAREA RUNOFF(CFS) =    3.93
  EFFECTIVE AREA(ACRES) =      1.64     AREA-AVERAGED Fm(INCH/HR) =   0.18
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.90
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       4.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.50   FLOW VELOCITY(FEET/SEC.) =   8.98
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      3.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   735.00  DOWNSTREAM(FEET) =   729.70
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.50
  PIPE TRAVEL TIME(MIN.) =   2.59    Tc(MIN.) =   12.74
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      4.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   12.74
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.842
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.15      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    1.15      SUBAREA RUNOFF(CFS) =    2.75
  EFFECTIVE AREA(ACRES) =      2.79   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        2.8       PEAK FLOW RATE(CFS) =       6.68

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      5.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   729.70  DOWNSTREAM(FEET) =   724.70
  FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.68
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =   13.42
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      5.00 =    1850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      5.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   13.42
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.759
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.98      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =    0.98      SUBAREA RUNOFF(CFS) =    2.27
  EFFECTIVE AREA(ACRES) =      3.77   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =        3.8       PEAK FLOW RATE(CFS) =       8.75

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   724.70  DOWNSTREAM(FEET) =   724.60
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.94
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   13.48
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE      6.00 =    1870.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      6.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   13.48
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.751
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        4.39      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.39      SUBAREA RUNOFF(CFS) =   10.79
  EFFECTIVE AREA(ACRES) =      8.16   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
  TOTAL AREA(ACRES) =        8.2       PEAK FLOW RATE(CFS) =      19.52

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   724.60  DOWNSTREAM(FEET) =   721.00
  FLOW LENGTH(FEET) =   530.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.77
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.52
  PIPE TRAVEL TIME(MIN.) =   1.30    Tc(MIN.) =   14.79
```

```
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    2400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.79
  RAINFALL INTENSITY(INCH/HR) =   2.61
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.47
  EFFECTIVE STREAM AREA(ACRES) =       8.16
  TOTAL STREAM AREA(ACRES) =       8.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      19.52

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    744.50  DOWNSTREAM(FEET) =    743.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.152
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.658
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        3.58      0.20     0.100    75    8.15
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      11.72
  TOTAL AREA(ACRES) =       3.58   PEAK FLOW RATE(CFS) =     11.72

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      9.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   743.00  DOWNSTREAM(FEET) =   735.50
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.72
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.30
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE      9.00 =     395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE      9.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.622
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        3.63      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     3.63      SUBAREA RUNOFF(CFS) =    11.77
  EFFECTIVE AREA(ACRES) =       7.21   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        7.2       PEAK FLOW RATE(CFS) =      23.37

****************************************************************************
  FLOW PROCESS FROM NODE      9.00 TO NODE     10.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   735.50  DOWNSTREAM(FEET) =   721.00
  FLOW LENGTH(FEET) =   750.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.51
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.37
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE      7.00 TO NODE     10.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.49
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.357
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        6.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     6.16      SUBAREA RUNOFF(CFS) =    18.50
  EFFECTIVE AREA(ACRES) =      13.37   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =       13.4       PEAK FLOW RATE(CFS) =      40.16

****************************************************************************
  FLOW PROCESS FROM NODE     10.00 TO NODE     10.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    9.49
RAINFALL INTENSITY(INCH/HR) =   3.36
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =      13.37
TOTAL STREAM AREA(ACRES) =      13.37
PEAK FLOW RATE(CFS) AT CONFLUENCE =      40.16

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       19.52   14.79    2.611  0.20( 0.09) 0.47       8.2       1.00
    2       40.16    9.49    3.357  0.20( 0.02) 0.10      13.4       7.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       56.39    9.49    3.357  0.20( 0.04) 0.20      18.6       7.00
    2       50.69   14.79    2.611  0.20( 0.05) 0.24      21.5       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      56.39    Tc(MIN.) =     9.49
EFFECTIVE AREA(ACRES) =      18.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
TOTAL AREA(ACRES) =       21.5
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     10.00 =    2400.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     10.00 TO NODE     11.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   721.00  DOWNSTREAM(FEET) =   710.00
FLOW LENGTH(FEET) =   300.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.69
ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      56.39
PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.78
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     11.00 =    2700.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    9.78
RAINFALL INTENSITY(INCH/HR) =   3.30
AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.20
EFFECTIVE STREAM AREA(ACRES) =      18.60
TOTAL STREAM AREA(ACRES) =      21.53
PEAK FLOW RATE(CFS) AT CONFLUENCE =      56.39

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   7
----------------------------------------------------------------------------
>>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
USER-SPECIFIED VALUES ARE AS FOLLOWS:
TC(MIN.) =    5.00   RAINFALL INTENSITY(INCH/HR) =  4.82
EFFECTIVE AREA(ACRES) =     0.50
TOTAL AREA(ACRES) =     0.50        PEAK FLOW RATE(CFS) =      1.30
AREA-AVERAGED Fm(INCH/HR) =   0.02  AREA-AVERAGED Fp(INCH/HR) =   0.20
AREA-AVERAGED Ap =  0.10
NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
      CONFLUENCE ANALYSES.

****************************************************************************
FLOW PROCESS FROM NODE     11.00 TO NODE     11.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    5.00
RAINFALL INTENSITY(INCH/HR) =   4.82
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       0.50
TOTAL STREAM AREA(ACRES) =       0.50
PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.30

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       56.39    9.78    3.299  0.20( 0.04) 0.20      18.6       7.00
    1       50.69   15.10    2.580  0.20( 0.05) 0.24      21.5       1.00
    2        1.30    5.00    4.824  0.20( 0.02) 0.10       0.5      11.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       43.60    5.00    4.824  0.20( 0.04) 0.20      10.0      11.00
    2       57.27    9.78    3.299  0.20( 0.04) 0.20      19.1       7.00
    3       51.39   15.10    2.580  0.20( 0.05) 0.24      22.0       1.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       57.27    Tc(MIN.) =      9.78
  EFFECTIVE AREA(ACRES) =       19.10   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.20
  TOTAL AREA(ACRES) =        22.0
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      11.00 =    2700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      11.00 TO NODE      12.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   710.00  DOWNSTREAM(FEET) =   708.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.61
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       57.27
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      12.00 =    2880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      12.00 TO NODE      12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.07
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.20
  EFFECTIVE STREAM AREA(ACRES) =       19.10
  TOTAL STREAM AREA(ACRES) =       22.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       57.27

****************************************************************************
  FLOW PROCESS FROM NODE      12.00 TO NODE      12.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN.) =     5.00   RAINFALL INTENSITY(INCH/HR) =  4.82
  EFFECTIVE AREA(ACRES) =      3.50
  TOTAL AREA(ACRES) =      3.50         PEAK FLOW RATE(CFS) =       8.80
  AREA-AVERAGED Fm(INCH/HR) =    0.02  AREA-AVERAGED Fp(INCH/HR) =    0.20
  AREA-AVERAGED Ap =  0.10
  NOTE: EFFECTIVE AREA IS USED AS THE TOTAL CONTRIBUTING AREA FOR ALL
        CONFLUENCE ANALYSES.

****************************************************************************
  FLOW PROCESS FROM NODE      12.00 TO NODE      12.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =     5.00
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       3.50
  TOTAL STREAM AREA(ACRES) =       3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.80

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       43.60    5.30    4.666  0.20( 0.04) 0.20      10.0      11.00
      1       57.27   10.07    3.246  0.20( 0.04) 0.20      19.1       7.00
      1       51.39   15.40    2.552  0.20( 0.05) 0.24      22.0       1.00
      2        8.80    5.00    4.824  0.20( 0.02) 0.10       3.5      12.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       51.32    5.00    4.824  0.20( 0.03) 0.17      12.9      12.00
      2       52.11    5.30    4.666  0.20( 0.03) 0.17      13.5      11.00
      3       63.18   10.07    3.246  0.20( 0.04) 0.19      22.6       7.00
      4       56.03   15.40    2.552  0.20( 0.04) 0.22      25.5       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       63.18    Tc(MIN.) =     10.07
  EFFECTIVE AREA(ACRES) =       22.60   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.19
  TOTAL AREA(ACRES) =       25.5
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      12.00 =    2880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      12.00 TO NODE      20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   708.00  DOWNSTREAM(FEET) =   703.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.06
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       63.18
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   10.27
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      20.00 =    3060.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      20.00 TO NODE      20.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   3.21
  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.19
  EFFECTIVE STREAM AREA(ACRES) =       22.60
  TOTAL STREAM AREA(ACRES) =       25.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       63.18

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     15.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   195.00
  ELEVATION DATA: UPSTREAM(FEET) =    765.50  DOWNSTREAM(FEET) =    761.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.398
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.619
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 D        0.29      0.20      0.100    75    5.40
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =       1.20
  TOTAL AREA(ACRES) =       0.29   PEAK FLOW RATE(CFS) =       1.20

****************************************************************************
  FLOW PROCESS FROM NODE     15.00 TO NODE     16.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  4 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  761.30  DOWNSTREAM ELEVATION(FEET) =  755.00
  STREET LENGTH(FEET) =   225.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 42.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  37.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.77
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    6.63
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.12
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
  STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    6.60
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.122
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.31      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.31      SUBAREA RUNOFF(CFS) =    1.14
  EFFECTIVE AREA(ACRES) =      0.60    AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        0.6        PEAK FLOW RATE(CFS) =       2.22

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   7.57
  FLOW VELOCITY(FEET/SEC.) =  3.25   DEPTH*VELOCITY(FT*FT/SEC.) =   0.95
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     16.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     16.00 TO NODE     17.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   755.00  DOWNSTREAM(FEET) =   716.00
  FLOW LENGTH(FEET) =   765.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.11
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.22
  PIPE TRAVEL TIME(MIN.) =   1.57    Tc(MIN.) =    8.17
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     17.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     17.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.653
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        5.48      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    5.48      SUBAREA RUNOFF(CFS) =   17.92
  EFFECTIVE AREA(ACRES) =      6.08   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        6.1        PEAK FLOW RATE(CFS) =      19.88
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     17.00 TO NODE     18.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   716.00  DOWNSTREAM(FEET) =   707.00
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.69
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.88
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     18.00 =    1500.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     18.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.62
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.544
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        3.06      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     3.06      SUBAREA RUNOFF(CFS) =     9.70
  EFFECTIVE AREA(ACRES) =       9.14   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =         9.1       PEAK FLOW RATE(CFS) =      28.99

****************************************************************************
  FLOW PROCESS FROM NODE     18.00 TO NODE     19.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   707.00  DOWNSTREAM(FEET) =   705.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.83
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.99
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    8.71
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     19.00 =    1570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.98      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     1.98      SUBAREA RUNOFF(CFS) =     6.24
  EFFECTIVE AREA(ACRES) =      11.12   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        11.1       PEAK FLOW RATE(CFS) =      35.06

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     19.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.71
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.523
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        2.65      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     2.65      SUBAREA RUNOFF(CFS) =     8.35
  EFFECTIVE AREA(ACRES) =      13.77   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
  TOTAL AREA(ACRES) =        13.8       PEAK FLOW RATE(CFS) =      43.41

****************************************************************************
  FLOW PROCESS FROM NODE     19.00 TO NODE     20.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   705.00  DOWNSTREAM(FEET) =   703.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.08
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.41
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE     14.00 TO NODE     20.00 =    1640.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     20.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.80
  RAINFALL INTENSITY(INCH/HR) =   3.50
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
```

```
EFFECTIVE STREAM AREA(ACRES) =      13.77
TOTAL STREAM AREA(ACRES) =      13.77
PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.41

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1       51.32    5.20    4.715  0.20( 0.03) 0.17      12.9      12.00
    1       52.11    5.51    4.568  0.20( 0.03) 0.17      13.5      11.00
    1       63.18   10.27    3.210  0.20( 0.04) 0.19      22.6       7.00
    1       56.03   15.60    2.534  0.20( 0.04) 0.22      25.5       1.00
    2       43.41    8.80    3.504  0.20( 0.02) 0.10      13.8      14.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1       85.94    5.20    4.715  0.20( 0.03) 0.14      21.1      12.00
    2       87.58    5.51    4.568  0.20( 0.03) 0.14      22.1      11.00
    3      103.17    8.80    3.504  0.20( 0.03) 0.15      33.6      14.00
    4      102.93   10.27    3.210  0.20( 0.03) 0.15      36.4       7.00
    5       87.35   15.60    2.534  0.20( 0.04) 0.18      39.3       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     103.17    Tc(MIN.) =     8.80
EFFECTIVE AREA(ACRES) =      33.56   AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
TOTAL AREA(ACRES) =      39.3
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     20.00 =    3060.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     20.00 TO NODE     23.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   703.00  DOWNSTREAM(FEET) =   667.50
FLOW LENGTH(FEET) =   945.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  25.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.44
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     103.17
PIPE TRAVEL TIME(MIN.) =   0.81    Tc(MIN.) =    9.61
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    4005.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    9.61
RAINFALL INTENSITY(INCH/HR) =   3.33
AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.15
EFFECTIVE STREAM AREA(ACRES) =      33.56
TOTAL STREAM AREA(ACRES) =      39.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =     103.17

****************************************************************************
FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    702.00  DOWNSTREAM(FEET) =    690.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.666
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.494
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp          Ap      SCS   Tc
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 D       0.55      0.20      0.100    75    5.67
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      2.21
TOTAL AREA(ACRES) =      0.55   PEAK FLOW RATE(CFS) =      2.21

****************************************************************************
FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  690.00  DOWNSTREAM ELEVATION(FEET) =  667.50
STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
STREET HALFWIDTH(FEET) = 54.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.19
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.33
  HALFSTREET FLOOD WIDTH(FEET) =    9.83
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.12
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.37
STREET FLOW TRAVEL TIME(MIN.) =   2.43   Tc(MIN.) =    8.09
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.673
SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       1.20      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     1.20      SUBAREA RUNOFF(CFS) =     3.95
EFFECTIVE AREA(ACRES) =       1.75    AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =         1.8        PEAK FLOW RATE(CFS) =       5.75

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.46
FLOW VELOCITY(FEET/SEC.) =  4.39   DEPTH*VELOCITY(FT*FT/SEC.) =   1.57
LONGEST FLOWPATH FROM NODE     21.00 TO NODE     23.00 =     900.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    8.09
RAINFALL INTENSITY(INCH/HR) =   3.67
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       1.75
TOTAL STREAM AREA(ACRES) =       1.75
PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.75

** CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       85.94    6.06    4.328  0.20( 0.03) 0.14      21.1      12.00
    1       87.58    6.36    4.211  0.20( 0.03) 0.14      22.1      11.00
    1      103.17    9.61    3.333  0.20( 0.03) 0.15      33.6      14.00
    1      102.93   11.08    3.075  0.20( 0.03) 0.15      36.4       7.00
    1       87.35   16.45    2.459  0.20( 0.04) 0.18      39.3       1.00
    2        5.75    8.09    3.673  0.20( 0.02) 0.10       1.8      21.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       91.02    6.06    4.328  0.20( 0.03) 0.14      22.4      12.00
    2       92.77    6.36    4.211  0.20( 0.03) 0.14      23.5      11.00
    3      101.66    8.09    3.673  0.20( 0.03) 0.14      30.0      21.00
    4      108.39    9.61    3.333  0.20( 0.03) 0.15      35.3      14.00
    5      107.74   11.08    3.075  0.20( 0.03) 0.15      38.1       7.00
    6       91.19   16.45    2.459  0.20( 0.03) 0.17      41.0       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     108.39    Tc(MIN.) =     9.61
EFFECTIVE AREA(ACRES) =      35.31   AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
TOTAL AREA(ACRES) =       41.0
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     23.00 =    4005.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     26.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   667.50  DOWNSTREAM(FEET) =   666.40
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  36.0 INCH PIPE IS  26.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.38
ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     108.39
PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    9.63
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     26.00 =    4035.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =    9.63
RAINFALL INTENSITY(INCH/HR) =   3.33
AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.15
EFFECTIVE STREAM AREA(ACRES) =      35.31
TOTAL STREAM AREA(ACRES) =      41.05
PEAK FLOW RATE(CFS) AT CONFLUENCE =     108.39

****************************************************************************
FLOW PROCESS FROM NODE     24.00 TO NODE     25.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    703.00  DOWNSTREAM(FEET) =    691.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.666
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.494
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D       0.80      0.20      0.100    75    5.67
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      3.22
```

```
  TOTAL AREA(ACRES) =       0.80   PEAK FLOW RATE(CFS) =       3.22

****************************************************************************
  FLOW PROCESS FROM NODE     25.00 TO NODE     26.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  691.00  DOWNSTREAM ELEVATION(FEET) =  666.40
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 54.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.37
    HALFSTREET FLOOD WIDTH(FEET) =   11.94
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.72
  STREET FLOW TRAVEL TIME(MIN.) =   2.13   Tc(MIN.) =    7.80
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.751
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        2.04      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     2.04      SUBAREA RUNOFF(CFS) =     6.74
  EFFECTIVE AREA(ACRES) =       2.84    AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         2.8        PEAK FLOW RATE(CFS) =       9.43

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.95
  FLOW VELOCITY(FEET/SEC.) =  5.10   DEPTH*VELOCITY(FT*FT/SEC.) =   2.05
  LONGEST FLOWPATH FROM NODE     24.00 TO NODE     26.00 =     900.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     26.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.80
  RAINFALL INTENSITY(INCH/HR) =   3.75
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.32
  EFFECTIVE STREAM AREA(ACRES) =       2.84
  TOTAL STREAM AREA(ACRES) =       2.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       9.43

  ** CONFLUENCE DATA **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       91.02    6.08    4.317  0.20( 0.03) 0.14      22.4      12.00
      1       92.77    6.38    4.201  0.20( 0.03) 0.14      23.5      11.00
      1      101.66    8.12    3.667  0.20( 0.03) 0.14      30.0      21.00
      1      108.39    9.63    3.328  0.20( 0.03) 0.15      35.3      14.00
      1      107.74   11.10    3.071  0.20( 0.03) 0.15      38.1       7.00
      1       91.19   16.48    2.456  0.20( 0.03) 0.17      41.0       1.00
      2        9.43    7.80    3.751  0.20( 0.06) 0.32       2.8      24.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
      1       99.50    6.08    4.317  0.20( 0.03) 0.16      24.6      12.00
      2      101.43    6.38    4.201  0.20( 0.03) 0.16      25.8      11.00
      3      109.45    7.80    3.751  0.20( 0.03) 0.16      31.6      24.00
      4      110.87    8.12    3.667  0.20( 0.03) 0.16      32.8      21.00
      5      116.73    9.63    3.328  0.20( 0.03) 0.16      38.2      14.00
      6      115.43   11.10    3.071  0.20( 0.03) 0.16      41.0       7.00
      7       97.30   16.48    2.456  0.20( 0.04) 0.18      43.9       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     116.73    Tc(MIN.) =     9.63
  EFFECTIVE AREA(ACRES) =      38.15   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.16
  TOTAL AREA(ACRES) =       43.9
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     26.00 =    4035.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     26.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   666.40  DOWNSTREAM(FEET) =   659.00
  FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.35
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     116.73
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.68
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     59.00 =    4110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  10
```

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

****************************************************************************
  FLOW PROCESS FROM NODE     27.00 TO NODE     28.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    689.00  DOWNSTREAM(FEET) =    685.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.359
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.606
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                D        1.08      0.20     0.350    75    8.36
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      3.44
  TOTAL AREA(ACRES) =      1.08   PEAK FLOW RATE(CFS) =      3.44

****************************************************************************
  FLOW PROCESS FROM NODE     28.00 TO NODE     29.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  685.00  DOWNSTREAM ELEVATION(FEET) =  669.50
  STREET LENGTH(FEET) =   780.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.60
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.39
  STREET FLOW TRAVEL TIME(MIN.) =   3.61   Tc(MIN.) =   11.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.944
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        3.00      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.76
  EFFECTIVE AREA(ACRES) =      4.08    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      10.55

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.34
  FLOW VELOCITY(FEET/SEC.) =  3.94   DEPTH*VELOCITY(FT*FT/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     29.00 =    1080.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     29.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.944
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        3.00      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.00      SUBAREA RUNOFF(CFS) =    7.76
  EFFECTIVE AREA(ACRES) =      7.08   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        7.1       PEAK FLOW RATE(CFS) =      18.31

****************************************************************************
  FLOW PROCESS FROM NODE     29.00 TO NODE     30.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   669.50  DOWNSTREAM(FEET) =   664.50
  FLOW LENGTH(FEET) =   315.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.31
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     30.00 =    1395.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
```

```
"11+ DWELLINGS/ACRE"        D        0.50      0.20     0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.27
EFFECTIVE AREA(ACRES) =      7.58   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
TOTAL AREA(ACRES) =        7.6       PEAK FLOW RATE(CFS) =      19.08

****************************************************************************
FLOW PROCESS FROM NODE     30.00 TO NODE     30.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.55
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 D        0.25      0.20     0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.64
EFFECTIVE AREA(ACRES) =      7.83   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =        7.8       PEAK FLOW RATE(CFS) =      19.72

****************************************************************************
FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   664.50  DOWNSTREAM(FEET) =   663.50
FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.51
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      19.72
PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   12.62
LONGEST FLOWPATH FROM NODE     27.00 TO NODE     31.00 =    1440.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.62
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.856
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS               D        1.86      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    1.86      SUBAREA RUNOFF(CFS) =    4.66
EFFECTIVE AREA(ACRES) =      9.69   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
TOTAL AREA(ACRES) =        9.7       PEAK FLOW RATE(CFS) =      24.32

****************************************************************************
FLOW PROCESS FROM NODE     31.00 TO NODE     32.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   663.50  DOWNSTREAM(FEET) =   661.50
FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.21
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      24.32
PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   12.76
LONGEST FLOWPATH FROM NODE     27.00 TO NODE     32.00 =    1530.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     32.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.76
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.839
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS               D        2.80      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    2.80      SUBAREA RUNOFF(CFS) =    6.98
EFFECTIVE AREA(ACRES) =     12.49   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
TOTAL AREA(ACRES) =       12.5       PEAK FLOW RATE(CFS) =      31.15

****************************************************************************
FLOW PROCESS FROM NODE     32.00 TO NODE     33.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   661.50  DOWNSTREAM(FEET) =   661.00
FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      31.15
PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   12.97
LONGEST FLOWPATH FROM NODE     27.00 TO NODE     33.00 =    1620.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
  MAINLINE Tc(MIN.) =   12.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.812
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.16      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.16      SUBAREA RUNOFF(CFS) =     0.40
  EFFECTIVE AREA(ACRES) =      12.65   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       12.6       PEAK FLOW RATE(CFS) =      31.25

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     33.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.812
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.48      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.48      SUBAREA RUNOFF(CFS) =     1.21
  EFFECTIVE AREA(ACRES) =      13.13   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       13.1       PEAK FLOW RATE(CFS) =      32.46

****************************************************************************
  FLOW PROCESS FROM NODE     33.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   661.00  DOWNSTREAM(FEET) =   660.60
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  28.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.45
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.46
  PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =   13.40
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     38.00 =    1760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.40
  RAINFALL INTENSITY(INCH/HR) =   2.76
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.33
  EFFECTIVE STREAM AREA(ACRES) =      13.13
  TOTAL STREAM AREA(ACRES) =      13.13
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      32.46

****************************************************************************
  FLOW PROCESS FROM NODE     34.00 TO NODE     35.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    689.00  DOWNSTREAM(FEET) =    686.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.854
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.491
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                D        1.27      0.20     0.350    75    8.85
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      3.91
  TOTAL AREA(ACRES) =      1.27   PEAK FLOW RATE(CFS) =      3.91

****************************************************************************
  FLOW PROCESS FROM NODE     35.00 TO NODE     36.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  686.00  DOWNSTREAM ELEVATION(FEET) =  681.00
  STREET LENGTH(FEET) =   585.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.32
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   17.75
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.13
  STREET FLOW TRAVEL TIME(MIN.) =   3.73   Tc(MIN.) =   12.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.861
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
      LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D       2.71      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     2.71      SUBAREA RUNOFF(CFS) =     6.81
  EFFECTIVE AREA(ACRES) =       3.98    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =         4.0        PEAK FLOW RATE(CFS) =      10.00

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.44   HALFSTREET FLOOD WIDTH(FEET) =  18.00
  FLOW VELOCITY(FEET/SEC.) =  2.65   DEPTH*VELOCITY(FT*FT/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     36.00 =     885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     36.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.861
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D       2.22      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     2.22      SUBAREA RUNOFF(CFS) =     5.58
  EFFECTIVE AREA(ACRES) =       6.20    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =         6.2        PEAK FLOW RATE(CFS) =      15.58

****************************************************************************
  FLOW PROCESS FROM NODE     36.00 TO NODE     37.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   681.00  DOWNSTREAM(FEET) =   663.50
  FLOW LENGTH(FEET) =   735.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.34
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.58
  PIPE TRAVEL TIME(MIN.) =   1.18    Tc(MIN.) =   13.77
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     37.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
      LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D       0.58      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.58      SUBAREA RUNOFF(CFS) =     1.41
  EFFECTIVE AREA(ACRES) =       6.78    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =         6.8        PEAK FLOW RATE(CFS) =      16.19

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     37.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.77
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.719
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D       5.07      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     5.07      SUBAREA RUNOFF(CFS) =    12.09
  EFFECTIVE AREA(ACRES) =      11.85   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =        11.9       PEAK FLOW RATE(CFS) =      28.28

****************************************************************************
  FLOW PROCESS FROM NODE     37.00 TO NODE     38.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   663.50  DOWNSTREAM(FEET) =   660.60
  FLOW LENGTH(FEET) =    55.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      28.28
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   13.82
  LONGEST FLOWPATH FROM NODE     34.00 TO NODE     38.00 =    1675.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     38.00 TO NODE     38.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.82
  RAINFALL INTENSITY(INCH/HR) =   2.71
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =      11.85
```

```
TOTAL STREAM AREA(ACRES) =      11.85
PEAK FLOW RATE(CFS) AT CONFLUENCE =      28.28

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       32.46   13.40    2.761  0.20( 0.07) 0.33      13.1      27.00
    2       28.28   13.82    2.713  0.20( 0.07) 0.34      11.9      34.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       60.37   13.40    2.761  0.20( 0.07) 0.33      24.6      27.00
    2       60.16   13.82    2.713  0.20( 0.07) 0.33      25.0      34.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      60.37    Tc(MIN.) =    13.40
EFFECTIVE AREA(ACRES) =      24.62   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =       25.0
LONGEST FLOWPATH FROM NODE     27.00 TO NODE     38.00 =    1760.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     38.00 TO NODE     40.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   660.60  DOWNSTREAM(FEET) =   660.40
FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.80
ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      60.37
PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   13.55
LONGEST FLOWPATH FROM NODE     27.00 TO NODE     40.00 =    1820.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   13.55
RAINFALL INTENSITY(INCH/HR) =   2.74
AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.33
EFFECTIVE STREAM AREA(ACRES) =      24.62
TOTAL STREAM AREA(ACRES) =      24.98
PEAK FLOW RATE(CFS) AT CONFLUENCE =      60.37

****************************************************************************
FLOW PROCESS FROM NODE     39.00 TO NODE     40.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
ELEVATION DATA: UPSTREAM(FEET) =    665.50  DOWNSTREAM(FEET) =    660.40

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.099
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.311
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                  D       0.30      0.20      0.100    75    6.10
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA RUNOFF(CFS) =      1.16
TOTAL AREA(ACRES) =      0.30   PEAK FLOW RATE(CFS) =      1.16

****************************************************************************
FLOW PROCESS FROM NODE     40.00 TO NODE     40.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    6.10
RAINFALL INTENSITY(INCH/HR) =   4.31
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =      0.30
TOTAL STREAM AREA(ACRES) =      0.30
PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.16

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       60.37   13.55    2.744  0.20( 0.07) 0.33      24.6      27.00
    1       60.16   13.97    2.697  0.20( 0.07) 0.33      25.0      34.00
    2        1.16    6.10    4.311  0.20( 0.02) 0.10       0.3      39.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       44.25    6.10    4.311  0.20( 0.07) 0.33      11.4      39.00
    2       61.11   13.55    2.744  0.20( 0.07) 0.33      24.9      27.00
    3       60.88   13.97    2.697  0.20( 0.07) 0.33      25.3      34.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      61.11    Tc(MIN.) =    13.55
  EFFECTIVE AREA(ACRES) =      24.92   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =       25.3
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     40.00 =    1820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   660.40  DOWNSTREAM(FEET) =   659.00
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  31.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.41
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      61.11
  PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   14.32
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     59.00 =    2165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       44.25    6.95    4.005  0.20( 0.07) 0.33      11.4      39.00
      2       61.11   14.32    2.659  0.20( 0.07) 0.33      24.9      27.00
      3       60.88   14.75    2.615  0.20( 0.07) 0.33      25.3      34.00
  LONGEST FLOWPATH FROM NODE     27.00 TO NODE     59.00 =    2165.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       99.50    6.13    4.299  0.20( 0.03) 0.16      24.6      12.00
      2      101.43    6.43    4.184  0.20( 0.03) 0.16      25.8      11.00
      3      109.45    7.84    3.739  0.20( 0.03) 0.16      31.6      24.00
      4      110.87    8.16    3.655  0.20( 0.03) 0.16      32.8      21.00
      5      116.73    9.68    3.320  0.20( 0.03) 0.16      38.2      14.00
      6      115.43   11.15    3.064  0.20( 0.03) 0.16      41.0       7.00
      7       97.30   16.52    2.452  0.20( 0.04) 0.18      43.9       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     59.00 =    4110.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      141.46    6.13    4.299  0.20( 0.04) 0.21      34.7      12.00
      2      144.24    6.43    4.184  0.20( 0.04) 0.21      36.4      11.00
      3      148.61    6.95    4.005  0.20( 0.04) 0.21      39.3      39.00
      4      155.74    7.84    3.739  0.20( 0.04) 0.21      44.7      24.00
      5      157.90    8.16    3.655  0.20( 0.04) 0.21      46.4      21.00
      6      167.22    9.68    3.320  0.20( 0.04) 0.21      54.5      14.00
      7      169.28   11.15    3.064  0.20( 0.04) 0.21      60.1       7.00
      8      165.83   14.32    2.659  0.20( 0.05) 0.23      67.6      27.00
      9      164.17   14.75    2.615  0.20( 0.05) 0.23      68.2      34.00
     10      154.30   16.52    2.452  0.20( 0.05) 0.24      69.2       1.00
    TOTAL AREA(ACRES) =        69.2

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      169.28  Tc(MIN.) =   11.147
  EFFECTIVE AREA(ACRES) =     60.06  AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =       69.2
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     59.00 =    4110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
  ELEVATION DATA: UPSTREAM(FEET) =    768.00  DOWNSTREAM(FEET) =    764.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.194
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.273
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        2.62      0.20      0.900    75    6.19
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =       9.65
  TOTAL AREA(ACRES) =       2.62   PEAK FLOW RATE(CFS) =       9.65

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   764.00  DOWNSTREAM(FEET) =   763.60
  FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.1 INCHES
```

```
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.87
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        9.65
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =    6.48
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     43.00 =     195.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.48
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.164
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.43      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =     0.43      SUBAREA RUNOFF(CFS) =     1.54
  EFFECTIVE AREA(ACRES) =       3.05   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =         3.0       PEAK FLOW RATE(CFS) =      10.94

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   763.60  DOWNSTREAM(FEET) =   762.00
  FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       10.94
  PIPE TRAVEL TIME(MIN.) =   1.13    Tc(MIN.) =    7.61
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     44.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.61
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.803
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        1.13      0.20      0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =     1.13      SUBAREA RUNOFF(CFS) =     3.68
  EFFECTIVE AREA(ACRES) =       4.18   AREA-AVERAGED Fm(INCH/HR) =  0.18
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =         4.2       PEAK FLOW RATE(CFS) =      13.63

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     45.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   762.00  DOWNSTREAM(FEET) =   754.00
  FLOW LENGTH(FEET) =   485.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.70
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       13.63
  PIPE TRAVEL TIME(MIN.) =   0.93    Tc(MIN.) =    8.54
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     45.00 =    1025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     45.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.563
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        7.70      0.20      0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     7.70      SUBAREA RUNOFF(CFS) =    23.51
  EFFECTIVE AREA(ACRES) =      11.88   AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =        11.9       PEAK FLOW RATE(CFS) =      36.24

****************************************************************************
  FLOW PROCESS FROM NODE     45.00 TO NODE     46.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   754.00  DOWNSTREAM(FEET) =   735.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       36.24
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.62
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     46.00 =    1145.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     46.00 TO NODE     46.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
MAINLINE Tc(MIN.) =    8.62
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.544
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       0.38      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.21
EFFECTIVE AREA(ACRES) =     12.26   AREA-AVERAGED Fm(INCH/HR) =  0.17
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.84
TOTAL AREA(ACRES) =       12.3       PEAK FLOW RATE(CFS) =      37.25

****************************************************************************
FLOW PROCESS FROM NODE     46.00 TO NODE     47.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   735.00  DOWNSTREAM(FEET) =   705.00
FLOW LENGTH(FEET) =   495.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  18.22
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      37.25
PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    9.07
LONGEST FLOWPATH FROM NODE     41.00 TO NODE     47.00 =    1640.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.07
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.443
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       0.80      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.46
EFFECTIVE AREA(ACRES) =     13.06   AREA-AVERAGED Fm(INCH/HR) =  0.16
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.80
TOTAL AREA(ACRES) =       13.1       PEAK FLOW RATE(CFS) =      38.59

****************************************************************************
FLOW PROCESS FROM NODE     47.00 TO NODE     47.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.07
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.443
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D       2.10      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    6.47
EFFECTIVE AREA(ACRES) =     15.16   AREA-AVERAGED Fm(INCH/HR) =  0.14
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.70
TOTAL AREA(ACRES) =       15.2       PEAK FLOW RATE(CFS) =      45.06

****************************************************************************
FLOW PROCESS FROM NODE     47.00 TO NODE     48.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   705.00  DOWNSTREAM(FEET) =   702.00
FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.65
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      45.06
PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    9.11
LONGEST FLOWPATH FROM NODE     41.00 TO NODE     48.00 =    1685.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     48.00 TO NODE     48.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.11
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.435
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D       0.94      0.20      0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =    0.94      SUBAREA RUNOFF(CFS) =    2.87
EFFECTIVE AREA(ACRES) =     16.10   AREA-AVERAGED Fm(INCH/HR) =  0.13
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.67
TOTAL AREA(ACRES) =       16.1       PEAK FLOW RATE(CFS) =      47.82

****************************************************************************
FLOW PROCESS FROM NODE     48.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   702.00  DOWNSTREAM(FEET) =   668.40
FLOW LENGTH(FEET) =   555.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  19.04
ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      47.82
PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    9.60
LONGEST FLOWPATH FROM NODE     41.00 TO NODE     55.00 =    2240.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.60
  RAINFALL INTENSITY(INCH/HR) =   3.34
  AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.67
  EFFECTIVE STREAM AREA(ACRES) =      16.10
  TOTAL STREAM AREA(ACRES) =      16.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      47.82

****************************************************************************
  FLOW PROCESS FROM NODE     49.00 TO NODE     50.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   150.00
  ELEVATION DATA: UPSTREAM(FEET) =    740.00  DOWNSTREAM(FEET) =    732.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.495
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.160
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.33      0.20     0.900    75    6.49
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA RUNOFF(CFS) =       1.18
  TOTAL AREA(ACRES) =       0.33   PEAK FLOW RATE(CFS) =       1.18

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   732.00  DOWNSTREAM(FEET) =   709.00
  FLOW LENGTH(FEET) =   555.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.18
  PIPE TRAVEL TIME(MIN.) =   1.48    Tc(MIN.) =    7.97
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     51.00 =     705.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     51.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.704
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        5.03      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    5.03      SUBAREA RUNOFF(CFS) =   16.68
  EFFECTIVE AREA(ACRES) =      5.36   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        5.4       PEAK FLOW RATE(CFS) =      17.72

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   709.00  DOWNSTREAM(FEET) =   706.50
  FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.72
  PIPE TRAVEL TIME(MIN.) =   0.56    Tc(MIN.) =    8.54
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     52.00 =     960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.54
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.564
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        4.75      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    4.75      SUBAREA RUNOFF(CFS) =   15.15
  EFFECTIVE AREA(ACRES) =     10.11   AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.13
  TOTAL AREA(ACRES) =       10.1       PEAK FLOW RATE(CFS) =      32.20

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =   706.50  DOWNSTREAM(FEET) =   705.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.64
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.20
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     53.00 =    1110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     53.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.86
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.489
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       2.27      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    2.27      SUBAREA RUNOFF(CFS) =    7.09
  EFFECTIVE AREA(ACRES) =     12.38   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.12
  TOTAL AREA(ACRES) =       12.4       PEAK FLOW RATE(CFS) =      38.60

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   705.50  DOWNSTREAM(FEET) =   704.00
  FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.96
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.60
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     54.00 =    1275.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     54.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.17
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.422
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D       1.97      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    1.97      SUBAREA RUNOFF(CFS) =    6.03
  EFFECTIVE AREA(ACRES) =     14.35   AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.12
  TOTAL AREA(ACRES) =       14.4       PEAK FLOW RATE(CFS) =      43.89

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   704.00  DOWNSTREAM(FEET) =   668.40
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.11
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      43.89
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE     49.00 TO NODE     55.00 =    1425.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.12
  EFFECTIVE STREAM AREA(ACRES) =      14.35
  TOTAL STREAM AREA(ACRES) =      14.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.89

  ** CONFLUENCE DATA **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       47.82    9.60    3.335  0.20( 0.13) 0.67      16.1      41.00
      2       43.89    9.25    3.405  0.20( 0.02) 0.12      14.4      49.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       91.00    9.25    3.405  0.20( 0.08) 0.41      29.9      49.00
      2       90.81    9.60    3.335  0.20( 0.08) 0.41      30.5      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      91.00    Tc(MIN.) =     9.25
  EFFECTIVE AREA(ACRES) =      29.87   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       30.5
```

```
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     55.00 =    2240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     58.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   668.40  DOWNSTREAM(FEET) =   665.00
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.79
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      91.00
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    9.31
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     58.00 =    2310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.31
  RAINFALL INTENSITY(INCH/HR) =   3.39
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      29.87
  TOTAL STREAM AREA(ACRES) =      30.45
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      91.00

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     57.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    706.50  DOWNSTREAM(FEET) =    695.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.715
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.472
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.37      0.20      0.100    75    5.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =       1.48
  TOTAL AREA(ACRES) =       0.37   PEAK FLOW RATE(CFS) =       1.48

****************************************************************************
  FLOW PROCESS FROM NODE     57.00 TO NODE     58.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  5 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  695.00  DOWNSTREAM ELEVATION(FEET) =  665.00
  STREET LENGTH(FEET) =   475.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    8.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.76
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.31
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    7.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.871
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.17      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    1.17      SUBAREA RUNOFF(CFS) =    3.97
  EFFECTIVE AREA(ACRES) =      1.54    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =  10.21
  FLOW VELOCITY(FEET/SEC.) =  5.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.59
  LONGEST FLOWPATH FROM NODE     56.00 TO NODE     58.00 =     775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.38
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.871
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.41      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
```

```
  SUBAREA AREA(ACRES) =     1.41      SUBAREA RUNOFF(CFS) =     4.86
  EFFECTIVE AREA(ACRES) =       2.95   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =         2.9       PEAK FLOW RATE(CFS) =       10.11

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     58.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.38
  RAINFALL INTENSITY(INCH/HR) =   3.87
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.31
  EFFECTIVE STREAM AREA(ACRES) =       2.95
  TOTAL STREAM AREA(ACRES) =       2.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      10.11

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       91.00    9.31    3.394  0.20( 0.08) 0.41      29.9      49.00
      1       90.81    9.65    3.324  0.20( 0.08) 0.41      30.5      41.00
      2       10.11    7.38    3.871  0.20( 0.06) 0.31       2.9      56.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       92.63    7.38    3.871  0.20( 0.08) 0.40      26.6      56.00
      2       99.85    9.31    3.394  0.20( 0.08) 0.40      32.8      49.00
      3       99.47    9.65    3.324  0.20( 0.08) 0.40      33.4      41.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      99.85    Tc(MIN.) =     9.31
  EFFECTIVE AREA(ACRES) =      32.82   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =       33.4
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     58.00 =    2310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     58.00 TO NODE     59.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   665.00  DOWNSTREAM(FEET) =   659.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  24.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.34
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      99.85
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =     9.40
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     59.00 =    2430.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     59.00 TO NODE     59.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       92.63    7.47    3.843  0.20( 0.08) 0.40      26.6      56.00
      2       99.85    9.40    3.375  0.20( 0.08) 0.40      32.8      49.00
      3       99.47    9.75    3.306  0.20( 0.08) 0.40      33.4      41.00
  LONGEST FLOWPATH FROM NODE     41.00 TO NODE     59.00 =    2430.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      141.46    6.13    4.299  0.20( 0.04) 0.21      34.7      12.00
      2      144.24    6.43    4.184  0.20( 0.04) 0.21      36.4      11.00
      3      148.61    6.95    4.005  0.20( 0.04) 0.21      39.3      39.00
      4      155.74    7.84    3.739  0.20( 0.04) 0.21      44.7      24.00
      5      157.90    8.16    3.655  0.20( 0.04) 0.21      46.4      21.00
      6      167.22    9.68    3.320  0.20( 0.04) 0.21      54.5      14.00
      7      169.28   11.15    3.064  0.20( 0.04) 0.21      60.1       7.00
      8      165.83   14.32    2.659  0.20( 0.05) 0.23      67.6      27.00
      9      164.17   14.75    2.615  0.20( 0.05) 0.23      68.2      34.00
     10      154.30   16.52    2.452  0.20( 0.05) 0.24      69.2       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     59.00 =    4110.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      226.65    6.13    4.299  0.20( 0.06) 0.28      56.5      12.00
      2      231.17    6.43    4.184  0.20( 0.06) 0.28      59.3      11.00
      3      238.43    6.95    4.005  0.20( 0.06) 0.28      64.1      39.00
      4      245.43    7.47    3.843  0.20( 0.06) 0.28      69.1      56.00
      5      249.76    7.84    3.739  0.20( 0.06) 0.28      72.5      24.00
      6      253.12    8.16    3.655  0.20( 0.06) 0.28      75.3      21.00
      7      265.37    9.40    3.375  0.20( 0.06) 0.28      85.9      49.00
      8      266.77    9.68    3.320  0.20( 0.06) 0.28      87.8      14.00
      9      266.79    9.75    3.306  0.20( 0.06) 0.28      88.2      41.00
     10      261.29   11.15    3.064  0.20( 0.06) 0.28      93.5       7.00
     11      245.34   14.32    2.659  0.20( 0.06) 0.29     101.0      27.00
     12      242.33   14.75    2.615  0.20( 0.06) 0.29     101.6      34.00
     13      227.44   16.52    2.452  0.20( 0.06) 0.29     102.6       1.00
    TOTAL AREA(ACRES) =       102.6

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      266.79  Tc(MIN.) =     9.746
  EFFECTIVE AREA(ACRES) =      88.21  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
```

```
  TOTAL AREA(ACRES) =       102.6
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      59.00 =     4110.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      59.00 TO NODE      59.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      59.00 TO NODE      62.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    659.00  DOWNSTREAM(FEET) =    643.90
  FLOW LENGTH(FEET) =    840.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  43.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.51
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      266.79
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE       1.00 TO NODE      62.00 =     4950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      62.00 TO NODE      62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.50
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =       88.21
  TOTAL STREAM AREA(ACRES) =      102.57
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      266.79

****************************************************************************
  FLOW PROCESS FROM NODE      60.00 TO NODE      61.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    300.00
  ELEVATION DATA: UPSTREAM(FEET) =     665.50  DOWNSTREAM(FEET) =     658.20

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =     6.259
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.248
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA       Fp          Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D        0.58      0.20      0.100    75    6.26
```

```
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =       2.21
  TOTAL AREA(ACRES) =       0.58   PEAK FLOW RATE(CFS) =       2.21

****************************************************************************
  FLOW PROCESS FROM NODE      61.00 TO NODE      62.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  658.20  DOWNSTREAM ELEVATION(FEET) =  643.90
  STREET LENGTH(FEET) =   630.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 54.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.48
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.46
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.42
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   3.07   Tc(MIN.) =    9.33
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.389
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA       Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.50      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.52
  EFFECTIVE AREA(ACRES) =      2.08    AREA-AVERAGED Fm(INCH/HR) =  0.03
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.17
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       6.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.28
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE      60.00 TO NODE      62.00 =     930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      62.00 TO NODE      62.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    9.33
RAINFALL INTENSITY(INCH/HR) =   3.39
AREA-AVERAGED Fm(INCH/HR) =  0.03
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.17
EFFECTIVE STREAM AREA(ACRES) =       2.08
TOTAL STREAM AREA(ACRES) =       2.08
PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.28

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      226.65    6.92    4.015  0.20( 0.06) 0.28      56.5      12.00
    1      231.17    7.21    3.920  0.20( 0.06) 0.28      59.3      11.00
    1      238.43    7.73    3.770  0.20( 0.06) 0.28      64.1      39.00
    1      245.43    8.25    3.633  0.20( 0.06) 0.28      69.1      56.00
    1      249.76    8.62    3.544  0.20( 0.06) 0.28      72.5      24.00
    1      253.12    8.92    3.475  0.20( 0.06) 0.28      75.3      21.00
    1      265.37   10.16    3.230  0.20( 0.06) 0.28      85.9      49.00
    1      266.77   10.43    3.181  0.20( 0.06) 0.28      87.8      14.00
    1      266.79   10.50    3.169  0.20( 0.06) 0.28      88.2      41.00
    1      261.29   11.91    2.952  0.20( 0.06) 0.28      93.5       7.00
    1      245.34   15.10    2.580  0.20( 0.06) 0.29     101.0      27.00
    1      242.33   15.53    2.540  0.20( 0.06) 0.29     101.6      34.00
    1      227.44   17.31    2.389  0.20( 0.06) 0.29     102.6       1.00
    2        6.28    9.33    3.389  0.20( 0.03) 0.17       2.1      60.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      232.17    6.92    4.015  0.20( 0.06) 0.28      58.0      12.00
    2      236.79    7.21    3.920  0.20( 0.06) 0.28      60.9      11.00
    3      244.23    7.73    3.770  0.20( 0.06) 0.28      65.8      39.00
    4      251.39    8.25    3.633  0.20( 0.06) 0.28      70.9      56.00
    5      255.83    8.62    3.544  0.20( 0.06) 0.28      74.4      24.00
    6      259.28    8.92    3.475  0.20( 0.06) 0.28      77.3      21.00
    7      263.45    9.33    3.389  0.20( 0.06) 0.28      80.9      60.00
    8      271.35   10.16    3.230  0.20( 0.06) 0.28      88.0      49.00
    9      272.66   10.43    3.181  0.20( 0.06) 0.28      89.9      14.00
   10      272.66   10.50    3.169  0.20( 0.06) 0.28      90.3      41.00
   11      266.75   11.91    2.952  0.20( 0.06) 0.28      95.5       7.00
   12      250.11   15.10    2.580  0.20( 0.06) 0.29     103.1      27.00
   13      247.02   15.53    2.540  0.20( 0.06) 0.29     103.7      34.00
   14      231.85   17.31    2.389  0.20( 0.06) 0.29     104.7       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     272.66    Tc(MIN.) =    10.43
EFFECTIVE AREA(ACRES) =      89.91   AREA-AVERAGED Fm(INCH/HR) =  0.06
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
TOTAL AREA(ACRES) =      104.7
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     62.00 =    4950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     82.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   643.90  DOWNSTREAM(FEET) =   643.40
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  57.0 INCH PIPE IS  42.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.45
  ESTIMATED PIPE DIAMETER(INCH) =  57.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     272.66
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE     82.00 =    4975.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     82.00 TO NODE     82.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    714.50  DOWNSTREAM(FEET) =    709.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.638
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.540
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.08      0.20     0.500    75    8.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       3.34
  TOTAL AREA(ACRES) =       1.08   PEAK FLOW RATE(CFS) =       3.34

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  709.50  DOWNSTREAM ELEVATION(FEET) =  702.50
  STREET LENGTH(FEET) =   550.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017
```

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.12
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.39
  HALFSTREET FLOOD WIDTH(FEET) =   15.21
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.93
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.14
STREET FLOW TRAVEL TIME(MIN.) =   3.13   Tc(MIN.) =   11.77
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.972
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"5-7 DWELLINGS/ACRE"        D        2.14      0.20      0.500    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
SUBAREA AREA(ACRES) =    2.14      SUBAREA RUNOFF(CFS) =    5.53
EFFECTIVE AREA(ACRES) =      3.22    AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
TOTAL AREA(ACRES) =         3.2        PEAK FLOW RATE(CFS) =       8.32

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  17.24
FLOW VELOCITY(FEET/SEC.) =  3.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.33
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     65.00 =     850.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   702.50  DOWNSTREAM(FEET) =   699.50
FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.09
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       8.32
PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   12.29
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     66.00 =    1075.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.29
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.899
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.49      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =    1.49      SUBAREA RUNOFF(CFS) =    3.78
EFFECTIVE AREA(ACRES) =      4.71    AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.47
TOTAL AREA(ACRES) =         4.7        PEAK FLOW RATE(CFS) =      11.89

****************************************************************************
FLOW PROCESS FROM NODE     66.00 TO NODE     67.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   699.50  DOWNSTREAM(FEET) =   699.00
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.7 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.26
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       11.89
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   12.35
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     67.00 =    1105.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     67.00 TO NODE     67.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.35
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.891
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.52      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =    1.52      SUBAREA RUNOFF(CFS) =    3.85
EFFECTIVE AREA(ACRES) =      6.23    AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
TOTAL AREA(ACRES) =         6.2        PEAK FLOW RATE(CFS) =      15.70

****************************************************************************
FLOW PROCESS FROM NODE     67.00 TO NODE     68.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   699.00  DOWNSTREAM(FEET) =   698.90
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.84
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       15.70
PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.46
```

```
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     68.00 =    1135.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     68.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.46
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.877
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        2.06      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     2.06      SUBAREA RUNOFF(CFS) =     5.19
  EFFECTIVE AREA(ACRES) =       8.29   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.44
  TOTAL AREA(ACRES) =         8.3       PEAK FLOW RATE(CFS) =      20.81

****************************************************************************
  FLOW PROCESS FROM NODE     68.00 TO NODE     69.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   698.90  DOWNSTREAM(FEET) =   698.80
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.20
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.81
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.55
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     69.00 =    1165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     69.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.865
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        3.75      0.20      0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     3.75      SUBAREA RUNOFF(CFS) =     9.09
  EFFECTIVE AREA(ACRES) =      12.04   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.57
  TOTAL AREA(ACRES) =        12.0       PEAK FLOW RATE(CFS) =      29.81

****************************************************************************
  FLOW PROCESS FROM NODE     69.00 TO NODE     75.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   698.80  DOWNSTREAM(FEET) =   685.00
  FLOW LENGTH(FEET) =   450.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.27
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.81
  PIPE TRAVEL TIME(MIN.) =   0.57    Tc(MIN.) =   13.12
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     75.00 =    1615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.12
  RAINFALL INTENSITY(INCH/HR) =   2.79
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.57
  EFFECTIVE STREAM AREA(ACRES) =      12.04
  TOTAL STREAM AREA(ACRES) =      12.04
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.81

****************************************************************************
  FLOW PROCESS FROM NODE     70.00 TO NODE     71.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   210.00
  ELEVATION DATA: UPSTREAM(FEET) =    708.00  DOWNSTREAM(FEET) =    705.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.426
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.856
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        0.42      0.20      0.400    75    7.43
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA RUNOFF(CFS) =       1.43
  TOTAL AREA(ACRES) =       0.42   PEAK FLOW RATE(CFS) =       1.43

****************************************************************************
  FLOW PROCESS FROM NODE     71.00 TO NODE     72.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
```

```
==============================================================================
  UPSTREAM ELEVATION(FEET) =  705.00  DOWNSTREAM ELEVATION(FEET) =  702.50
  STREET LENGTH(FEET) =   230.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.33
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =   10.54
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.19
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   1.75   Tc(MIN.) =    9.18
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.420
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.60      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    1.80
  EFFECTIVE AREA(ACRES) =      1.02    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        1.0        PEAK FLOW RATE(CFS) =       3.07

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  11.86
  FLOW VELOCITY(FEET/SEC.) =  2.33   DEPTH*VELOCITY(FT*FT/SEC.) =   0.77
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     72.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     72.00 TO NODE     73.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   702.50  DOWNSTREAM(FEET) =   695.00
  FLOW LENGTH(FEET) =   480.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.84
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   1.37    Tc(MIN.) =   10.55
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     73.00 =     920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     73.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.55
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.161
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        1.20      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.20      SUBAREA RUNOFF(CFS) =    3.33
  EFFECTIVE AREA(ACRES) =      2.22    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.16

****************************************************************************
  FLOW PROCESS FROM NODE     73.00 TO NODE     74.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   695.00  DOWNSTREAM(FEET) =   693.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.37
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.16
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   10.67
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     74.00 =     980.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.141
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        1.22      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =    1.22      SUBAREA RUNOFF(CFS) =    3.36
  EFFECTIVE AREA(ACRES) =      3.44    AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =        3.4        PEAK FLOW RATE(CFS) =       9.48

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     74.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.67
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.141
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        3.36      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     3.36      SUBAREA RUNOFF(CFS) =     9.26
  EFFECTIVE AREA(ACRES) =       6.80   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.40
  TOTAL AREA(ACRES) =         6.8       PEAK FLOW RATE(CFS) =      18.74

****************************************************************************
  FLOW PROCESS FROM NODE     74.00 TO NODE     75.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   693.50  DOWNSTREAM(FEET) =   685.00
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.71
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.74
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.70
  LONGEST FLOWPATH FROM NODE     70.00 TO NODE     75.00 =    1030.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     75.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.70
  RAINFALL INTENSITY(INCH/HR) =   3.14
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.40
  EFFECTIVE STREAM AREA(ACRES) =       6.80
  TOTAL STREAM AREA(ACRES) =       6.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.74

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       29.81  13.12    2.794  0.20( 0.11) 0.57      12.0      63.00
      2       18.74  10.70    3.135  0.20( 0.08) 0.40       6.8      70.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       46.16  10.70    3.135  0.20( 0.10) 0.50      16.6      70.00
      2       46.46  13.12    2.794  0.20( 0.10) 0.51      18.8      63.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.46    Tc(MIN.) =    13.12
  EFFECTIVE AREA(ACRES) =      18.84   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.51
  TOTAL AREA(ACRES) =       18.8
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     75.00 =    1615.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     75.00 TO NODE     76.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   685.00  DOWNSTREAM(FEET) =   682.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.19
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.46
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   13.24
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     76.00 =    1720.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     76.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   13.24
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        1.52      0.20      0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     1.52      SUBAREA RUNOFF(CFS) =     3.57
  EFFECTIVE AREA(ACRES) =      20.36   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.53
  TOTAL AREA(ACRES) =       20.4       PEAK FLOW RATE(CFS) =      48.98

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       49.14  10.83    3.115  0.20( 0.11) 0.53      18.1      70.00
      2       48.98  13.24    2.780  0.20( 0.11) 0.53      20.4      63.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =      49.14  Tc(MIN.) =   10.83
  AREA-AVERAGED Fm(INCH/HR) =  0.11  AREA-AVERAGED Fp(INCH/HR) =  0.20
```

```
  AREA-AVERAGED Ap =  0.53  EFFECTIVE AREA(ACRES) =      18.14

****************************************************************************
  FLOW PROCESS FROM NODE     76.00 TO NODE     77.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   682.00  DOWNSTREAM(FEET) =   650.00
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  31.89
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      49.14
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.90
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     77.00 =    1850.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     77.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.90
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.104
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  ".4 DWELLING/ACRE"          D        0.80      0.20     0.900    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
  SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.11
  EFFECTIVE AREA(ACRES) =      18.94   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =       21.2       PEAK FLOW RATE(CFS) =      51.07

****************************************************************************
  FLOW PROCESS FROM NODE     77.00 TO NODE     80.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   650.00  DOWNSTREAM(FEET) =   643.90
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  30.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      51.07
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   10.91
  LONGEST FLOWPATH FROM NODE     63.00 TO NODE     80.00 =    1880.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.91
  RAINFALL INTENSITY(INCH/HR) =   3.10
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =      18.94
  TOTAL STREAM AREA(ACRES) =      21.16
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      51.07

****************************************************************************
  FLOW PROCESS FROM NODE     78.00 TO NODE     79.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   255.00
  ELEVATION DATA: UPSTREAM(FEET) =    665.00  DOWNSTREAM(FEET) =    656.60

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.063
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.967
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.12      0.20     0.500    75    7.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.90
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.90

****************************************************************************
  FLOW PROCESS FROM NODE     79.00 TO NODE     80.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  656.60  DOWNSTREAM ELEVATION(FEET) =  643.90
  STREET LENGTH(FEET) =   600.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 54.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.12
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   13.37
```

```
  AVERAGE FLOW VELOCITY(FEET/SEC.) =     3.57
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =     1.40
STREET FLOW TRAVEL TIME(MIN.) =   2.80   Tc(MIN.) =     9.87
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.283
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        1.52      0.20      0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =     1.52      SUBAREA RUNOFF(CFS) =     4.44
EFFECTIVE AREA(ACRES) =       2.64    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =         2.6        PEAK FLOW RATE(CFS) =       7.65

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.71
FLOW VELOCITY(FEET/SEC.) =  3.76   DEPTH*VELOCITY(FT*FT/SEC.) =   1.56
LONGEST FLOWPATH FROM NODE     78.00 TO NODE     80.00 =     855.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     80.00 TO NODE     80.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =     9.87
RAINFALL INTENSITY(INCH/HR) =   3.28
AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.33
EFFECTIVE STREAM AREA(ACRES) =       2.64
TOTAL STREAM AREA(ACRES) =       2.64
PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.65

** CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1       51.07   10.91    3.101  0.20( 0.11) 0.54      18.9      70.00
    1       50.70   13.33    2.770  0.20( 0.11) 0.55      21.2      63.00
    2        7.65    9.87    3.283  0.20( 0.07) 0.33       2.6      78.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1       56.63    9.87    3.283  0.20( 0.10) 0.51      19.8      78.00
    2       58.28   10.91    3.101  0.20( 0.10) 0.52      21.6      70.00
    3       57.12   13.33    2.770  0.20( 0.10) 0.52      23.8      63.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      58.28    Tc(MIN.) =     10.91
EFFECTIVE AREA(ACRES) =      21.58   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
TOTAL AREA(ACRES) =       23.8
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     80.00 =    1880.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     80.00 TO NODE     82.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   643.90  DOWNSTREAM(FEET) =   643.40
FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  42.0 INCH PIPE IS  31.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      58.28
PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   11.15
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     82.00 =    1990.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     82.00 TO NODE     82.00 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1       56.63   10.11    3.238  0.20( 0.10) 0.51      19.8      78.00
    2       58.28   11.15    3.063  0.20( 0.10) 0.52      21.6      70.00
    3       57.12   13.57    2.741  0.20( 0.10) 0.52      23.8      63.00
LONGEST FLOWPATH FROM NODE     63.00 TO NODE     82.00 =    1990.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR)  (INCH/HR)          (ACRES)    NODE
    1      232.17    6.94    4.008  0.20( 0.06) 0.28      58.0      12.00
    2      236.79    7.23    3.914  0.20( 0.06) 0.28      60.9      11.00
    3      244.23    7.75    3.764  0.20( 0.06) 0.28      65.8      39.00
    4      251.39    8.27    3.627  0.20( 0.06) 0.28      70.9      56.00
    5      255.83    8.64    3.538  0.20( 0.06) 0.28      74.4      24.00
    6      259.28    8.95    3.470  0.20( 0.06) 0.28      77.3      21.00
    7      263.45    9.35    3.384  0.20( 0.06) 0.28      80.9      60.00
    8      271.35   10.18    3.226  0.20( 0.06) 0.28      88.0      49.00
    9      272.66   10.45    3.178  0.20( 0.06) 0.28      89.9      14.00
   10      272.66   10.52    3.166  0.20( 0.06) 0.28      90.3      41.00
   11      266.75   11.93    2.949  0.20( 0.06) 0.28      95.5       7.00
   12      250.11   15.12    2.578  0.20( 0.06) 0.29     103.1      27.00
   13      247.02   15.55    2.538  0.20( 0.06) 0.29     103.7      34.00
   14      231.85   17.33    2.387  0.20( 0.06) 0.29     104.7       1.00
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     82.00 =    4975.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
```

```
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
   1      280.57    6.94    4.008  0.20( 0.06) 0.32      71.6      12.00
   2      286.04    7.23    3.914  0.20( 0.06) 0.32      75.0      11.00
   3      294.91    7.75    3.764  0.20( 0.06) 0.32      81.0      39.00
   4      303.48    8.27    3.627  0.20( 0.06) 0.32      87.1      56.00
   5      308.88    8.64    3.538  0.20( 0.06) 0.32      91.3      24.00
   6      313.10    8.95    3.470  0.20( 0.06) 0.32      94.8      21.00
   7      318.27    9.35    3.384  0.20( 0.06) 0.32      99.2      60.00
   8      327.32   10.11    3.238  0.20( 0.06) 0.32     107.1      78.00
   9      328.09   10.18    3.226  0.20( 0.06) 0.32     107.9      49.00
  10      329.83   10.45    3.178  0.20( 0.06) 0.32     110.3      14.00
  11      329.94   10.52    3.166  0.20( 0.06) 0.32     110.8      41.00
  12      328.29   11.15    3.063  0.20( 0.06) 0.32     114.2      70.00
  13      324.66   11.93    2.949  0.20( 0.06) 0.32     117.8       7.00
  14      315.33   13.57    2.741  0.20( 0.07) 0.33     123.2      63.00
  15      303.70   15.12    2.578  0.20( 0.07) 0.33     126.9      27.00
  16      299.74   15.55    2.538  0.20( 0.07) 0.33     127.5      34.00
  17      281.30   17.33    2.387  0.20( 0.07) 0.33     128.4       1.00
 TOTAL AREA(ACRES) =        128.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      329.94  Tc(MIN.) =   10.524
 EFFECTIVE AREA(ACRES) =    110.78  AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
 TOTAL AREA(ACRES) =      128.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     82.00 =    4975.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     82.00 TO NODE     82.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE     82.00 TO NODE     84.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   643.40  DOWNSTREAM(FEET) =   626.90
 FLOW LENGTH(FEET) =   795.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  60.0 INCH PIPE IS  45.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.58
 ESTIMATED PIPE DIAMETER(INCH) =  60.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     329.94
 PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   11.17
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE     84.00 =    5770.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   11.17
 RAINFALL INTENSITY(INCH/HR) =   3.06
 AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.32
 EFFECTIVE STREAM AREA(ACRES) =     110.78
 TOTAL STREAM AREA(ACRES) =     128.45
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     329.94

****************************************************************************
 FLOW PROCESS FROM NODE     62.00 TO NODE     83.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
 ELEVATION DATA: UPSTREAM(FEET) =    643.90  DOWNSTREAM(FEET) =    637.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.509
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.155
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D       0.67      0.20      0.100    75    6.51
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.49
 TOTAL AREA(ACRES) =      0.67   PEAK FLOW RATE(CFS) =      2.49

****************************************************************************
 FLOW PROCESS FROM NODE     83.00 TO NODE     84.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  637.90  DOWNSTREAM ELEVATION(FEET) =  626.90
 STREET LENGTH(FEET) =   525.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 54.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.49
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.65
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.33
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.21
 STREET FLOW TRAVEL TIME(MIN.) =   2.63   Tc(MIN.) =    9.14
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.429
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SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)   CN
COMMERCIAL                  D        1.30      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    3.99
EFFECTIVE AREA(ACRES) =      1.97    AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =        2.0        PEAK FLOW RATE(CFS) =       6.04

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.28
FLOW VELOCITY(FEET/SEC.) =  3.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.39
LONGEST FLOWPATH FROM NODE     62.00 TO NODE     84.00 =     825.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     84.00 TO NODE     84.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =    9.14
RAINFALL INTENSITY(INCH/HR) =   3.43
AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.10
EFFECTIVE STREAM AREA(ACRES) =       1.97
TOTAL STREAM AREA(ACRES) =       1.97
PEAK FLOW RATE(CFS) AT CONFLUENCE =       6.04

** CONFLUENCE DATA **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      280.57    7.61    3.804  0.20( 0.06) 0.32      71.6      12.00
    1      286.04    7.90    3.723  0.20( 0.06) 0.32      75.0      11.00
    1      294.91    8.41    3.593  0.20( 0.06) 0.32      81.0      39.00
    1      303.48    8.94    3.472  0.20( 0.06) 0.32      87.1      56.00
    1      308.88    9.31    3.393  0.20( 0.06) 0.32      91.3      24.00
    1      313.10    9.59    3.336  0.20( 0.06) 0.32      94.8      21.00
    1      318.27   10.00    3.258  0.20( 0.06) 0.32      99.2      60.00
    1      327.32   10.75    3.127  0.20( 0.06) 0.32     107.1      78.00
    1      328.09   10.82    3.116  0.20( 0.06) 0.32     107.9      49.00
    1      329.83   11.10    3.072  0.20( 0.06) 0.32     110.3      14.00
    1      329.94   11.17    3.061  0.20( 0.06) 0.32     110.8      41.00
    1      328.29   11.80    2.967  0.20( 0.06) 0.32     114.2      70.00
    1      324.66   12.57    2.862  0.20( 0.06) 0.32     117.8       7.00
    1      315.33   14.22    2.670  0.20( 0.07) 0.33     123.2      63.00
    1      303.70   15.79    2.516  0.20( 0.07) 0.33     126.9      27.00
    1      299.74   16.21    2.479  0.20( 0.07) 0.33     127.5      34.00
    1      281.30   18.00    2.337  0.20( 0.07) 0.33     128.4       1.00
    2        6.04    9.14    3.429  0.20( 0.02) 0.10       2.0      62.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1      286.15    7.61    3.804  0.20( 0.06) 0.32      73.2      12.00
    2      291.72    7.90    3.723  0.20( 0.06) 0.32      76.7      11.00
    3      300.75    8.41    3.593  0.20( 0.06) 0.32      82.8      39.00
    4      309.47    8.94    3.472  0.20( 0.06) 0.32      89.0      56.00
    5      312.42    9.14    3.429  0.20( 0.06) 0.32      91.3      62.00
    6      314.87    9.31    3.393  0.20( 0.06) 0.32      93.3      24.00
    7      318.98    9.59    3.336  0.20( 0.06) 0.32      96.7      21.00
    8      324.01   10.00    3.258  0.20( 0.06) 0.32     101.1      60.00
    9      332.83   10.75    3.127  0.20( 0.06) 0.32     109.1      78.00
   10      333.58   10.82    3.116  0.20( 0.06) 0.32     109.8      49.00
   11      335.24   11.10    3.072  0.20( 0.06) 0.32     112.2      14.00
   12      335.33   11.17    3.061  0.20( 0.06) 0.32     112.7      41.00
   13      333.51   11.80    2.967  0.20( 0.06) 0.32     116.2      70.00
   14      329.70   12.57    2.862  0.20( 0.06) 0.32     119.8       7.00
   15      320.03   14.22    2.670  0.20( 0.07) 0.33     125.2      63.00
   16      308.12   15.79    2.516  0.20( 0.07) 0.33     128.9      27.00
   17      304.10   16.21    2.479  0.20( 0.07) 0.33     129.5      34.00
   18      285.40   18.00    2.337  0.20( 0.07) 0.33     130.4       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     335.33    Tc(MIN.) =    11.17
EFFECTIVE AREA(ACRES) =     112.75   AREA-AVERAGED Fm(INCH/HR) =  0.06
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
TOTAL AREA(ACRES) =      130.4
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     84.00 =    5770.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     84.00 TO NODE     86.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   626.90  DOWNSTREAM(FEET) =   625.90
FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  54.0 INCH PIPE IS  43.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  24.41
ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     335.33
PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =   11.19
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    5800.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   11.19
RAINFALL INTENSITY(INCH/HR) =   3.06
AREA-AVERAGED Fm(INCH/HR) =  0.06
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  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.32
  EFFECTIVE STREAM AREA(ACRES) =     112.75
  TOTAL STREAM AREA(ACRES) =     130.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     335.33

****************************************************************************
  FLOW PROCESS FROM NODE     80.00 TO NODE     85.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    643.90  DOWNSTREAM(FEET) =    637.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.329
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.614
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.12      0.20      0.500    75    8.33
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =      3.54
  TOTAL AREA(ACRES) =      1.12   PEAK FLOW RATE(CFS) =      3.54

****************************************************************************
  FLOW PROCESS FROM NODE     85.00 TO NODE     86.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  637.90  DOWNSTREAM ELEVATION(FEET) =  625.90
  STREET LENGTH(FEET) =   560.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 54.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.51
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.66
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   2.56   Tc(MIN.) =   10.88
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.106
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.19      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     2.19      SUBAREA RUNOFF(CFS) =     5.92
  EFFECTIVE AREA(ACRES) =      3.31    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        3.3        PEAK FLOW RATE(CFS) =       8.95

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  15.67
  FLOW VELOCITY(FEET/SEC.) =  3.92   DEPTH*VELOCITY(FT*FT/SEC.) =   1.69
  LONGEST FLOWPATH FROM NODE     80.00 TO NODE     86.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     86.00 TO NODE     86.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.88
  RAINFALL INTENSITY(INCH/HR) =   3.11
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =       3.31
  TOTAL STREAM AREA(ACRES) =       3.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       8.95

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)            (ACRES)    NODE
      1      286.15    7.63    3.798  0.20( 0.06) 0.32      73.2      12.00
      1      291.72    7.92    3.718  0.20( 0.06) 0.32      76.7      11.00
      1      300.75    8.44    3.588  0.20( 0.06) 0.32      82.8      39.00
      1      309.47    8.96    3.468  0.20( 0.06) 0.32      89.0      56.00
      1      312.42    9.16    3.425  0.20( 0.06) 0.32      91.3      62.00
      1      314.87    9.33    3.389  0.20( 0.06) 0.32      93.3      24.00
      1      318.98    9.61    3.332  0.20( 0.06) 0.32      96.7      21.00
      1      324.01   10.02    3.255  0.20( 0.06) 0.32     101.1      60.00
      1      332.83   10.77    3.124  0.20( 0.06) 0.32     109.1      78.00
      1      333.58   10.84    3.113  0.20( 0.06) 0.32     109.8      49.00
      1      335.24   11.12    3.069  0.20( 0.06) 0.32     112.2      14.00
      1      335.33   11.19    3.058  0.20( 0.06) 0.32     112.7      41.00
      1      333.51   11.82    2.964  0.20( 0.06) 0.32     116.2      70.00
      1      329.70   12.59    2.860  0.20( 0.06) 0.32     119.8       7.00
      1      320.03   14.24    2.668  0.20( 0.07) 0.33     125.2      63.00
      1      308.12   15.81    2.514  0.20( 0.07) 0.33     128.9      27.00
      1      304.10   16.23    2.477  0.20( 0.07) 0.33     129.5      34.00
      1      285.40   18.02    2.335  0.20( 0.07) 0.33     130.4       1.00
      2        8.95   10.88    3.106  0.20( 0.10) 0.50       3.3      80.00
```

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

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR)  (INCH/HR)            (ACRES)    NODE
    1       293.87    7.63    3.798  0.20( 0.06) 0.32      75.6      12.00
    2       299.57    7.92    3.718  0.20( 0.06) 0.32      79.1      11.00
    3       308.80    8.44    3.588  0.20( 0.06) 0.32      85.3      39.00
    4       317.73    8.96    3.468  0.20( 0.06) 0.32      91.8      56.00
    5       320.76    9.16    3.425  0.20( 0.06) 0.32      94.1      62.00
    6       323.26    9.33    3.389  0.20( 0.06) 0.32      96.1      24.00
    7       327.48    9.61    3.332  0.20( 0.06) 0.32      99.7      21.00
    8       332.67   10.02    3.255  0.20( 0.06) 0.32     104.2      60.00
    9       341.75   10.77    3.124  0.20( 0.06) 0.32     112.4      78.00
   10       342.52   10.84    3.113  0.20( 0.06) 0.32     113.1      49.00
   11       342.78   10.88    3.106  0.20( 0.06) 0.32     113.5      80.00
   12       344.09   11.12    3.069  0.20( 0.06) 0.32     115.6      14.00
   13       344.14   11.19    3.058  0.20( 0.06) 0.32     116.1      41.00
   14       342.05   11.82    2.964  0.20( 0.07) 0.33     119.5      70.00
   15       337.92   12.59    2.860  0.20( 0.07) 0.33     123.1       7.00
   16       327.68   14.24    2.668  0.20( 0.07) 0.33     128.5      63.00
   17       315.31   15.81    2.514  0.20( 0.07) 0.33     132.2      27.00
   18       311.18   16.23    2.477  0.20( 0.07) 0.33     132.8      34.00
   19       292.06   18.02    2.335  0.20( 0.07) 0.33     133.7       1.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =     344.14    Tc(MIN.) =    11.19
EFFECTIVE AREA(ACRES) =     116.06   AREA-AVERAGED Fm(INCH/HR) =  0.06
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
TOTAL AREA(ACRES) =      133.7
LONGEST FLOWPATH FROM NODE      1.00 TO NODE     86.00 =    5800.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     86.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   625.90  DOWNSTREAM(FEET) =   624.50
FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  63.0 INCH PIPE IS  46.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  20.09
ESTIMATED PIPE DIAMETER(INCH) =  63.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =     344.14
PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   11.25
LONGEST FLOWPATH FROM NODE      1.00 TO NODE    150.00 =    5875.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
>>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
FLOW PROCESS FROM NODE     87.00 TO NODE     88.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    667.00  DOWNSTREAM(FEET) =    661.00

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   10.342
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.197
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
PUBLIC PARK                 D       1.00      0.20      0.850    75   10.34
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
SUBAREA RUNOFF(CFS) =      2.72
TOTAL AREA(ACRES) =      1.00   PEAK FLOW RATE(CFS) =      2.72

****************************************************************************
FLOW PROCESS FROM NODE     88.00 TO NODE     89.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    661.00  DOWNSTREAM(FEET) =    660.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   195.00   CHANNEL SLOPE =  0.0051
CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.045
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
PUBLIC PARK                 D       1.13      0.20      0.850    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.19
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.50
AVERAGE FLOW DEPTH(FEET) =   0.77   TRAVEL TIME(MIN.) =   0.93
Tc(MIN.) =   11.27
SUBAREA AREA(ACRES) =     1.13       SUBAREA RUNOFF(CFS) =    2.92
EFFECTIVE AREA(ACRES) =      2.13     AREA-AVERAGED Fm(INCH/HR) =   0.17
AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.85
TOTAL AREA(ACRES) =        2.1         PEAK FLOW RATE(CFS) =       5.51

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.86   FLOW VELOCITY(FEET/SEC.) =   3.75
LONGEST FLOWPATH FROM NODE     87.00 TO NODE     89.00 =     495.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     89.00 TO NODE     90.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   660.00  DOWNSTREAM(FEET) =   657.60
```

```
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.32
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.51
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   11.45
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     90.00 =     585.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     90.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.018
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.37      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.37      SUBAREA RUNOFF(CFS) =     1.00
  EFFECTIVE AREA(ACRES) =       2.50   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.74
  TOTAL AREA(ACRES) =         2.5       PEAK FLOW RATE(CFS) =       6.46

****************************************************************************
  FLOW PROCESS FROM NODE     90.00 TO NODE     91.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   657.60  DOWNSTREAM(FEET) =   656.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.46
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =   11.70
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     91.00 =     690.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     91.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.70
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        2.75      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     2.75      SUBAREA RUNOFF(CFS) =     7.21
  EFFECTIVE AREA(ACRES) =       5.25   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =         5.2       PEAK FLOW RATE(CFS) =      13.58

****************************************************************************
  FLOW PROCESS FROM NODE     91.00 TO NODE     92.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   656.00  DOWNSTREAM(FEET) =   655.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.73
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.58
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.81
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     92.00 =     750.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     92.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.81
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.965
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.80      0.20     0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     0.80      SUBAREA RUNOFF(CFS) =     2.08
  EFFECTIVE AREA(ACRES) =       6.05   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.52
  TOTAL AREA(ACRES) =         6.1       PEAK FLOW RATE(CFS) =      15.58

****************************************************************************
  FLOW PROCESS FROM NODE     92.00 TO NODE     93.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   655.00  DOWNSTREAM(FEET) =   652.10
  FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.29
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.58
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   12.24
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     93.00 =     960.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     93.00 IS CODE =  81
```

```
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.24
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.907
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.83      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     0.83      SUBAREA RUNOFF(CFS) =     2.11
  EFFECTIVE AREA(ACRES) =       6.88   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =         6.9       PEAK FLOW RATE(CFS) =      17.38

****************************************************************************
  FLOW PROCESS FROM NODE     93.00 TO NODE     94.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   652.10  DOWNSTREAM(FEET) =   649.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.36
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.38
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =   12.68
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     94.00 =    1185.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.848
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"       D        0.81      0.20      0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     0.81      SUBAREA RUNOFF(CFS) =     2.02
  EFFECTIVE AREA(ACRES) =       7.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
  TOTAL AREA(ACRES) =         7.7       PEAK FLOW RATE(CFS) =      19.03

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     94.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.68
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.848
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        2.83      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     2.83      SUBAREA RUNOFF(CFS) =     7.08
  EFFECTIVE AREA(ACRES) =      10.52   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
  TOTAL AREA(ACRES) =        10.5       PEAK FLOW RATE(CFS) =      26.11

****************************************************************************
  FLOW PROCESS FROM NODE     94.00 TO NODE     99.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   649.00  DOWNSTREAM(FEET) =   648.50
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.03
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.11
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   12.73
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE     99.00 =    1215.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     99.00 TO NODE     99.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.73
  RAINFALL INTENSITY(INCH/HR) =   2.84
  AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.45
  EFFECTIVE STREAM AREA(ACRES) =      10.52
  TOTAL STREAM AREA(ACRES) =      10.52
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      26.11

****************************************************************************
  FLOW PROCESS FROM NODE     95.00 TO NODE     96.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    664.00  DOWNSTREAM(FEET) =    659.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.994
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.699
```

```
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS                D        1.16      0.20     0.350    75    7.99
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =       3.79
TOTAL AREA(ACRES) =       1.16   PEAK FLOW RATE(CFS) =       3.79

****************************************************************************
FLOW PROCESS FROM NODE     96.00 TO NODE     97.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  659.00  DOWNSTREAM ELEVATION(FEET) =  654.00
STREET LENGTH(FEET) =   245.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.52
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.36
  HALFSTREET FLOOD WIDTH(FEET) =   13.28
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.41
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
STREET FLOW TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    9.19
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                D        1.15      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    1.15      SUBAREA RUNOFF(CFS) =    3.46
EFFECTIVE AREA(ACRES) =       2.31    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        2.3        PEAK FLOW RATE(CFS) =       6.96

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.60
FLOW VELOCITY(FEET/SEC.) =  3.60   DEPTH*VELOCITY(FT*FT/SEC.) =   1.36
LONGEST FLOWPATH FROM NODE     95.00 TO NODE     97.00 =     545.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     97.00 TO NODE     97.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.19
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.417
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                D        1.50      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.52
EFFECTIVE AREA(ACRES) =       3.81    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        3.8        PEAK FLOW RATE(CFS) =      11.48

****************************************************************************
FLOW PROCESS FROM NODE     97.00 TO NODE     98.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   654.00  DOWNSTREAM(FEET) =   649.00
FLOW LENGTH(FEET) =   345.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.73
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      11.48
PIPE TRAVEL TIME(MIN.) =   0.74    Tc(MIN.) =    9.94
LONGEST FLOWPATH FROM NODE     95.00 TO NODE     98.00 =     890.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     98.00 TO NODE     98.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.94
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.270
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        0.28      0.20     0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.28      SUBAREA RUNOFF(CFS) =    0.82
EFFECTIVE AREA(ACRES) =       4.09    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
TOTAL AREA(ACRES) =        4.1        PEAK FLOW RATE(CFS) =      11.79

****************************************************************************
FLOW PROCESS FROM NODE     98.00 TO NODE     99.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   649.00  DOWNSTREAM(FEET) =   648.50
FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
```

```
PIPE-FLOW VELOCITY(FEET/SEC.) =   7.57
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       11.79
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.02
LONGEST FLOWPATH FROM NODE     95.00 TO NODE     99.00 =     930.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     99.00 TO NODE     99.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.02
RAINFALL INTENSITY(INCH/HR) =   3.25
AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.33
EFFECTIVE STREAM AREA(ACRES) =       4.09
TOTAL STREAM AREA(ACRES) =       4.09
PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.79

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       26.11   12.73    2.842  0.20( 0.09) 0.45      10.5      87.00
    2       11.79   10.02    3.254  0.20( 0.07) 0.33       4.1      95.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1       35.42   10.02    3.254  0.20( 0.08) 0.41      12.4      95.00
    2       36.37   12.73    2.842  0.20( 0.08) 0.42      14.6      87.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      36.37    Tc(MIN.) =    12.73
EFFECTIVE AREA(ACRES) =      14.61   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =       14.6
LONGEST FLOWPATH FROM NODE     87.00 TO NODE     99.00 =    1215.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     99.00 TO NODE    100.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   648.50  DOWNSTREAM(FEET) =   645.00
FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.8 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.64
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       36.37
PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   12.99
LONGEST FLOWPATH FROM NODE     87.00 TO NODE    100.00 =    1395.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   12.99
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.810
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        0.77      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     0.77      SUBAREA RUNOFF(CFS) =     1.89
EFFECTIVE AREA(ACRES) =      15.38   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
TOTAL AREA(ACRES) =       15.4       PEAK FLOW RATE(CFS) =      37.73

****************************************************************************
FLOW PROCESS FROM NODE    100.00 TO NODE    101.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   645.00  DOWNSTREAM(FEET) =   641.00
FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.3 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.39
ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       37.73
PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   13.23
LONGEST FLOWPATH FROM NODE     87.00 TO NODE    101.00 =    1575.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    101.00 TO NODE    101.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   13.23
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.780
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                 D        2.12      0.20      0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =     2.12      SUBAREA RUNOFF(CFS) =     5.17
EFFECTIVE AREA(ACRES) =      17.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
TOTAL AREA(ACRES) =       17.5       PEAK FLOW RATE(CFS) =      42.50
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   641.00  DOWNSTREAM(FEET) =   640.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.48
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      42.50
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   13.32
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE    106.00 =    1635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.32
  RAINFALL INTENSITY(INCH/HR) =   2.77
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.41
  EFFECTIVE STREAM AREA(ACRES) =      17.50
  TOTAL STREAM AREA(ACRES) =      17.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      42.50

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    655.00  DOWNSTREAM(FEET) =    649.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.843
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.739
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        1.09      0.20     0.350    75    7.84
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =       3.60
  TOTAL AREA(ACRES) =       1.09   PEAK FLOW RATE(CFS) =       3.60

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  649.50  DOWNSTREAM ELEVATION(FEET) =  644.00
  STREET LENGTH(FEET) =   260.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.60
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   13.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.23
  STREET FLOW TRAVEL TIME(MIN.) =   1.25   Tc(MIN.) =    9.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.438
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        1.32      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    1.32      SUBAREA RUNOFF(CFS) =    4.00
  EFFECTIVE AREA(ACRES) =      2.41    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       7.30

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  14.80
  FLOW VELOCITY(FEET/SEC.) =  3.68   DEPTH*VELOCITY(FT*FT/SEC.) =   1.41
  LONGEST FLOWPATH FROM NODE    102.00 TO NODE    104.00 =     560.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.10
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.438
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        1.31      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    1.31      SUBAREA RUNOFF(CFS) =    3.97
  EFFECTIVE AREA(ACRES) =      3.72   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        3.7        PEAK FLOW RATE(CFS) =      11.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   644.00  DOWNSTREAM(FEET) =   640.50
  FLOW LENGTH(FEET) =   390.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.28
  PIPE TRAVEL TIME(MIN.) =   0.99    Tc(MIN.) =   10.09
  LONGEST FLOWPATH FROM NODE    102.00 TO NODE    105.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.243
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.24      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.24      SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =       3.96   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =         4.0       PEAK FLOW RATE(CFS) =      11.32

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.09
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.243
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        0.67      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.67      SUBAREA RUNOFF(CFS) =    1.93
  EFFECTIVE AREA(ACRES) =       4.63   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         4.6       PEAK FLOW RATE(CFS) =      13.25

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   640.50  DOWNSTREAM(FEET) =   640.00
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.25
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.16
  LONGEST FLOWPATH FROM NODE    102.00 TO NODE    106.00 =     985.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.16
  RAINFALL INTENSITY(INCH/HR) =   3.23
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.32
  EFFECTIVE STREAM AREA(ACRES) =       4.63
  TOTAL STREAM AREA(ACRES) =       4.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.25

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       42.36   10.61    3.150  0.20( 0.08) 0.40      15.3      95.00
      1       42.50   13.32    2.770  0.20( 0.08) 0.41      17.5      87.00
      2       13.25   10.16    3.230  0.20( 0.06) 0.32       4.6     102.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       54.84   10.16    3.230  0.20( 0.08) 0.38      19.2     102.00
      2       55.28   10.61    3.150  0.20( 0.08) 0.38      19.9      95.00
      3       53.83   13.32    2.770  0.20( 0.08) 0.39      22.1      87.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      55.28    Tc(MIN.) =    10.61
  EFFECTIVE AREA(ACRES) =       19.89   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =       22.1
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE    106.00 =    1635.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   640.00  DOWNSTREAM(FEET) =   638.50
FLOW LENGTH(FEET) =    85.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  12.55
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       55.28
PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   10.73
LONGEST FLOWPATH FROM NODE     87.00 TO NODE    107.00 =    1720.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
MAINLINE Tc(MIN.) =   10.73
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.132
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        0.52      0.20     0.200    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.45
EFFECTIVE AREA(ACRES) =     20.41   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =       22.7       PEAK FLOW RATE(CFS) =      56.14

****************************************************************************
FLOW PROCESS FROM NODE    107.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   638.50  DOWNSTREAM(FEET) =   637.00
FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  13.24
ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       56.14
PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.82
LONGEST FLOWPATH FROM NODE     87.00 TO NODE    113.00 =    1795.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   10.82
RAINFALL INTENSITY(INCH/HR) =   3.12
AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.38
EFFECTIVE STREAM AREA(ACRES) =       20.41
TOTAL STREAM AREA(ACRES) =       22.65
PEAK FLOW RATE(CFS) AT CONFLUENCE =       56.14

****************************************************************************
FLOW PROCESS FROM NODE    108.00 TO NODE    109.00 IS CODE =  21
----------------------------------------------------------------------------
>>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
>>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
ELEVATION DATA: UPSTREAM(FEET) =    659.50  DOWNSTREAM(FEET) =    654.70

Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.254
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.908
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
RESIDENTIAL
"11+ DWELLINGS/ACRE"        D        0.41      0.20     0.200    75    7.25
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA RUNOFF(CFS) =       1.43
TOTAL AREA(ACRES) =       0.41   PEAK FLOW RATE(CFS) =       1.43

****************************************************************************
FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  6 USED)<<<<<
==============================================================================
UPSTREAM ELEVATION(FEET) =  654.70  DOWNSTREAM ELEVATION(FEET) =  649.00
STREET LENGTH(FEET) =   435.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.09
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.35
  HALFSTREET FLOOD WIDTH(FEET) =   12.87
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.67
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.93
STREET FLOW TRAVEL TIME(MIN.) =   2.71   Tc(MIN.) =    9.97
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.265
SUBAREA LOSS RATE DATA(AMC  II):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.85      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     1.85      SUBAREA RUNOFF(CFS) =     5.30
EFFECTIVE AREA(ACRES) =       2.26    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
TOTAL AREA(ACRES) =         2.3        PEAK FLOW RATE(CFS) =       6.49

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  15.51
FLOW VELOCITY(FEET/SEC.) =  3.00   DEPTH*VELOCITY(FT*FT/SEC.) =   1.18
LONGEST FLOWPATH FROM NODE    108.00 TO NODE    110.00 =     735.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.97
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.265
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        2.08      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     2.08      SUBAREA RUNOFF(CFS) =     5.96
EFFECTIVE AREA(ACRES) =       4.34   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =         4.3        PEAK FLOW RATE(CFS) =      12.45

****************************************************************************
FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   649.00  DOWNSTREAM(FEET) =   644.50
FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  18.0 INCH PIPE IS  13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.52
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      12.45
PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =   10.46
LONGEST FLOWPATH FROM NODE    108.00 TO NODE    111.00 =     990.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.46
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.176
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        0.73      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     0.73      SUBAREA RUNOFF(CFS) =     2.03
EFFECTIVE AREA(ACRES) =       5.07   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
TOTAL AREA(ACRES) =         5.1        PEAK FLOW RATE(CFS) =      14.14

****************************************************************************
FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   644.50  DOWNSTREAM(FEET) =   638.00
FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.67
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      14.14
PIPE TRAVEL TIME(MIN.) =   0.78    Tc(MIN.) =   11.24
LONGEST FLOWPATH FROM NODE    108.00 TO NODE    112.00 =    1395.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   11.24
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.049
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        1.02      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     1.02      SUBAREA RUNOFF(CFS) =     2.73
EFFECTIVE AREA(ACRES) =       6.09   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
TOTAL AREA(ACRES) =         6.1        PEAK FLOW RATE(CFS) =      16.29

****************************************************************************
FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   11.24
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.049
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
     LAND USE              GROUP   (ACRES)   (INCH/HR)   (DECIMAL)   CN
  RESIDENTIAL
  "8-10 DWELLINGS/ACRE"      D        1.57       0.20       0.400    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
  SUBAREA AREA(ACRES) =     1.57      SUBAREA RUNOFF(CFS) =     4.20
  EFFECTIVE AREA(ACRES) =       7.66   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.39
  TOTAL AREA(ACRES) =         7.7       PEAK FLOW RATE(CFS) =       20.49

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   638.00  DOWNSTREAM(FEET) =   637.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.56
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       20.49
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   11.31
  LONGEST FLOWPATH FROM NODE    108.00 TO NODE    113.00 =    1440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    113.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.31
  RAINFALL INTENSITY(INCH/HR) =   3.04
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.39
  EFFECTIVE STREAM AREA(ACRES) =       7.66
  TOTAL STREAM AREA(ACRES) =       7.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      20.49

  ** CONFLUENCE DATA **
   STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1       55.72   10.37     3.193   0.20( 0.08) 0.38      19.8     102.00
      1       56.14   10.82     3.116   0.20( 0.08) 0.38      20.4      95.00
      1       54.62   13.53     2.746   0.20( 0.08) 0.39      22.7      87.00
      2       20.49   11.31     3.039   0.20( 0.08) 0.39       7.7     108.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1       75.47   10.37     3.193   0.20( 0.08) 0.38      26.8     102.00
      2       76.24   10.82     3.116   0.20( 0.08) 0.38      27.7      95.00
      3       76.35   11.31     3.039   0.20( 0.08) 0.38      28.5     108.00
      4       73.08   13.53     2.746   0.20( 0.08) 0.39      30.3      87.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       76.35    Tc(MIN.) =    11.31
  EFFECTIVE AREA(ACRES) =       28.48   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =        30.3
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE    113.00 =    1795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   637.00  DOWNSTREAM(FEET) =   635.00
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  36.0 INCH PIPE IS  24.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.86
  ESTIMATED PIPE DIAMETER(INCH) =  36.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       76.35
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   11.41
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE    114.00 =    1885.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.41
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.023
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D       3.05      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     3.05      SUBAREA RUNOFF(CFS) =     8.11
  EFFECTIVE AREA(ACRES) =      31.53   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.38
  TOTAL AREA(ACRES) =        33.4       PEAK FLOW RATE(CFS) =       83.63

  ** PEAK FLOW RATE TABLE **
   STREAM       Q       Tc    Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)          (ACRES)    NODE
      1       83.20   10.47     3.175   0.20( 0.08) 0.38      29.8     102.00
      2       83.79   10.92     3.100   0.20( 0.08) 0.38      30.8      95.00
      3       83.63   11.41     3.023   0.20( 0.08) 0.38      31.5     108.00
      4       79.77   13.64     2.734   0.20( 0.08) 0.38      33.4      87.00
  NEW PEAK FLOW DATA ARE:
  PEAK FLOW RATE(CFS) =       83.79  Tc(MIN.) =   10.92
  AREA-AVERAGED Fm(INCH/HR) =  0.08  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.38  EFFECTIVE AREA(ACRES) =       30.79
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    120.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   635.00  DOWNSTREAM(FEET) =   625.50
  FLOW LENGTH(FEET) =   585.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.48
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       83.79
  PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   11.64
  LONGEST FLOWPATH FROM NODE     87.00 TO NODE    120.00 =    2470.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.64
  RAINFALL INTENSITY(INCH/HR) =   2.99
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.38
  EFFECTIVE STREAM AREA(ACRES) =       30.79
  TOTAL STREAM AREA(ACRES) =       33.36
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       83.79

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    116.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    631.50  DOWNSTREAM(FEET) =    628.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.741
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.516
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               D        0.72      0.20     0.350    75    8.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =       2.23
  TOTAL AREA(ACRES) =       0.72   PEAK FLOW RATE(CFS) =       2.23

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   628.30  DOWNSTREAM(FEET) =   626.70
  FLOW LENGTH(FEET) =   195.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.23
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.23
  PIPE TRAVEL TIME(MIN.) =   0.77    Tc(MIN.) =    9.51
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    117.00 =     495.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    117.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.51
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.353
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        0.69      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    2.04
  EFFECTIVE AREA(ACRES) =       1.41   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        1.4       PEAK FLOW RATE(CFS) =       4.17

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.70  DOWNSTREAM(FEET) =   626.60
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.15
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.17
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.59
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    118.00 =     515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.59
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.337
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
```

```
      LAND USE              GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        1.09      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.09      SUBAREA RUNOFF(CFS) =     3.20
  EFFECTIVE AREA(ACRES) =       2.50   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =         2.5       PEAK FLOW RATE(CFS) =       7.35

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    119.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.60  DOWNSTREAM(FEET) =   626.50
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.35
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.66
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    119.00 =     535.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    9.66
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.323
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        1.71      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.71      SUBAREA RUNOFF(CFS) =     5.01
  EFFECTIVE AREA(ACRES) =       4.21   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =         4.2       PEAK FLOW RATE(CFS) =      12.33

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.50  DOWNSTREAM(FEET) =   625.50
  FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  14.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.04
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.33
  PIPE TRAVEL TIME(MIN.) =   0.41    Tc(MIN.) =   10.07
  LONGEST FLOWPATH FROM NODE    115.00 TO NODE    120.00 =     685.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.245
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.50      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.50      SUBAREA RUNOFF(CFS) =     1.45
  EFFECTIVE AREA(ACRES) =       4.71   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         4.7       PEAK FLOW RATE(CFS) =      13.48

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.07
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.245
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        1.00      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     1.00      SUBAREA RUNOFF(CFS) =     2.90
  EFFECTIVE AREA(ACRES) =       5.71   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =         5.7       PEAK FLOW RATE(CFS) =      16.38

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.07
  RAINFALL INTENSITY(INCH/HR) =   3.25
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.28
  EFFECTIVE STREAM AREA(ACRES) =       5.71
  TOTAL STREAM AREA(ACRES) =       5.71
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.38

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
```

NUMBER	(CFS)	(MIN.)	(INCH/HR)	(INCH/HR)		(ACRES)	NODE
1	83.20	11.19	3.057	0.20(0.08)	0.38	29.8	102.00
1	83.79	11.64	2.989	0.20(0.08)	0.38	30.8	95.00
1	83.63	12.14	2.920	0.20(0.08)	0.38	31.5	108.00
1	79.77	14.39	2.652	0.20(0.08)	0.38	33.4	87.00
2	16.38	10.07	3.245	0.20(0.06)	0.28	5.7	115.00

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

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.99	10.07	3.245	0.20(0.07)	0.36	32.6	115.00
2	98.62	11.19	3.057	0.20(0.07)	0.36	35.5	102.00
3	98.86	11.64	2.989	0.20(0.07)	0.36	36.5	95.00
4	98.35	12.14	2.920	0.20(0.07)	0.36	37.2	108.00
5	93.11	14.39	2.652	0.20(0.07)	0.37	39.1	87.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 98.86 Tc(MIN.) = 11.64
EFFECTIVE AREA(ACRES) = 36.50 AREA-AVERAGED Fm(INCH/HR) = 0.07
AREA-AVERAGED Fp(INCH/HR) = 0.20 AREA-AVERAGED Ap = 0.36
TOTAL AREA(ACRES) = 39.1
LONGEST FLOWPATH FROM NODE 87.00 TO NODE 120.00 = 2470.00 FEET.

****
FLOW PROCESS FROM NODE 120.00 TO NODE 150.00 IS CODE = 31

>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========
ELEVATION DATA: UPSTREAM(FEET) = 625.50 DOWNSTREAM(FEET) = 624.50
FLOW LENGTH(FEET) = 45.00 MANNING'S N = 0.013
DEPTH OF FLOW IN 39.0 INCH PIPE IS 27.5 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) = 15.79
ESTIMATED PIPE DIAMETER(INCH) = 39.00 NUMBER OF PIPES = 1
PIPE-FLOW(CFS) = 98.86
PIPE TRAVEL TIME(MIN.) = 0.05 Tc(MIN.) = 11.69
LONGEST FLOWPATH FROM NODE 87.00 TO NODE 150.00 = 2515.00 FEET.

****
FLOW PROCESS FROM NODE 150.00 TO NODE 150.00 IS CODE = 11

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

** MAIN STREAM CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	95.99	10.12	3.236	0.20(0.07)	0.36	32.6	115.00
2	98.62	11.24	3.050	0.20(0.07)	0.36	35.5	102.00
3	98.86	11.69	2.982	0.20(0.07)	0.36	36.5	95.00
4	98.35	12.19	2.913	0.20(0.07)	0.36	37.2	108.00
5	93.11	14.44	2.647	0.20(0.07)	0.37	39.1	87.00

LONGEST FLOWPATH FROM NODE 87.00 TO NODE 150.00 = 2515.00 FEET.

** MEMORY BANK # 1 CONFLUENCE DATA **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	293.87	7.69	3.780	0.20(0.06)	0.32	75.6	12.00
2	299.57	7.99	3.701	0.20(0.06)	0.32	79.1	11.00
3	308.80	8.50	3.572	0.20(0.06)	0.32	85.3	39.00
4	317.73	9.02	3.454	0.20(0.06)	0.32	91.8	56.00
5	320.76	9.22	3.411	0.20(0.06)	0.32	94.1	62.00
6	323.26	9.39	3.376	0.20(0.06)	0.32	96.1	24.00
7	327.48	9.68	3.319	0.20(0.06)	0.32	99.7	21.00
8	332.67	10.08	3.243	0.20(0.06)	0.32	104.2	60.00
9	341.75	10.84	3.114	0.20(0.06)	0.32	112.4	78.00
10	342.52	10.90	3.102	0.20(0.06)	0.32	113.1	49.00
11	342.78	10.95	3.096	0.20(0.06)	0.32	113.5	80.00
12	344.09	11.18	3.059	0.20(0.06)	0.32	115.6	14.00
13	344.14	11.25	3.048	0.20(0.06)	0.32	116.1	41.00
14	342.05	11.88	2.956	0.20(0.07)	0.33	119.5	70.00
15	337.92	12.65	2.852	0.20(0.07)	0.33	123.1	7.00
16	327.68	14.30	2.661	0.20(0.07)	0.33	128.5	63.00
17	315.31	15.87	2.509	0.20(0.07)	0.33	132.2	27.00
18	311.18	16.30	2.471	0.20(0.07)	0.33	132.8	34.00
19	292.06	18.08	2.330	0.20(0.07)	0.33	133.7	1.00

LONGEST FLOWPATH FROM NODE 1.00 TO NODE 150.00 = 5875.00 FEET.

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	379.37	7.69	3.780	0.20(0.07)	0.33	100.3	12.00
2	386.43	7.99	3.701	0.20(0.07)	0.33	104.8	11.00
3	397.98	8.50	3.572	0.20(0.07)	0.33	112.7	39.00
4	409.18	9.02	3.454	0.20(0.07)	0.33	120.8	56.00
5	413.05	9.22	3.411	0.20(0.07)	0.33	123.8	62.00
6	416.28	9.39	3.376	0.20(0.07)	0.33	126.3	24.00
7	421.68	9.68	3.319	0.20(0.07)	0.33	130.8	21.00
8	428.51	10.08	3.243	0.20(0.07)	0.33	136.6	60.00
9	429.09	10.12	3.236	0.20(0.07)	0.33	137.1	115.00
10	439.42	10.84	3.114	0.20(0.07)	0.33	146.9	78.00
11	440.36	10.90	3.102	0.20(0.07)	0.33	147.8	49.00
12	440.72	10.95	3.096	0.20(0.07)	0.33	148.3	80.00
13	442.57	11.18	3.059	0.20(0.07)	0.33	150.9	14.00
14	442.76	11.24	3.050	0.20(0.07)	0.33	151.5	102.00
15	442.78	11.25	3.048	0.20(0.07)	0.33	151.6	41.00
16	441.54	11.69	2.982	0.20(0.07)	0.33	155.0	95.00
17	440.71	11.88	2.956	0.20(0.07)	0.33	156.3	70.00
18	438.77	12.19	2.913	0.20(0.07)	0.33	158.2	108.00
19	435.18	12.65	2.852	0.20(0.07)	0.34	160.7	7.00
20	421.10	14.30	2.661	0.20(0.07)	0.34	167.5	63.00
21	419.72	14.44	2.647	0.20(0.07)	0.34	167.9	87.00
22	403.42	15.87	2.509	0.20(0.07)	0.34	171.2	27.00
23	397.93	16.30	2.471	0.20(0.07)	0.34	171.8	34.00
24	373.71	18.08	2.330	0.20(0.07)	0.34	172.8	1.00

TOTAL AREA(ACRES) = 172.8

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) = 442.78 Tc(MIN.) = 11.250

```
  EFFECTIVE AREA(ACRES) =    151.62  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =      172.8
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    150.00 =    5875.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    702.00  DOWNSTREAM(FEET) =    699.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.923
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.273
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.00      0.20      0.500    75    9.92
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       2.86
  TOTAL AREA(ACRES) =       1.00   PEAK FLOW RATE(CFS) =       2.86

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  699.50  DOWNSTREAM ELEVATION(FEET) =  687.50
  STREET LENGTH(FEET) =   750.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.71
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.26
  STREET FLOW TRAVEL TIME(MIN.) =   3.84   Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.26      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    3.26      SUBAREA RUNOFF(CFS) =    7.69
  EFFECTIVE AREA(ACRES) =      4.26    AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      10.04

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.75
  FLOW VELOCITY(FEET/SEC.) =  3.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    123.00 =    1050.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.76
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.720
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.45      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =    2.45      SUBAREA RUNOFF(CFS) =    5.78
  EFFECTIVE AREA(ACRES) =      6.71   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        6.7        PEAK FLOW RATE(CFS) =      15.82

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   687.50  DOWNSTREAM(FEET) =   666.50
  FLOW LENGTH(FEET) =   405.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  13.88
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       15.82
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =   14.25
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    124.00 =    1455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.25
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.667
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.98      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     0.98      SUBAREA RUNOFF(CFS) =     2.26
  EFFECTIVE AREA(ACRES) =       7.69   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =         7.7       PEAK FLOW RATE(CFS) =      17.77

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   666.50  DOWNSTREAM(FEET) =   663.50
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       17.77
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   14.32
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    125.00 =    1515.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.659
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.65      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     2.65      SUBAREA RUNOFF(CFS) =     6.10
  EFFECTIVE AREA(ACRES) =      10.34   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        10.3       PEAK FLOW RATE(CFS) =      23.82

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    125.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.32
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.659
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        2.92      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     2.92      SUBAREA RUNOFF(CFS) =     6.73
  EFFECTIVE AREA(ACRES) =      13.26   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        13.3       PEAK FLOW RATE(CFS) =      30.54

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   663.50  DOWNSTREAM(FEET) =   659.00
  FLOW LENGTH(FEET) =   105.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.75
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       30.54
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =   14.44
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    126.00 =    1620.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.44
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.647
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        3.48      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     3.48      SUBAREA RUNOFF(CFS) =     7.98
  EFFECTIVE AREA(ACRES) =      16.74   AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.50
  TOTAL AREA(ACRES) =        16.7       PEAK FLOW RATE(CFS) =      38.37

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

```
  FLOW PROCESS FROM NODE    126.00 TO NODE    131.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   659.00  DOWNSTREAM(FEET) =   658.50
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.37
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   14.52
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    131.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.52
  RAINFALL INTENSITY(INCH/HR) =   2.64
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.50
  EFFECTIVE STREAM AREA(ACRES) =      16.74
  TOTAL STREAM AREA(ACRES) =      16.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      38.37

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   285.00
  ELEVATION DATA: UPSTREAM(FEET) =    685.00  DOWNSTREAM(FEET) =    679.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.474
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.842
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                D        0.98      0.20      0.350    75    7.47
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =       3.33
  TOTAL AREA(ACRES) =       0.98   PEAK FLOW RATE(CFS) =       3.33

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  679.00  DOWNSTREAM ELEVATION(FEET) =  664.50
  STREET LENGTH(FEET) =   590.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.27
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.39
    HALFSTREET FLOOD WIDTH(FEET) =   15.11
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.01
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.56
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =    9.92
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.272
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        3.42      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    3.42      SUBAREA RUNOFF(CFS) =    9.86
  EFFECTIVE AREA(ACRES) =      4.40    AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =        4.4        PEAK FLOW RATE(CFS) =      12.68

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  17.85
  FLOW VELOCITY(FEET/SEC.) =  4.48   DEPTH*VELOCITY(FT*FT/SEC.) =   1.95
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    129.00 =     875.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    130.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   664.50  DOWNSTREAM(FEET) =   663.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.92
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.68
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   10.03
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    130.00 =     935.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  81
----------------------------------------------------------------------------
```

```
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.03
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.254
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        6.07      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     6.07      SUBAREA RUNOFF(CFS) =   17.39
  EFFECTIVE AREA(ACRES) =      10.47   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
  TOTAL AREA(ACRES) =       10.5       PEAK FLOW RATE(CFS) =      30.00

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   663.00  DOWNSTREAM(FEET) =   659.00
  FLOW LENGTH(FEET) =   240.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.58
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      30.00
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =   10.40
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    131.00 =    1175.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  D        0.55      0.20      0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.55      SUBAREA RUNOFF(CFS) =    1.57
  EFFECTIVE AREA(ACRES) =      11.02   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       11.0       PEAK FLOW RATE(CFS) =      30.93

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    131.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   10.40
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.186
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        1.94      0.20      0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.94      SUBAREA RUNOFF(CFS) =    5.44
  EFFECTIVE AREA(ACRES) =      12.96   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =       13.0       PEAK FLOW RATE(CFS) =      36.37

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   659.00  DOWNSTREAM(FEET) =   658.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.01
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.37
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.50
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    132.00 =    1225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    132.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.50
  RAINFALL INTENSITY(INCH/HR) =   3.17
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.34
  EFFECTIVE STREAM AREA(ACRES) =      12.96
  TOTAL STREAM AREA(ACRES) =      12.96
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      36.37

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       38.37   14.52    2.639  0.20( 0.10) 0.50      16.7     121.00
      2       36.37   10.50    3.170  0.20( 0.07) 0.34      13.0     127.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       69.93   10.50    3.170  0.20( 0.08) 0.42      25.1     127.00
      2       68.51   14.52    2.639  0.20( 0.09) 0.43      29.7     121.00
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       69.93    Tc(MIN.) =    10.50
  EFFECTIVE AREA(ACRES) =      25.06   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =        29.7
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    132.00 =    1665.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   658.50  DOWNSTREAM(FEET) =   653.00
  FLOW LENGTH(FEET) =   180.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.39
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       69.93
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   10.68
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    133.00 =    1845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.68
  RAINFALL INTENSITY(INCH/HR) =   3.14
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.42
  EFFECTIVE STREAM AREA(ACRES) =       25.06
  TOTAL STREAM AREA(ACRES) =       29.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       69.93

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    133.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    659.00  DOWNSTREAM(FEET) =    653.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.25      0.20     0.100    75    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =       1.08
  TOTAL AREA(ACRES) =       0.25   PEAK FLOW RATE(CFS) =       1.08

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    133.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.00
  RAINFALL INTENSITY(INCH/HR) =   4.82
  AREA-AVERAGED Fm(INCH/HR) =  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.10
  EFFECTIVE STREAM AREA(ACRES) =       0.25
  TOTAL STREAM AREA(ACRES) =       0.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.08

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       69.93   10.68    3.139  0.20( 0.08) 0.42      25.1     127.00
      1       68.51   14.70    2.620  0.20( 0.09) 0.43      29.7     121.00
      2        1.08    5.00    4.824  0.20( 0.02) 0.10       0.2     126.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       51.87    5.00    4.824  0.20( 0.08) 0.41      12.0     126.00
      2       70.63   10.68    3.139  0.20( 0.08) 0.41      25.3     127.00
      3       69.10   14.70    2.620  0.20( 0.09) 0.43      30.0     121.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       70.63    Tc(MIN.) =    10.68
  EFFECTIVE AREA(ACRES) =      25.31   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       30.0
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    133.00 =    1845.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    134.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   653.00  DOWNSTREAM(FEET) =   626.00
  FLOW LENGTH(FEET) =   590.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.03
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
```

```
  PIPE-FLOW(CFS) =       70.63
  PIPE TRAVEL TIME(MIN.) =   0.52    Tc(MIN.) =   11.20
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    134.00 =    2435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        1.33      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA AREA(ACRES) =     1.33      SUBAREA RUNOFF(CFS) =     3.54
  EFFECTIVE AREA(ACRES) =      26.64   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.42
  TOTAL AREA(ACRES) =       31.3       PEAK FLOW RATE(CFS) =      71.29

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   11.20
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"        D        1.46      0.20      0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     1.46      SUBAREA RUNOFF(CFS) =     3.96
  EFFECTIVE AREA(ACRES) =      28.10   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.41
  TOTAL AREA(ACRES) =       32.7       PEAK FLOW RATE(CFS) =      75.26

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   626.00  DOWNSTREAM(FEET) =   624.50
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  29.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.28
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       75.26
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =   11.40
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    150.00 =    2570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1       59.37    5.77    4.449  0.20( 0.08) 0.40      14.8     126.00
      2       75.26   11.40    3.026  0.20( 0.08) 0.41      28.1     127.00
      3       73.23   15.42    2.550  0.20( 0.08) 0.42      32.7     121.00
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    150.00 =    2570.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      379.37    7.69    3.780  0.20( 0.07) 0.33     100.3      12.00
      2      386.43    7.99    3.701  0.20( 0.07) 0.33     104.8      11.00
      3      397.98    8.50    3.572  0.20( 0.07) 0.33     112.7      39.00
      4      409.18    9.02    3.454  0.20( 0.07) 0.33     120.8      56.00
      5      413.05    9.22    3.411  0.20( 0.07) 0.33     123.8      62.00
      6      416.28    9.39    3.376  0.20( 0.07) 0.33     126.3      24.00
      7      421.68    9.68    3.319  0.20( 0.07) 0.33     130.8      21.00
      8      428.51   10.08    3.243  0.20( 0.07) 0.33     136.6      60.00
      9      429.09   10.12    3.236  0.20( 0.07) 0.33     137.1     115.00
     10      439.42   10.84    3.114  0.20( 0.07) 0.33     146.9      78.00
     11      440.36   10.90    3.102  0.20( 0.07) 0.33     147.8      49.00
     12      440.72   10.95    3.096  0.20( 0.07) 0.33     148.3      80.00
     13      442.57   11.18    3.059  0.20( 0.07) 0.33     150.9      14.00
     14      442.76   11.24    3.050  0.20( 0.07) 0.33     151.5     102.00
     15      442.78   11.25    3.048  0.20( 0.07) 0.33     151.6      41.00
     16      441.54   11.69    2.982  0.20( 0.07) 0.33     155.0      95.00
     17      440.71   11.88    2.956  0.20( 0.07) 0.33     156.3      70.00
     18      438.77   12.19    2.913  0.20( 0.07) 0.33     158.2     108.00
     19      435.18   12.65    2.852  0.20( 0.07) 0.34     160.7       7.00
     20      421.10   14.30    2.661  0.20( 0.07) 0.34     167.5      63.00
     21      419.72   14.44    2.647  0.20( 0.07) 0.34     167.9      87.00
     22      403.42   15.87    2.509  0.20( 0.07) 0.34     171.2      27.00
     23      397.93   16.30    2.471  0.20( 0.07) 0.34     171.8      34.00
     24      373.71   18.08    2.330  0.20( 0.07) 0.34     172.8       1.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    150.00 =    5875.00 FEET.

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1      395.07    5.77    4.449  0.20( 0.07) 0.34      90.0     126.00
      2      444.17    7.69    3.780  0.20( 0.07) 0.34     119.6      12.00
      3      452.06    7.99    3.701  0.20( 0.07) 0.34     124.9      11.00
      4      465.06    8.50    3.572  0.20( 0.07) 0.34     133.9      39.00
      5      477.74    9.02    3.454  0.20( 0.07) 0.34     143.3      56.00
      6      482.17    9.22    3.411  0.20( 0.07) 0.34     146.7      62.00
      7      485.88    9.39    3.376  0.20( 0.07) 0.34     149.7      24.00
      8      492.09    9.68    3.319  0.20( 0.07) 0.34     154.8      21.00
      9      500.06   10.08    3.243  0.20( 0.07) 0.34     161.6      60.00
```

```
  10      500.75   10.12    3.236  0.20( 0.07) 0.34     162.2     115.00
  11      513.10   10.84    3.114  0.20( 0.07) 0.34     173.6      78.00
  12      514.23   10.90    3.102  0.20( 0.07) 0.34     174.7      49.00
  13      514.71   10.95    3.096  0.20( 0.07) 0.34     175.3      80.00
  14      517.22   11.18    3.059  0.20( 0.07) 0.34     178.5      14.00
  15      517.57   11.24    3.050  0.20( 0.07) 0.34     179.2     102.00
  16      517.62   11.25    3.048  0.20( 0.07) 0.34     179.4      41.00
  17      517.63   11.40    3.026  0.20( 0.07) 0.35     180.8     127.00
  18      516.64   11.69    2.982  0.20( 0.07) 0.35     183.4      95.00
  19      515.72   11.88    2.956  0.20( 0.07) 0.35     185.0      70.00
  20      513.63   12.19    2.913  0.20( 0.07) 0.35     187.2     108.00
  21      509.80   12.65    2.852  0.20( 0.07) 0.35     190.3       7.00
  22      494.89   14.30    2.661  0.20( 0.07) 0.35     198.9      63.00
  23      493.44   14.44    2.647  0.20( 0.07) 0.35     199.5      87.00
  24      481.81   15.42    2.550  0.20( 0.07) 0.35     202.9     121.00
  25      475.41   15.87    2.509  0.20( 0.07) 0.35     204.0      27.00
  26      468.81   16.30    2.471  0.20( 0.07) 0.35     204.6      34.00
  27      440.40   18.08    2.330  0.20( 0.07) 0.35     205.5       1.00
 TOTAL AREA(ACRES) =        205.5

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      517.63  Tc(MIN.) =   11.395
 EFFECTIVE AREA(ACRES) =    180.82  AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
 TOTAL AREA(ACRES) =      205.5
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE    150.00 =    5875.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    150.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    152.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   624.50  DOWNSTREAM(FEET) =   606.10
 FLOW LENGTH(FEET) =   915.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  72.0 INCH PIPE IS  53.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  22.83
 ESTIMATED PIPE DIAMETER(INCH) =  72.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     517.63
 PIPE TRAVEL TIME(MIN.) =   0.67    Tc(MIN.) =   12.06
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE    152.00 =    6790.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.06
 RAINFALL INTENSITY(INCH/HR) =   2.93
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20
 AREA-AVERAGED Ap =  0.35
 EFFECTIVE STREAM AREA(ACRES) =     180.82
 TOTAL STREAM AREA(ACRES) =     205.54
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     517.63

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    151.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   265.00
 ELEVATION DATA: UPSTREAM(FEET) =    625.50  DOWNSTREAM(FEET) =    619.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.126
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.300
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP    (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  D        0.56      0.20     0.100    75    6.13
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.16
 TOTAL AREA(ACRES) =      0.56   PEAK FLOW RATE(CFS) =      2.16

****************************************************************************
 FLOW PROCESS FROM NODE    151.00 TO NODE    152.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  3 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  619.90  DOWNSTREAM ELEVATION(FEET) =  606.10
 STREET LENGTH(FEET) =   675.00   CURB HEIGHT(INCHES) =  8.0
 STREET HALFWIDTH(FEET) = 54.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  49.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.017
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

   **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.30
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.36
   HALFSTREET FLOOD WIDTH(FEET) =   11.46
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.28
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
 STREET FLOW TRAVEL TIME(MIN.) =   3.43   Tc(MIN.) =    9.55
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.344
```

```
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  D        1.43      0.20      0.100    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =     1.43      SUBAREA RUNOFF(CFS) =     4.28
EFFECTIVE AREA(ACRES) =       1.99    AREA-AVERAGED Fm(INCH/HR) =  0.02
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.10
TOTAL AREA(ACRES) =         2.0        PEAK FLOW RATE(CFS) =       5.95

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.39   HALFSTREET FLOOD WIDTH(FEET) =  13.28
FLOW VELOCITY(FEET/SEC.) =  3.51   DEPTH*VELOCITY(FT*FT/SEC.) =   1.37
LONGEST FLOWPATH FROM NODE    120.00 TO NODE    152.00 =     940.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    9.55
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.344
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
RESIDENTIAL
"8-10 DWELLINGS/ACRE"       D        2.78      0.20      0.400    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.400
SUBAREA AREA(ACRES) =     2.78      SUBAREA RUNOFF(CFS) =     8.17
EFFECTIVE AREA(ACRES) =       4.77   AREA-AVERAGED Fm(INCH/HR) =  0.05
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.27
TOTAL AREA(ACRES) =         4.8       PEAK FLOW RATE(CFS) =      14.12

****************************************************************************
FLOW PROCESS FROM NODE    152.00 TO NODE    152.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =     9.55
RAINFALL INTENSITY(INCH/HR) =   3.34
AREA-AVERAGED Fm(INCH/HR) =  0.05
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.27
EFFECTIVE STREAM AREA(ACRES) =       4.77
TOTAL STREAM AREA(ACRES) =       4.77
PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.12

** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      395.07    6.49    4.160  0.20( 0.07) 0.34      90.0     126.00
    1      444.17    8.40    3.597  0.20( 0.07) 0.34     119.6      12.00
    1      452.06    8.68    3.531  0.20( 0.07) 0.34     124.9      11.00
    1      465.06    9.19    3.419  0.20( 0.07) 0.34     133.9      39.00
    1      477.74    9.71    3.314  0.20( 0.07) 0.34     143.3      56.00
    1      482.17    9.91    3.276  0.20( 0.07) 0.34     146.7      62.00
    1      485.88   10.08    3.244  0.20( 0.07) 0.34     149.7      24.00
    1      492.09   10.36    3.194  0.20( 0.07) 0.34     154.8      21.00
    1      500.06   10.77    3.125  0.20( 0.07) 0.34     161.6      60.00
    1      500.75   10.80    3.119  0.20( 0.07) 0.34     162.2     115.00
    1      513.10   11.50    3.010  0.20( 0.07) 0.34     173.6      78.00
    1      514.23   11.57    3.000  0.20( 0.07) 0.34     174.7      49.00
    1      514.71   11.61    2.994  0.20( 0.07) 0.34     175.3      80.00
    1      517.22   11.85    2.960  0.20( 0.07) 0.34     178.5      14.00
    1      517.57   11.91    2.952  0.20( 0.07) 0.34     179.2     102.00
    1      517.62   11.92    2.950  0.20( 0.07) 0.34     179.4      41.00
    1      517.63   12.06    2.930  0.20( 0.07) 0.35     180.8     127.00
    1      516.64   12.36    2.890  0.20( 0.07) 0.35     183.4      95.00
    1      515.72   12.55    2.865  0.20( 0.07) 0.35     185.0      70.00
    1      513.63   12.85    2.827  0.20( 0.07) 0.35     187.2     108.00
    1      509.80   13.32    2.770  0.20( 0.07) 0.35     190.3       7.00
    1      494.89   14.98    2.592  0.20( 0.07) 0.35     198.9      63.00
    1      493.44   15.12    2.579  0.20( 0.07) 0.35     199.5      87.00
    1      481.81   16.10    2.488  0.20( 0.07) 0.35     202.9     121.00
    1      475.41   16.56    2.449  0.20( 0.07) 0.35     204.0      27.00
    1      468.81   16.98    2.414  0.20( 0.07) 0.35     204.6      34.00
    1      440.40   18.79    2.280  0.20( 0.07) 0.35     205.5       1.00
    2       14.12    9.55    3.344  0.20( 0.05) 0.27       4.8     120.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
    1      407.05    6.49    4.160  0.20( 0.07) 0.34      93.2     126.00
    2      457.53    8.40    3.597  0.20( 0.07) 0.34     123.8      12.00
    3      465.61    8.68    3.531  0.20( 0.07) 0.34     129.2      11.00
    4      478.94    9.19    3.419  0.20( 0.07) 0.34     138.5      39.00
    5      488.13    9.55    3.344  0.20( 0.07) 0.34     145.3     120.00
    6      491.73    9.71    3.314  0.20( 0.07) 0.34     148.0      56.00
    7      496.00    9.91    3.276  0.20( 0.07) 0.34     151.5      62.00
    8      499.57   10.08    3.244  0.20( 0.07) 0.34     154.4      24.00
    9      505.56   10.36    3.194  0.20( 0.07) 0.34     159.6      21.00
   10      513.24   10.77    3.125  0.20( 0.07) 0.34     166.4      60.00
   11      513.90   10.80    3.119  0.20( 0.07) 0.34     167.0     115.00
   12      525.78   11.50    3.010  0.20( 0.07) 0.34     178.4      78.00
   13      526.87   11.57    3.000  0.20( 0.07) 0.34     179.5      49.00
   14      527.32   11.61    2.994  0.20( 0.07) 0.34     180.1      80.00
   15      529.69   11.85    2.960  0.20( 0.07) 0.34     183.3      14.00
   16      530.01   11.91    2.952  0.20( 0.07) 0.34     184.0     102.00
   17      530.05   11.92    2.950  0.20( 0.07) 0.34     184.1      41.00
   18      529.97   12.06    2.930  0.20( 0.07) 0.34     185.6     127.00
   19      528.81   12.36    2.890  0.20( 0.07) 0.34     188.2      95.00
   20      527.79   12.55    2.865  0.20( 0.07) 0.34     189.7      70.00
   21      525.52   12.85    2.827  0.20( 0.07) 0.34     192.0     108.00
   22      521.45   13.32    2.770  0.20( 0.07) 0.35     195.1       7.00
```

```
   23      505.78   14.98    2.592  0.20( 0.07) 0.35     203.7      63.00
   24      504.28   15.12    2.579  0.20( 0.07) 0.35     204.3      87.00
   25      492.26   16.10    2.488  0.20( 0.07) 0.35     207.7     121.00
   26      485.69   16.56    2.449  0.20( 0.07) 0.35     208.7      27.00
   27      478.94   16.98    2.414  0.20( 0.07) 0.35     209.3      34.00
   28      449.95   18.79    2.280  0.20( 0.07) 0.35     210.3       1.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     530.05    Tc(MIN.) =    11.92
  EFFECTIVE AREA(ACRES) =     184.15   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.34
  TOTAL AREA(ACRES) =      210.3
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    152.00 =    6790.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   606.10  DOWNSTREAM(FEET) =   602.00
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  66.0 INCH PIPE IS  51.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  26.60
  ESTIMATED PIPE DIAMETER(INCH) =  66.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     530.05
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.00
  LONGEST FLOWPATH FROM NODE      1.00 TO NODE    165.00 =    6925.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    154.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    638.00  DOWNSTREAM(FEET) =    634.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.215
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.054
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                 D        0.90      0.20     0.850    75   11.22
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.34
  TOTAL AREA(ACRES) =      0.90   PEAK FLOW RATE(CFS) =      2.34

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    155.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  634.00  DOWNSTREAM ELEVATION(FEET) =  631.00
  STREET LENGTH(FEET) =   185.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 18.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.017
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.86
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   11.96
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.89
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   1.07   Tc(MIN.) =   12.28
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.900
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  PUBLIC PARK                 D        1.24      0.20     0.850    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA AREA(ACRES) =     1.24      SUBAREA RUNOFF(CFS) =     3.05
  EFFECTIVE AREA(ACRES) =      2.14    AREA-AVERAGED Fm(INCH/HR) =  0.17
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.85
  TOTAL AREA(ACRES) =        2.1        PEAK FLOW RATE(CFS) =       5.26

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.68
  FLOW VELOCITY(FEET/SEC.) =  3.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    155.00 =     485.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   631.00  DOWNSTREAM(FEET) =   629.00
  FLOW LENGTH(FEET) =   225.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.47
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.26
```

```
  PIPE TRAVEL TIME(MIN.) =   0.69    Tc(MIN.) =   12.97
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    156.00 =     710.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    156.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   12.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.812
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        0.69      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    0.69      SUBAREA RUNOFF(CFS) =    1.70
  EFFECTIVE AREA(ACRES) =       2.83   AREA-AVERAGED Fm(INCH/HR) =  0.15
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.73
  TOTAL AREA(ACRES) =         2.8       PEAK FLOW RATE(CFS) =       6.79

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   629.00  DOWNSTREAM(FEET) =   620.00
  FLOW LENGTH(FEET) =   540.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.38
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.79
  PIPE TRAVEL TIME(MIN.) =   1.22    Tc(MIN.) =   14.19
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    157.00 =    1250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.673
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        0.50      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    0.50      SUBAREA RUNOFF(CFS) =    1.17
  EFFECTIVE AREA(ACRES) =       3.33   AREA-AVERAGED Fm(INCH/HR) =  0.13
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.67
  TOTAL AREA(ACRES) =         3.3       PEAK FLOW RATE(CFS) =       7.61

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    157.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.19
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.673
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS                D        2.21      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    2.21      SUBAREA RUNOFF(CFS) =    5.18
  EFFECTIVE AREA(ACRES) =       5.54   AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.54
  TOTAL AREA(ACRES) =         5.5       PEAK FLOW RATE(CFS) =      12.79

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   618.50
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.29
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.79
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =   14.24
  LONGEST FLOWPATH FROM NODE    153.00 TO NODE    162.00 =    1285.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.24
  RAINFALL INTENSITY(INCH/HR) =   2.67
  AREA-AVERAGED Fm(INCH/HR) =  0.11
  AREA-AVERAGED Fp(INCH/HR) =  0.20
  AREA-AVERAGED Ap =  0.54
  EFFECTIVE STREAM AREA(ACRES) =       5.54
  TOTAL STREAM AREA(ACRES) =       5.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      12.79

****************************************************************************
  FLOW PROCESS FROM NODE    158.00 TO NODE    159.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    631.00  DOWNSTREAM(FEET) =    626.00
```

```
Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.994
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.699
SUBAREA Tc AND LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
CONDOMINIUMS                D        0.50      0.20      0.350    75    7.99
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA RUNOFF(CFS) =       1.63
TOTAL AREA(ACRES) =       0.50   PEAK FLOW RATE(CFS) =       1.63

****************************************************************************
FLOW PROCESS FROM NODE    159.00 TO NODE    160.00 IS CODE =  62
----------------------------------------------------------------------------
>>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>(STREET TABLE SECTION #  6 USED)<<<<<
============================================================================
UPSTREAM ELEVATION(FEET) =  626.00  DOWNSTREAM ELEVATION(FEET) =  621.50
STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  6.0
STREET HALFWIDTH(FEET) = 18.00

DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  13.00
INSIDE STREET CROSSFALL(DECIMAL) =  0.017
OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.017

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

  **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.26
  STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
  STREET FLOW DEPTH(FEET) =  0.33
  HALFSTREET FLOOD WIDTH(FEET) =   11.45
  AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.64
  PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.86
STREET FLOW TRAVEL TIME(MIN.) =   1.99   Tc(MIN.) =    9.99
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.261
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                D        1.13      0.20      0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    1.13      SUBAREA RUNOFF(CFS) =    3.25
EFFECTIVE AREA(ACRES) =      1.63    AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.68

END OF SUBAREA STREET FLOW HYDRAULICS:
DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  13.38
FLOW VELOCITY(FEET/SEC.) =  2.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.02
LONGEST FLOWPATH FROM NODE    158.00 TO NODE    160.00 =     615.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   621.50  DOWNSTREAM(FEET) =   620.00
FLOW LENGTH(FEET) =   210.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   9.6 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   4.89
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       4.68
PIPE TRAVEL TIME(MIN.) =   0.72    Tc(MIN.) =   10.70
LONGEST FLOWPATH FROM NODE    158.00 TO NODE    161.00 =     825.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    161.00 TO NODE    161.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   10.70
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.136
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp          Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                D        0.65      0.20      0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    0.65      SUBAREA RUNOFF(CFS) =    1.79
EFFECTIVE AREA(ACRES) =      2.28   AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
TOTAL AREA(ACRES) =        2.3       PEAK FLOW RATE(CFS) =       6.29

****************************************************************************
FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   620.00  DOWNSTREAM(FEET) =   618.50
FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       6.29
PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   10.83
LONGEST FLOWPATH FROM NODE    158.00 TO NODE    162.00 =     890.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    162.00 TO NODE    162.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
>>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
TIME OF CONCENTRATION(MIN.) =   10.83
RAINFALL INTENSITY(INCH/HR) =   3.11
AREA-AVERAGED Fm(INCH/HR) =  0.07
AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.35
EFFECTIVE STREAM AREA(ACRES) =        2.28
TOTAL STREAM AREA(ACRES) =        2.28
PEAK FLOW RATE(CFS) AT CONFLUENCE =        6.29

** CONFLUENCE DATA **
 STREAM        Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER      (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)     NODE
    1        12.79   14.24     2.668   0.20( 0.11) 0.54       5.5      153.00
    2         6.29   10.83     3.114   0.20( 0.07) 0.35       2.3      158.00

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

** PEAK FLOW RATE TABLE **
 STREAM        Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER      (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)     NODE
    1        17.72   10.83     3.114   0.20( 0.10) 0.48       6.5      158.00
    2        18.15   14.24     2.668   0.20( 0.10) 0.49       7.8      153.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =       18.15    Tc(MIN.) =    14.24
EFFECTIVE AREA(ACRES) =        7.82   AREA-AVERAGED Fm(INCH/HR) =  0.10
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.49
TOTAL AREA(ACRES) =         7.8
LONGEST FLOWPATH FROM NODE    153.00 TO NODE    162.00 =    1285.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    162.00 TO NODE    163.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   618.50  DOWNSTREAM(FEET) =   612.00
FLOW LENGTH(FEET) =   270.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  10.72
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      18.15
PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   14.66
LONGEST FLOWPATH FROM NODE    153.00 TO NODE    163.00 =    1555.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    163.00 TO NODE    163.00 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =   14.66
*  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.624
SUBAREA LOSS RATE DATA(AMC  II):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
CONDOMINIUMS                D        3.24      0.20     0.350    75
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
SUBAREA AREA(ACRES) =    3.24      SUBAREA RUNOFF(CFS) =    7.45
EFFECTIVE AREA(ACRES) =     11.06   AREA-AVERAGED Fm(INCH/HR) =  0.09
AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.45
TOTAL AREA(ACRES) =       11.1       PEAK FLOW RATE(CFS) =      25.23

** PEAK FLOW RATE TABLE **
 STREAM        Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER      (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)     NODE
    1        25.94   11.26     3.047   0.20( 0.09) 0.43       9.7      158.00
    2        25.23   14.66     2.624   0.20( 0.09) 0.45      11.1      153.00
NEW PEAK FLOW DATA ARE:
PEAK FLOW RATE(CFS) =       25.94  Tc(MIN.) =   11.26
AREA-AVERAGED Fm(INCH/HR) =  0.09  AREA-AVERAGED Fp(INCH/HR) =  0.20
AREA-AVERAGED Ap =  0.43  EFFECTIVE AREA(ACRES) =       9.74

****************************************************************************
FLOW PROCESS FROM NODE    163.00 TO NODE    165.00 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   612.00  DOWNSTREAM(FEET) =   602.00
FLOW LENGTH(FEET) =   165.00   MANNING'S N =  0.013
DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  16.65
ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =      25.94
PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   11.42
LONGEST FLOWPATH FROM NODE    153.00 TO NODE    165.00 =    1720.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  11
----------------------------------------------------------------------------
>>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

** MAIN STREAM CONFLUENCE DATA **
 STREAM        Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER      (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)     NODE
    1        25.94   11.42     3.022   0.20( 0.09) 0.43       9.7      158.00
    2        25.23   14.82     2.608   0.20( 0.09) 0.45      11.1      153.00
LONGEST FLOWPATH FROM NODE    153.00 TO NODE    165.00 =    1720.00 FEET.

** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM        Q       Tc    Intensity   Fp(Fm)      Ap      Ae      HEADWATER
 NUMBER      (CFS)   (MIN.)  (INCH/HR)  (INCH/HR)           (ACRES)     NODE
    1       407.05    6.58     4.128   0.20( 0.07) 0.34      93.2      126.00
    2       457.53    8.48     3.576   0.20( 0.07) 0.34     123.8       12.00
    3       465.61    8.76     3.511   0.20( 0.07) 0.34     129.2       11.00
    4       478.94    9.27     3.401   0.20( 0.07) 0.34     138.5       39.00
    5       488.13    9.64     3.326   0.20( 0.07) 0.34     145.3      120.00
```

```
  6      491.73    9.79    3.297  0.20( 0.07) 0.34      148.0      56.00
  7      496.00    9.99    3.260  0.20( 0.07) 0.34      151.5      62.00
  8      499.57   10.16    3.229  0.20( 0.07) 0.34      154.4      24.00
  9      505.56   10.45    3.179  0.20( 0.07) 0.34      159.6      21.00
 10      513.24   10.85    3.111  0.20( 0.07) 0.34      166.4      60.00
 11      513.90   10.89    3.105  0.20( 0.07) 0.34      167.0     115.00
 12      525.78   11.59    2.997  0.20( 0.07) 0.34      178.4      78.00
 13      526.87   11.66    2.987  0.20( 0.07) 0.34      179.5      49.00
 14      527.32   11.70    2.981  0.20( 0.07) 0.34      180.1      80.00
 15      529.69   11.93    2.948  0.20( 0.07) 0.34      183.3      14.00
 16      530.01   11.99    2.940  0.20( 0.07) 0.34      184.0     102.00
 17      530.05   12.00    2.939  0.20( 0.07) 0.34      184.1      41.00
 18      529.97   12.15    2.919  0.20( 0.07) 0.34      185.6     127.00
 19      528.81   12.45    2.879  0.20( 0.07) 0.34      188.2      95.00
 20      527.79   12.63    2.855  0.20( 0.07) 0.34      189.7      70.00
 21      525.52   12.94    2.816  0.20( 0.07) 0.34      192.0     108.00
 22      521.45   13.41    2.760  0.20( 0.07) 0.35      195.1       7.00
 23      505.78   15.07    2.584  0.20( 0.07) 0.35      203.7      63.00
 24      504.28   15.20    2.570  0.20( 0.07) 0.35      204.3      87.00
 25      492.26   16.19    2.481  0.20( 0.07) 0.35      207.7     121.00
 26      485.69   16.64    2.442  0.20( 0.07) 0.35      208.7      27.00
 27      478.94   17.07    2.407  0.20( 0.07) 0.35      209.3      34.00
 28      449.95   18.87    2.274  0.20( 0.07) 0.35      210.3       1.00
LONGEST FLOWPATH FROM NODE      1.00 TO NODE    165.00 =    6925.00 FEET.

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)            (ACRES)    NODE
   1      427.64    6.58    4.128  0.20( 0.07) 0.35       98.8     126.00
   2      480.44    8.48    3.576  0.20( 0.07) 0.35      131.1      12.00
   3      488.83    8.76    3.511  0.20( 0.07) 0.35      136.7      11.00
   4      502.72    9.27    3.401  0.20( 0.07) 0.35      146.4      39.00
   5      512.30    9.64    3.326  0.20( 0.07) 0.35      153.5     120.00
   6      516.05    9.79    3.297  0.20( 0.07) 0.35      156.4      56.00
   7      520.53    9.99    3.260  0.20( 0.07) 0.35      160.0      62.00
   8      524.28   10.16    3.229  0.20( 0.07) 0.35      163.1      24.00
   9      530.56   10.45    3.179  0.20( 0.07) 0.35      168.5      21.00
  10      538.64   10.85    3.111  0.20( 0.07) 0.35      175.6      60.00
  11      539.33   10.89    3.105  0.20( 0.07) 0.35      176.3     115.00
  12      548.86   11.42    3.022  0.20( 0.07) 0.35      185.4     158.00
  13      551.69   11.59    2.997  0.20( 0.07) 0.35      188.2      78.00
  14      552.76   11.66    2.987  0.20( 0.07) 0.35      189.3      49.00
  15      553.21   11.70    2.981  0.20( 0.07) 0.35      189.9      80.00
  16      555.53   11.93    2.948  0.20( 0.07) 0.35      193.2      14.00
  17      555.83   11.99    2.940  0.20( 0.07) 0.35      194.0     102.00
  18      555.87   12.00    2.939  0.20( 0.07) 0.35      194.1      41.00
  19      555.76   12.15    2.919  0.20( 0.07) 0.35      195.6     127.00
  20      554.54   12.45    2.879  0.20( 0.07) 0.35      198.3      95.00
  21      553.48   12.63    2.855  0.20( 0.07) 0.35      199.9      70.00
  22      551.15   12.94    2.816  0.20( 0.07) 0.35      202.3     108.00
  23      546.98   13.41    2.760  0.20( 0.07) 0.35      205.6       7.00
  24      533.34   14.82    2.608  0.20( 0.07) 0.35      213.5     153.00
  25      530.78   15.07    2.584  0.20( 0.07) 0.35      214.7      63.00
  26      529.14   15.20    2.570  0.20( 0.07) 0.35      215.3      87.00
  27      516.22   16.19    2.481  0.20( 0.07) 0.36      218.7     121.00
  28      509.26   16.64    2.442  0.20( 0.07) 0.36      219.8      27.00
  29      502.17   17.07    2.407  0.20( 0.07) 0.36      220.4      34.00
  30      471.85   18.87    2.274  0.20( 0.07) 0.36      221.4       1.00
 TOTAL AREA(ACRES) =       221.4

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      555.87  Tc(MIN.) =   12.003
 EFFECTIVE AREA(ACRES) =    194.11  AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.35
 TOTAL AREA(ACRES) =      221.4
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE    165.00 =    6925.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    165.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   602.00  DOWNSTREAM(FEET) =   575.00
 FLOW LENGTH(FEET) =   255.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  54.0 INCH PIPE IS  40.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  43.28
 ESTIMATED PIPE DIAMETER(INCH) =  54.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =     555.87
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.10
 LONGEST FLOWPATH FROM NODE      1.00 TO NODE    166.00 =    7180.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    166.00 TO NODE    166.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =   12.10
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.925
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 RESIDENTIAL
 ".4 DWELLING/ACRE"          D        5.85      0.20      0.900    75
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.900
 SUBAREA AREA(ACRES) =     5.85      SUBAREA RUNOFF(CFS) =   14.45
 EFFECTIVE AREA(ACRES) =    199.96   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.36
 TOTAL AREA(ACRES) =      227.2       PEAK FLOW RATE(CFS) =     555.87
 NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =      227.2  TC(MIN.) =     12.10
 EFFECTIVE AREA(ACRES) =    199.96  AREA-AVERAGED Fm(INCH/HR)=  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.364
```

PEAK FLOW RATE(CFS) = 555.87

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	427.64	6.69	4.091	0.20(0.08)	0.38	104.7	126.00
2	480.44	8.59	3.552	0.20(0.07)	0.37	136.9	12.00
3	488.83	8.86	3.488	0.20(0.07)	0.37	142.5	11.00
4	502.72	9.37	3.380	0.20(0.07)	0.37	152.3	39.00
5	512.30	9.74	3.307	0.20(0.07)	0.37	159.4	120.00
6	516.05	9.89	3.278	0.20(0.07)	0.37	162.2	56.00
7	520.53	10.09	3.242	0.20(0.07)	0.36	165.9	62.00
8	524.28	10.26	3.211	0.20(0.07)	0.36	169.0	24.00
9	530.56	10.55	3.162	0.20(0.07)	0.36	174.4	21.00
10	538.64	10.95	3.095	0.20(0.07)	0.36	181.5	60.00
11	539.33	10.99	3.089	0.20(0.07)	0.36	182.1	115.00
12	548.86	11.52	3.008	0.20(0.07)	0.36	191.2	158.00
13	551.69	11.69	2.983	0.20(0.07)	0.36	194.1	78.00
14	552.76	11.76	2.973	0.20(0.07)	0.36	195.2	49.00
15	553.21	11.80	2.967	0.20(0.07)	0.36	195.8	80.00
16	555.53	12.03	2.935	0.20(0.07)	0.36	199.1	14.00
17	555.83	12.09	2.927	0.20(0.07)	0.36	199.8	102.00
18	555.87	12.10	2.925	0.20(0.07)	0.36	200.0	41.00
19	555.76	12.25	2.905	0.20(0.07)	0.36	201.5	127.00
20	554.54	12.54	2.866	0.20(0.07)	0.36	204.2	95.00
21	553.48	12.73	2.842	0.20(0.07)	0.36	205.8	70.00
22	551.15	13.04	2.804	0.20(0.07)	0.37	208.1	108.00
23	546.98	13.51	2.749	0.20(0.07)	0.37	211.4	7.00
24	533.34	14.92	2.598	0.20(0.07)	0.37	219.3	153.00
25	530.78	15.17	2.574	0.20(0.07)	0.37	220.6	63.00
26	529.14	15.30	2.561	0.20(0.07)	0.37	221.2	87.00
27	516.22	16.29	2.472	0.20(0.07)	0.37	224.6	121.00
28	509.26	16.75	2.434	0.20(0.07)	0.37	225.7	27.00
29	502.17	17.17	2.399	0.20(0.07)	0.37	226.3	34.00
30	471.85	18.98	2.267	0.20(0.07)	0.37	227.2	1.00

==========

==========

END OF RATIONAL METHOD ANALYSIS

AREA 'D'

```
****************************************************************************
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                          Analysis prepared by:

                     THIS IS HUNSAKER & ASSOCIATES
                              Irvine, Inc
                    Planning * Engineering * Surveying
         Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************* DESCRIPTION OF STUDY *************************
* W.O. #789-26, BAKER RANCH                                              *
* 25-YR STUDY                                                            *
* AREA 'D'                                                               *
 ************************************************************************

  FILE NAME: BR_D25.DAT
  TIME/DATE OF STUDY: 19:11 03/04/2011
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   300.00
  ELEVATION DATA: UPSTREAM(FEET) =    693.40  DOWNSTREAM(FEET) =    689.20
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.990
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.990
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  D       0.60     0.20      0.100    75    6.99
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.14
  TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.14
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =        0.6  TC(MIN.) =      6.99
  EFFECTIVE AREA(ACRES) =      0.60  AREA-AVERAGED Fm(INCH/HR)=  0.02
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.100
  PEAK FLOW RATE(CFS)    =       2.14
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

AREA ‘E’

```
****************************************************************************
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                            Irvine, Inc
                   Planning * Engineering * Surveying
         Three Hughes * Irvine, California 92618 * (949)583-1010

 ************************** DESCRIPTION OF STUDY **************************
* W.O. #789-26, BAKER RANCH                                                *
* 25-YR STUDY                                                              *
* AREA 'E'                                                                 *
 ****************************************************************************

  FILE NAME: BR_E25.DAT
  TIME/DATE OF STUDY: 12:38 03/07/2011
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  =====  ====  =====  =======
  1   66.0     61.0   0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  2   56.0     51.0   0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  3   54.0     49.0   0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  4   42.0     37.0   0.017/0.017/0.020   0.67    2.00 0.0313 0.167 0.0150
  5   20.0     15.0   0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  6   18.0     13.0   0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  7   15.0     10.0   0.017/0.017/0.020   0.50    1.50 0.0313 0.125 0.0150
  8   14.0      9.0   0.017/0.017/0.020   0.50    1.50 0.0313 0.125 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.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

****************************************************************************
  FLOW PROCESS FROM NODE     61.00 TO NODE     62.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   280.00
  ELEVATION DATA: UPSTREAM(FEET) =    773.50  DOWNSTREAM(FEET) =    768.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.132
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.663
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.07      0.20      0.500    75    8.13
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  SUBAREA RUNOFF(CFS) =       0.22
  TOTAL AREA(ACRES) =       0.07   PEAK FLOW RATE(CFS) =       0.22

****************************************************************************
  FLOW PROCESS FROM NODE     62.00 TO NODE     63.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    768.00  DOWNSTREAM(FEET) =    751.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   420.00   CHANNEL SLOPE =  0.0405
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   3.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.326
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "5-7 DWELLINGS/ACRE"        D        0.24      0.20      0.500    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.500
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.57
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.63
  AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   1.51
  Tc(MIN.) =    9.64
  SUBAREA AREA(ACRES) =      0.24       SUBAREA RUNOFF(CFS) =    0.70
  EFFECTIVE AREA(ACRES) =      0.31     AREA-AVERAGED Fm(INCH/HR) =   0.10
  AREA-AVERAGED Fp(INCH/HR) =   0.20  AREA-AVERAGED Ap =   0.50
  TOTAL AREA(ACRES) =        0.3         PEAK FLOW RATE(CFS) =       0.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   5.18
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     63.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     63.00 TO NODE     64.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   751.00  DOWNSTREAM(FEET) =   730.00
  FLOW LENGTH(FEET) =   595.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.44
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        0.90
  PIPE TRAVEL TIME(MIN.) =   1.82    Tc(MIN.) =   11.47
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     64.00 =    1295.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     64.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.47
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.016
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 D        0.39      0.20     0.100    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =     0.39      SUBAREA RUNOFF(CFS) =     1.05
  EFFECTIVE AREA(ACRES) =       0.70   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.28
  TOTAL AREA(ACRES) =         0.7       PEAK FLOW RATE(CFS) =       1.86

****************************************************************************
  FLOW PROCESS FROM NODE     64.00 TO NODE     65.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   730.00  DOWNSTREAM(FEET) =   729.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        1.86
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     65.00 =    1335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     65.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   11.58
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.999
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        1.90      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =     1.90      SUBAREA RUNOFF(CFS) =     5.01
  EFFECTIVE AREA(ACRES) =       2.60   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.33
  TOTAL AREA(ACRES) =         2.6       PEAK FLOW RATE(CFS) =       6.86

****************************************************************************
  FLOW PROCESS FROM NODE     65.00 TO NODE     66.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   729.00  DOWNSTREAM(FEET) =   726.20
  FLOW LENGTH(FEET) =   215.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.74
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =        6.86
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =   12.11
  LONGEST FLOWPATH FROM NODE     61.00 TO NODE     66.00 =    1550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   12.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  RESIDENTIAL
  "11+ DWELLINGS/ACRE"       D        0.78      0.20     0.200    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =     0.78      SUBAREA RUNOFF(CFS) =     2.02
  EFFECTIVE AREA(ACRES) =       3.38   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.30
  TOTAL AREA(ACRES) =         3.4       PEAK FLOW RATE(CFS) =       8.71

****************************************************************************
  FLOW PROCESS FROM NODE     66.00 TO NODE     66.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==============================================================================
  MAINLINE Tc(MIN.) =   12.11
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  2.924
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  CONDOMINIUMS               D        2.60      0.20     0.350    75
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.20
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
```

```
  SUBAREA AREA(ACRES) =     2.60      SUBAREA RUNOFF(CFS) =     6.68
  EFFECTIVE AREA(ACRES) =       5.98   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap =  0.32
  TOTAL AREA(ACRES) =         6.0       PEAK FLOW RATE(CFS) =      15.39
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)      =         6.0  TC(MIN.) =     12.11
  EFFECTIVE AREA(ACRES) =       5.98  AREA-AVERAGED Fm(INCH/HR)=  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.20  AREA-AVERAGED Ap = 0.322
  PEAK FLOW RATE(CFS)    =      15.39
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

SECTION 4

HYDROLOGY MAPS

TABLE C

Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
66	699.5	225	1.49	12.3	3.8	11.9
67	699.0	30	1.52	12.4	3.9	15.7
68	698.9	30	2.06	12.5	5.2	20.8
69	698.8	30	3.75	12.6	9.1	29.8
75	685.0	450		13.1	29.8	
70	708.0					
71	705.0	210	0.42	7.4	1.4	
72	702.5	230	0.60	9.2	1.8	3.1
73	695.0	480	1.20	10.6	3.3	6.2
74	693.5	60	1.22	10.7	3.4	9.5
			3.36	10.7	9.3	18.7
75	685.0	50		13.1	18.7	46.5
76	682.0	105	1.52	10.8	3.6	49.1
77	650.0	130	0.80	10.9	2.1	51.1
80	643.9	30		10.9	51.1	
78	665.0					
79	656.6	255	1.12	7.1	3.9	
80	643.9	600	1.52	10.9	7.7	58.3
82	643.4	110		10.5	58.3	329.9
84	626.9	795		11.2	329.9	
62	643.9					
83	637.9	300	0.67	6.5	2.5	
84	626.9	525	1.30	11.2	6.0	335.3
86	625.9	30		11.2	335.3	
80	643.9					
85	637.9	300	1.12	8.3	3.5	
86	625.9	560	2.19	11.2	9.0	344.1
150	624.5	75		11.3	344.1	
87	667.0					
88	661.0	300	1.00	10.3	2.7	
89	660.0	195	1.13	11.3	2.9	5.5
90	657.6	90	0.37	11.5	1.0	6.5
91	656.0	195	2.75	11.7	7.2	13.6
92	655.0	60	0.80	11.8	2.1	15.6
93	652.1	210	0.83	12.2	2.1	17.4
94	649.0	225	0.81	12.7	2.0	19.0
			2.83	12.7	7.1	26.1
99	648.5	30		12.7	26.1	
95	664.0					
96	659.0	300	1.16	8.0	3.8	
97	654.0	245	1.15	9.2	3.5	7.0
			1.50	9.2	4.5	11.5
98	649.0	345	0.28	9.9	0.8	11.8
99	648.5	40		12.7	11.8	36.4
100	645.0	180	0.77	13.0	1.9	37.7
101	641.0	180	2.12	13.2	5.2	42.5
106	640.0	60		13.3	42.5	
102	655.0					
103	649.5	300	1.09	7.8	3.6	
104	644.0	260	1.32	9.1	4.0	7.3
			1.31	9.1	4.0	11.3
105	640.5	390	0.24	10.1	0.7	11.3
			0.67	10.1	1.9	13.3
106	640.0	35		10.6	13.3	55.3
107	638.5	85	0.52	10.7	1.5	56.1
113	637.0	75		10.8	56.1	
108	659.5					
109	654.7	300	0.41	7.3	1.4	
110	649.0	435	1.85	10.0	5.3	6.5
			2.08	10.0	6.0	12.5
111	644.5	255	0.73	10.5	2.0	14.1
112	638.0	405	1.02	11.2	2.7	16.1
			1.57	11.2	4.2	20.5
113	637.0	45		11.3	20.5	76.4
114	635.0	90	3.05	10.9	8.1	83.8
120	625.5	585		11.6	83.8	
115	631.5					
116	628.3	300	0.72	8.7	2.2	
117	626.7	195	0.69	9.5	2.0	4.2
118	626.6	20	1.09	9.6	3.2	7.4
119	626.5	20	1.71	9.7	5.0	12.3
120	625.5	150	0.50	10.1	1.5	13.5
			1.00	11.6	2.9	98.9
150	624.5	45		11.3	98.9	442.8
121	702.0					
122	699.5	300	1.00	9.9	2.9	
123	687.5	750	3.26	13.8	7.7	10.0
			2.45	13.8	5.8	15.8
124	666.5	405	0.98	14.3	2.3	17.8
125	663.5	60	2.65	14.3	6.1	23.8
			2.92	14.3	6.7	30.5
126	659.0	105	3.48	14.4	8.0	38.4
131	658.5	45		14.5	38.4	
127	685.0					
128	679.0	285	0.98	7.5	3.3	
129	664.5	590	3.42	9.9	9.9	12.7
130	663.0	60	6.07	10.0	17.4	30.0
131	659.0	240	0.55	10.4	1.6	30.9
			1.94	10.4	5.4	36.4
132	658.5	50		10.5	36.4	69.9
133	653.0	180		10.7	69.9	
126	659.0					
133	653.0	185	0.25	10.7	1.1	70.6
134	626.0	590	1.33	11.2	3.5	71.3
			1.46	11.2	4.0	75.3
150	624.5	135		11.4	75.3	517.6
152	606.1	915		12.1	517.6	
120	625.5					
151	619.9	265	0.56	6.1	2.2	
152	606.1	675	1.43	9.6	4.3	6.0
			2.78	11.9	8.2	530.1
165	602.0	135		12.0	530.1	
153	638.0					
154	634.0	300	0.90	11.2	2.3	
155	631.0	185	1.24	12.3	3.1	5.3
156	629.0	225	0.69	13.0	1.7	6.8
157	620.0	540	0.50	14.2	1.2	7.6
			2.21	14.2	5.2	12.8
162	618.5	35		14.2	12.8	
158	631.0					
159	626.0	300	0.50	8.0	1.6	
160	621.5	315	1.13	10.0	3.3	4.7
161	620.0	210	0.65	10.7	1.8	6.3
162	618.5	65		14.2	6.3	18.2
163	612.0	270	3.24	11.3	7.5	25.9
165	602.0	165		12.0	25.9	555.9
166	575.0	255	5.85	12.1	14.5	555.9

TABLE D

Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
53	693.4					
52	689.2	300	0.60	7.0	2.1	

TABLE E

Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
61	773.5					
62	768.0	280	0.07	8.1	0.2	
63	751.0	420	0.24	9.6	0.7	0.9
64	730.0	595	0.39	11.5	1.1	1.9
65	729.0	40	1.90	11.6	5.0	6.9
66	726.2	215	0.78	12.1	2.0	8.7
			2.60	12.1	6.7	15.4

TABLE C

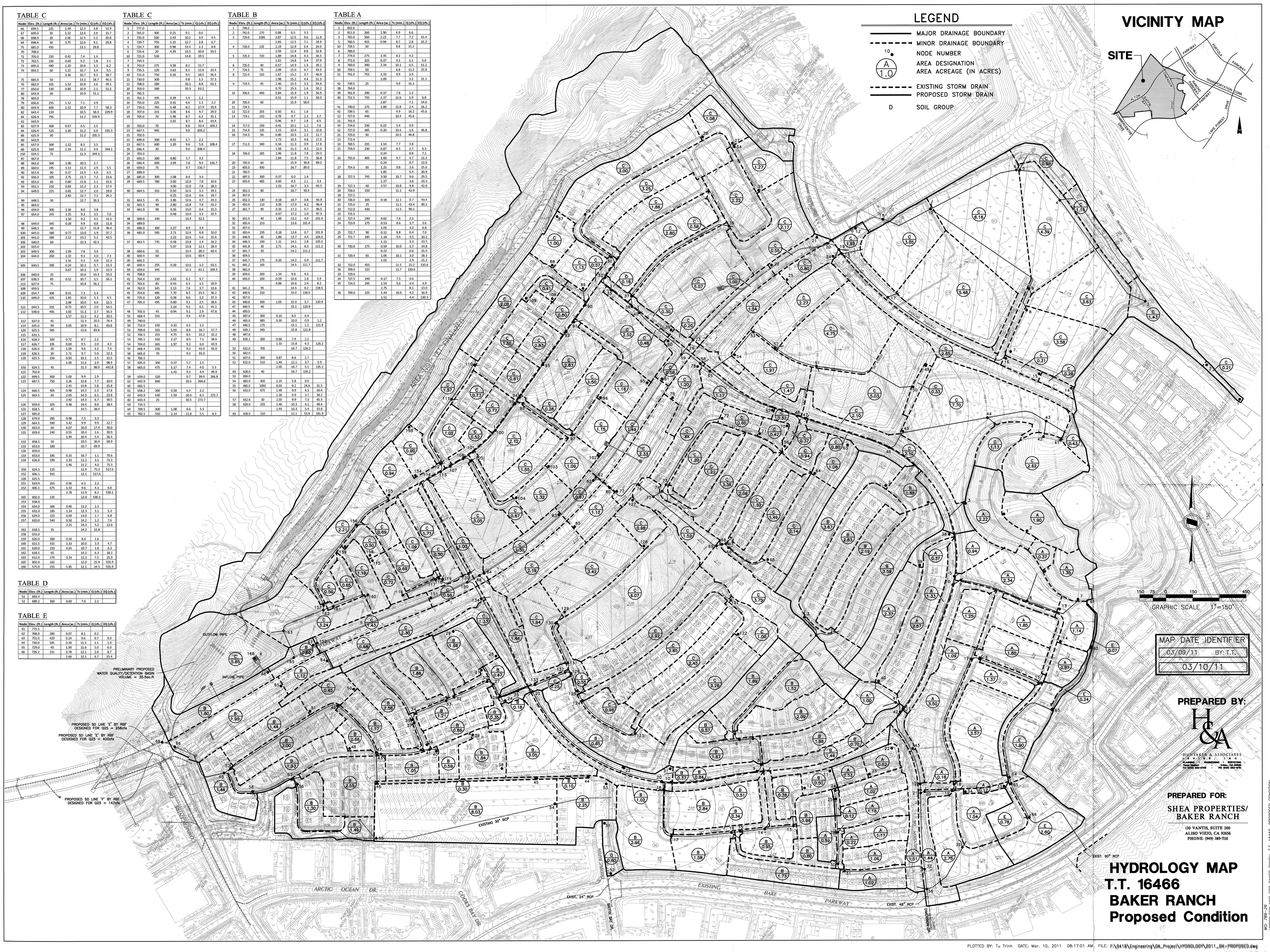
Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
1	777.0					
2	765.0	300	0.21	9.1	0.6	
3	735.0	500	1.43	10.2	3.9	4.5
4	729.7	750	1.15	12.7	2.8	6.7
5	724.7	300	0.98	13.4	2.3	8.8
6	724.6	20	4.39	13.5	10.8	19.5
10	721.0	530		14.8	19.5	
7	744.5					
8	743.0	275	3.58	8.2	11.7	
9	735.5	120	3.63	8.3	11.8	23.4
10	721.0	750	6.16	9.5	18.5	56.4
11	710.0	300		9.8	1.3	57.3
12	708.0	180		10.1	8.8	63.2
20	703.0	180		10.3	63.2	
14	765.5					
15	761.3	195	0.29	5.4	1.2	
16	755.0	225	0.31	6.6	1.1	2.2
17	716.0	765	5.48	8.2	17.9	19.9
18	707.0	315	3.06	8.6	9.7	29.0
19	705.0	70	1.98	8.7	6.2	35.1
			2.65	8.7	8.4	43.4
20	703.0	70		8.8	43.4	103.2
23	667.5	945		9.6	103.2	
21	702.0					
22	690.0	300	0.55	5.7	2.2	
23	667.5	600	1.20	9.6	5.8	108.4
26	666.4	30		9.6	108.4	
24	703.0					
25	691.0	300	0.80	5.7	3.2	
26	666.4	600	2.04	7.8	9.4	116.7
59	659.0	75		9.7	116.7	
27	689.0					
28	685.0	300	1.08	8.4	3.4	
29	669.5	780	3.00	12.0	7.8	10.6
			3.00	12.0	7.8	18.3
30	664.5	315	0.50	12.6	1.3	19.1
			0.25	12.6	0.6	19.7
31	663.5	45	1.86	12.6	4.7	24.3
32	661.5	90	2.80	12.8	7.0	31.2
33	661.0	90	0.16	13.0	0.4	31.3
			0.48	13.0	1.2	32.5
38	660.6	140		13.4	32.5	
34	689.0					
35	686.0	300	1.27	8.9	3.9	
36	681.0	585	2.71	12.6	6.8	10.0
			2.22	12.6	5.6	15.6
37	663.5	735	0.58	13.8	1.4	16.2
			5.07	13.8	12.1	28.3
38	660.6	55		13.4	28.3	60.4
40	660.4	60		13.6	60.4	
39	665.5					
40	660.4	255	0.30	13.6	1.2	61.1
59	659.0	345		11.1	61.1	189.3
41	768.0					
42	764.0	110	2.62	6.2	9.7	
43	763.6	85	0.43	6.5	1.5	10.9
44	762.0	345	1.13	7.6	3.7	13.6
45	754.0	485	7.70	8.5	23.5	36.2
46	735.0	120	0.38	8.6	1.2	37.3
47	705.0	495	0.80	9.1	2.5	38.6
			2.10	9.1	6.5	45.1
48	702.0	45	0.94	9.1	2.9	47.8
55	668.4	555		9.6	47.8	
49	740.0					
50	732.0	150	0.33	6.5	1.2	
51	709.0	555	5.03	8.0	16.7	17.7
52	706.5	255	4.75	8.5	15.2	32.2
53	705.5	150	2.27	8.9	7.1	38.6
54	704.0	165	1.97	9.2	6.0	43.9
55	668.4	150		9.3	43.9	91.0
58	665.0	70		9.3	91.0	
56	706.5					
57	695.0	300	0.37	5.7	1.5	
58	665.0	475	1.17	7.4	4.0	5.3
			1.41	9.3	4.9	99.9
59	659.0	120		9.7	99.9	266.8
62	643.9	840		10.5	266.8	
60	665.5					
61	658.2	300	0.58	6.3	2.2	
62	643.9	630	1.50	10.4	6.3	272.7
62	643.4	25		10.5	272.7	
63	714.5					
64	709.5	300	1.08	8.6	3.3	
65	702.5	550	2.14	11.8	5.5	8.3

TABLE B

Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
1	748.0					
2	742.0	270	0.88	6.5	3.3	
3	729.0	1095	3.87	12.5	9.6	11.9
			2.83	12.5	7.1	18.9
4	728.0	135	2.19	12.9	5.4	24.0
			3.59	12.9	8.8	32.8
5	725.3	720	1.89	14.8	4.3	34.5
			1.52	14.8	3.4	37.9
6	725.0	40	0.57	14.9	1.3	39.1
7	724.5	75	2.09	15.0	4.7	43.5
8	721.0	150	1.67	15.2	3.7	46.9
			1.98	15.2	4.4	51.3
9	719.5	45	1.46	15.3	3.3	54.6
			0.70	15.3	1.6	56.2
10	706.5	490	0.84	15.9	1.9	56.9
			0.51	15.9	1.1	58.0
20	705.0	60		15.9	58.0	
11	724.5					
12	721.0	255	0.50	8.1	1.6	
13	719.1	210	0.78	9.7	2.3	3.7
			0.96	9.7	2.8	6.5
14	717.0	150	0.41	10.1	1.2	7.6
15	714.9	135	1.15	10.4	3.1	10.6
16	714.5	50	0.80	10.5	2.3	12.7
			1.73	10.5	4.8	17.5
17	711.0	340	0.34	11.3	0.9	17.8
			1.58	11.3	4.3	22.0
18	706.0	285	2.96	11.8	7.8	29.3
			2.84	11.8	7.5	36.8
20	705.0	60		15.9	36.8	89.0
23	655.0	930		16.7	89.0	
21	760.5					
22	697.5	300	0.37	6.0	1.4	
23	655.0	665	0.65	8.5	2.1	3.3
			1.02	16.7	3.3	99.5
25	652.3	80		16.7	99.5	
24	657.0					
25	652.3	130	0.18	16.7	0.8	93.9
26	652.0	110	3.05	17.0	6.2	96.4
27	651.7	90	0.35	17.2	0.7	96.5
			0.47	17.2	1.0	97.5
30	651.0	40	1.66	13.2	4.0	101.4
32	650.4	210		13.6	101.4	
31	657.0					
32	650.4	235	0.18	13.6	0.7	101.8
33	646.9	45	1.86	13.7	4.4	104.0
34	646.3	190	1.21	14.1	2.8	105.0
35	641.8	30	2.71	14.1	6.3	111.2
37	641.7	30		14.2	111.2	
36	654.5					
37	641.7	175	0.20	14.2	0.9	111.7
41	641.2	165		14.5	111.7	
38	662.0					
39	659.0	300	1.54	9.6	4.5	
40	655.0	200	0.59	10.6	1.6	5.9
			0.86	10.6	2.4	8.2
41	641.2	95		14.5	8.2	118.5
43	640.6	210		15.0	118.5	
42	667.0					
43	640.6	300	1.05	15.0	3.7	120.9
47	640.5	40		15.1	120.9	
44	689.0					
45	687.0	300	0.10	6.5	0.4	
46	665.0	885	0.30	10.0	0.9	1.2
47	640.5	170		15.1	1.2	121.8
49	639.2	345		15.8	121.8	
48	647.0					
49	639.2	300	0.66	7.9	2.2	
			1.33	15.8	4.3	126.2
52	632.0	705		16.7	126.2	
50	642.0					
51	637.0	300	0.87	8.6	2.7	
52	632.0	510	1.44	12.1	3.7	5.9
			2.00	16.7	5.1	135.2
63	628.0	40		16.7	135.2	
53	694.0					
54	681.0	300	2.25	5.8	9.0	
55	665.0	1050	8.03	9.2	24.6	31.5
56	633.0	675	1.49	9.9	4.3	34.4
			1.30	9.9	3.7	38.2
57	632.6	30	2.55	9.9	7.3	45.3
58	629.0	255	1.46	10.3	4.1	48.4
			1.93	10.3	5.4	53.8
63	628.0	210		12.1	53.8	181.9

TABLE A

Node	Elev. (ft.)	Length (ft.)	Area (ac.)	Tc (min.)	Q (cfs.)	1Q (cfs.)
1	842.0					
2	811.0	260	1.90	6.9	6.6	
3	765.0	560	2.22	7.7	7.2	13.4
5	760.5	455	0.94	8.7	2.8	15.2
10	759.5	50		8.8	15.2	
6	789.0					
7	774.0	275	1.35	8.2	4.2	
8	771.0	325	0.37	9.3	1.1	5.0
9	760.0	390	2.34	10.1	6.5	11.2
10	759.5	50		8.8	11.2	25.8
11	741.0	755	1.33	9.9	3.9	
			1.09	9.9	3.2	31.1
42	739.5	25		9.9	31.1	
38	764.0					
39	761.0	290	0.37	7.8	1.2	
40	752.5	735	2.37	12.6	5.9	6.8
			2.87		7.1	14.0
41	740.0	175	1.00	12.8	2.4	16.2
42	739.5	65		9.9	16.2	45.6
12	727.0	640		10.4	45.6	
11	741.0					
43	734.0	230	0.22	5.4	0.9	
12	727.0	185	0.20	10.4	1.6	46.8
21	725.0	50		10.5	46.8	
13	772.4					
14	769.5	235	1.14	7.7	3.8	
15	759.0	230	0.87	8.5	2.7	6.3
			0.24		0.8	7.1
16	755.0	405	1.60	9.7	4.7	11.3
			0.24		0.7	12.0
17	754.5	50	1.25	9.8	3.6	15.6
			1.85		5.4	20.9
18	727.5	745	3.50	10.7	9.6	29.5
			1.37		3.8	33.3
19	727.3	40	3.57	10.8	9.8	42.9
20	726.0	150		11.1	42.9	
18	727.5					
20	726.0	165	0.18	11.1	0.7	43.4
21	725.0	25		11.1	43.4	90.1
32	712.0	430		11.5	90.1	
22	711.5					
23	727.4	240	0.62	7.6	2.1	
24	723.8	175	0.53	8.6	1.7	3.6
			1.01		3.2	6.8
25	722.7	90	0.12	8.8	0.4	7.0
29	721.7	185	1.18	9.4	3.5	10.2
			1.11		3.3	13.5
30	720.8	175	0.59	10.0	1.7	14.8
			0.22		0.6	15.4
31	720.4	65	1.06	10.1	3.0	18.3
			1.02		2.9	21.2
32	712.0	455		11.5	21.2	110.6
36	709.0	115		11.7	110.6	
33	729.0					
34	727.5	240	0.17	7.5	0.6	
35	724.0	295	1.54	9.6	4.4	4.9
			2.75		8.1	13.0
36	709.0	325	1.44	10.0	4.2	16.9
			1.51		4.4	130.3



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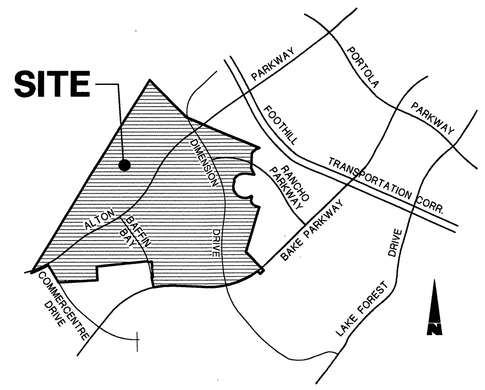
WO: 789-26
HYDROLOGY MAP FOR BAKER RANCH, T.T. 16466, PROPOSED CONDITION

VICINITY MAP



LEGEND

———	MAJOR DRAINAGE BOUNDARY
- - - -	MINOR DRAINAGE BOUNDARY
100 ●	NODE NUMBER
A / 1.0	AREA DESIGNATION AREA ACREAGE (IN ACRES)
Q10 =6.0cfs Q100=8.0cfs t=15.0 C.S. #1	PEAK FLOW RATE TIME OF CONCENTRATION
ΣQ10 =8.0cfs ΣQ100=10.0cfs t=15.0	PEAK CONFLUENCE FLOW RATE TIME OF CONCENTRATION
———	EXISTING STORM DRAIN
— C / B —	SOIL GROUP BOUNDARY

1" = 200'

GRAPHIC SCALE 1"=200'

PREPARED BY:

HUNSAKER & ASSOCIATES IRVINE, INC.
PLANNING • ENGINEERING • SURVEYING
Three Hughes • Irvine, CA 92618
PH (949) 583-1010 • FX (949) 583-0759

PREPARED FOR:

SHEA PROPERTIES/
BAKER RANCH

130 VANTIS, SUITE 200
ALISO VIEJO, CA 92656
VOICE: (949) 389-7116

MAP DATE IDENTIFIER	
DATE OF LATEST CHANGE TO THIS MAP	
03/30/10	BY: T.T.
DATE OF THIS PLOT	
04/01/10	

HYDROLOGY MAP
T.T. 16466
BAKER RANCH
Existing Condition

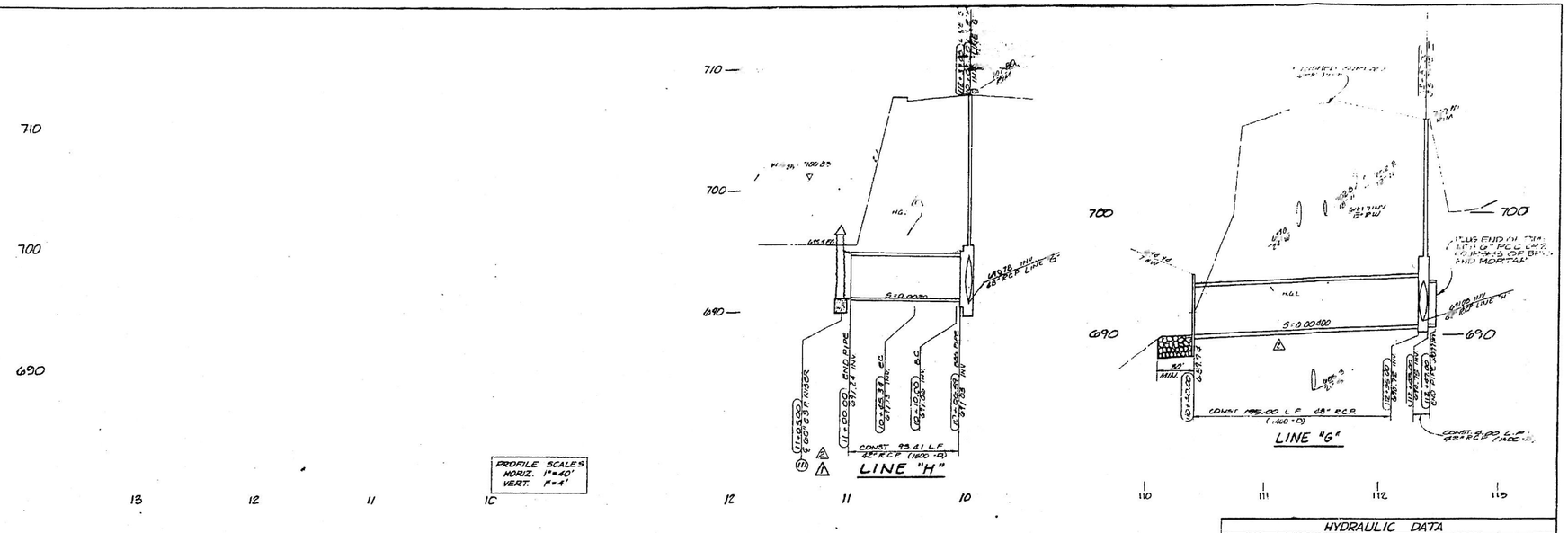
WO: 789-26X
HYDROLOGY MAP FOR BAKER RANCH, EXISTING CONDITION

L:\Baker ranch\SHEA\Residential\IMP\STORM\HYDRO\BR-2010-EXISTING.dwg

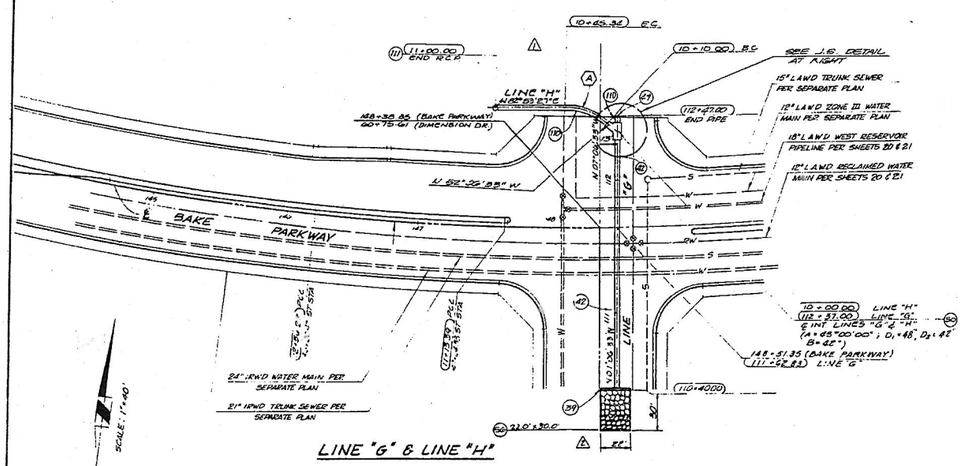
JUL 23 2010

SECTION 5

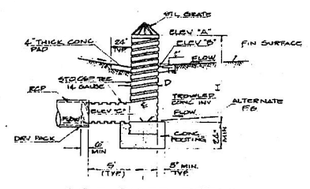
REFERENCES FROM RBF



DIMENSION DRIVE

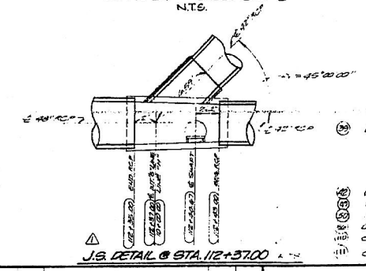


LINE "G" & LINE "H"



C.S.P. RISER DETAIL

MODIFIED OCEMA STD. PLAN
No. 1327 ~ SHEET 6 OF 8
N.T.S.



J.6 DETAIL @ STA. 112+37.00

HYDRAULIC DATA

LINE	STA. TO	STA.	Q100	S	Do	n	D	Dn	Vn	Qc	Vc	Fn
"G"	110+40.00	111+00.00	99.9*	0.0064	0.013	48"	—	—	8.4'	11.6	0.999	
"H"	10+00.00	111+00.00	99.9*	0.0012	0.012	0.013	42"	—	—	3.3'	13.5	1.000

* INTERIM CONDITION DISCHARGE

CONSTRUCTION NOTES

(38) CONST. CONCRETE HEADWALL PER DETAIL "D" ON SHEET 4

(48) CONST. 48" R.C.P. (SEE PROFILE FOR D LOAD)

(53) PLUG END OF PIPE WITH 6" PCC OR 2 COURSES OF BRICK & MORTAR

(55) INST. JUNCTION STRUCTURE TYPE III PER OCEMA STD. PLAN NO. 1312

(110) CONST. LOOSE RIP-RAP PER DETAIL ON SHEET 4

(111) CONST. 42" RCP (SEE PROFILE FOR D-LOAD)

(112) CONST. 60" C.S.P. RISER PER DETAIL ON THIS SHEET

STORM DRAIN CENTERLINE DATA

NO	LINE	LENGTH	BEARING
1	"H"	79.80'	N 52°06'35"W
2	"H"	17.89'	N 0°20'42"W

STORM DRAIN CURVE DATA

NO	REFERENCE	Δ	R	L	T
(A)	LINE "H"	45°00'00"	45.00'	35.34'	18.68
(B)	LINE "H"	4°20'18"	1887.00'	142.88'	71.47
(C)	LINE "H"	42°46'04"	45.00'	33.59'	17.62

Robert Bein, William Frost & Associates
PROFESSIONAL ENGINEERS PLANNERS & SURVEYORS
P.O. BOX 1746 / 1672 SUTTON BOULEVARD / PHONE 1 CALIFORNIA 92116
(714) 672-9100

DATE	BY	DESCRIPTION	APP'D.	DATE
5/6/90	S.M.T.	REVISED LINE "G" & "H" EXTEND RIP RAP		
1/90	E.B.	REVISED LINE "H"		

REVISIONS

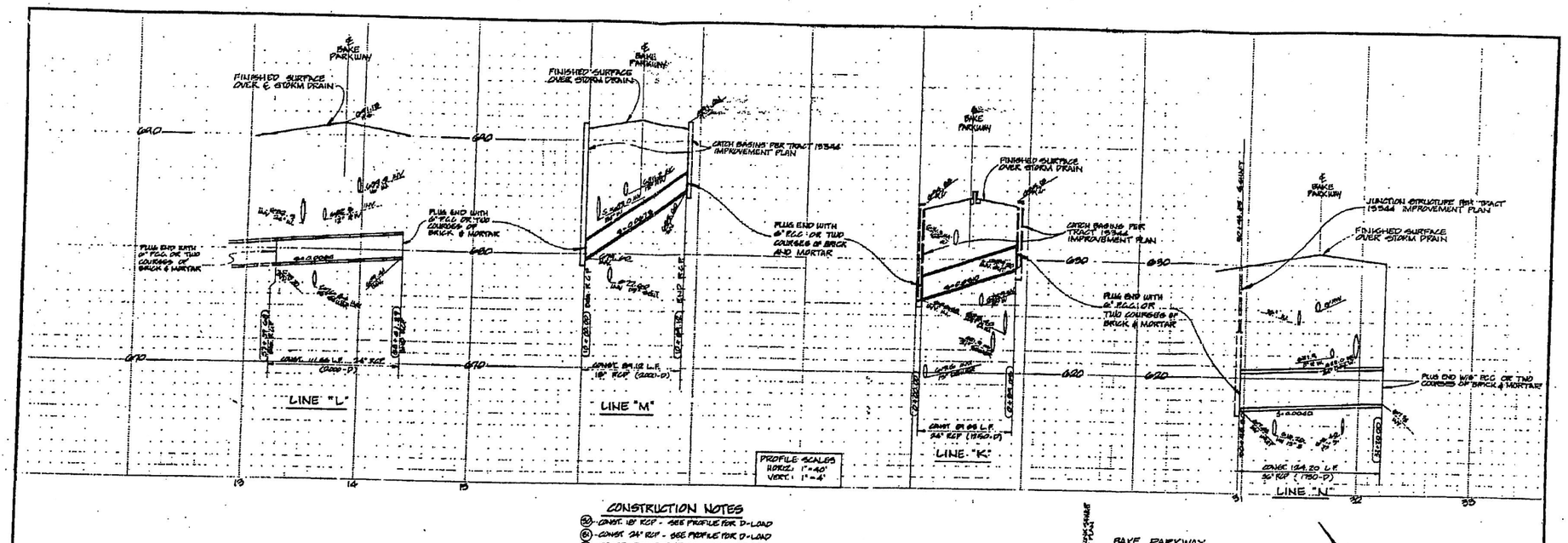
DESIGNED S.M.T.
DRAWN A.E.N.
CHECKED E.M.B.
SCALE 1"=40'
DATE
JOB NUMBER 2037-74454

PLAN AND PROFILE FOR THE IMPROVEMENT OF

BAKE PARKWAY
STORM DRAIN
LINE "G" AND LINE "H"

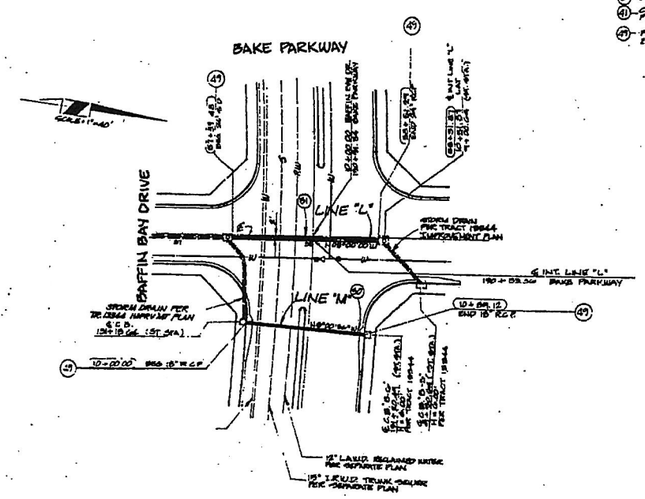
SHEET 30 OF 58

DR3 15530

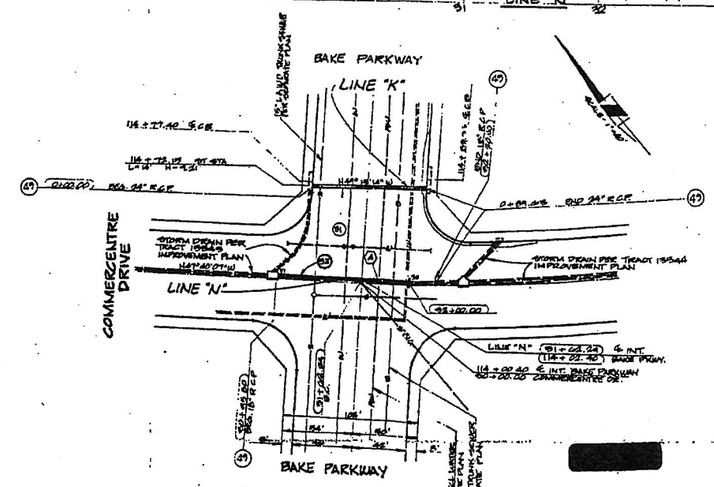


CONSTRUCTION NOTES

(30) CONST. 18" RCP - SEE PROFILE FOR D-LOAD
(31) CONST. 24" RCP - SEE PROFILE FOR D-LOAD
(41) CONST. REINFORCED CONCRETE COLLAR PER O.C.E.M.I. STD. NO. 1517
(49) PLUG END OF PIPE WITH 6" P.C.C. OR 2 COURSES OF BRICK & MORTAR



LINE "L" & LINE "M"



LINE "K" & LINE "N"

[redacted]

STORM DRAIN CURVE DATA					
No.	REFERENCE	Δ	R	L	T
(A)	LINE "N"	2°22'30"	1,398.00	55.95'	28.48'

Robert Bein, William Frost & Associates
PROFESSIONAL ENGINEERS PLANNERS & SURVEYORS

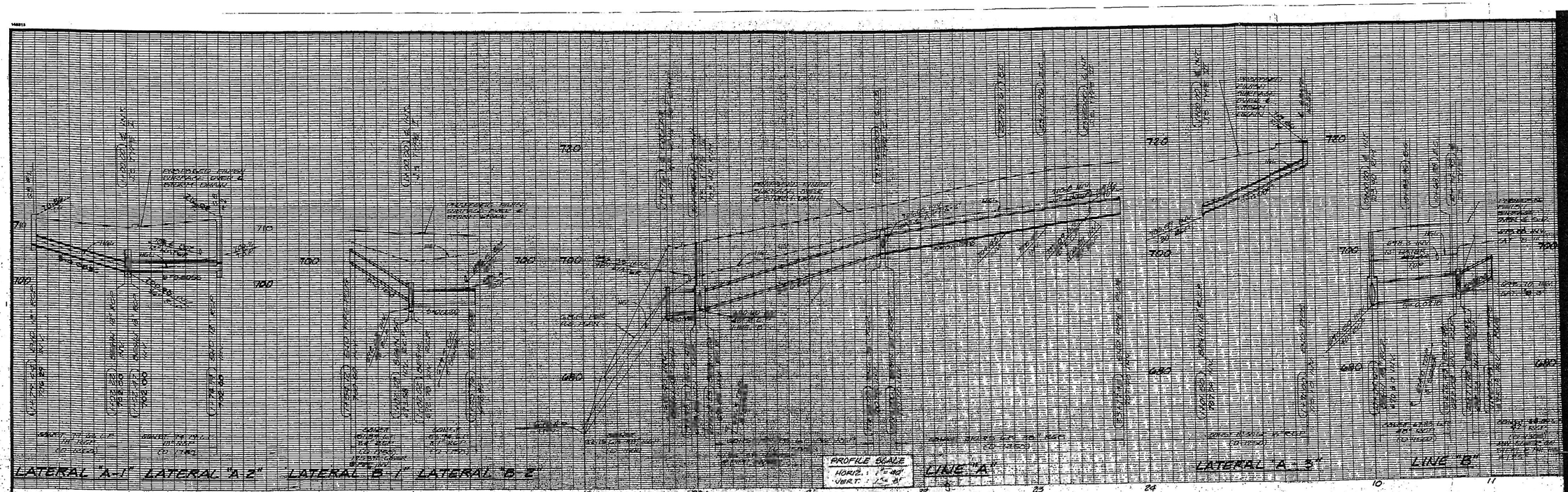
DATE	BY	DESCRIPTION	APP'D	DATE
		REVISIONS		

DESIGNED | CHECKED | SCALE | DRAWN | DATE

PLAN AND PROFILE FOR THE IMPROVEMENT OF
BAKE PARKWAY
STORM DRAIN
LINE "K", LINE "L", LINE "M" AND LINE "N"

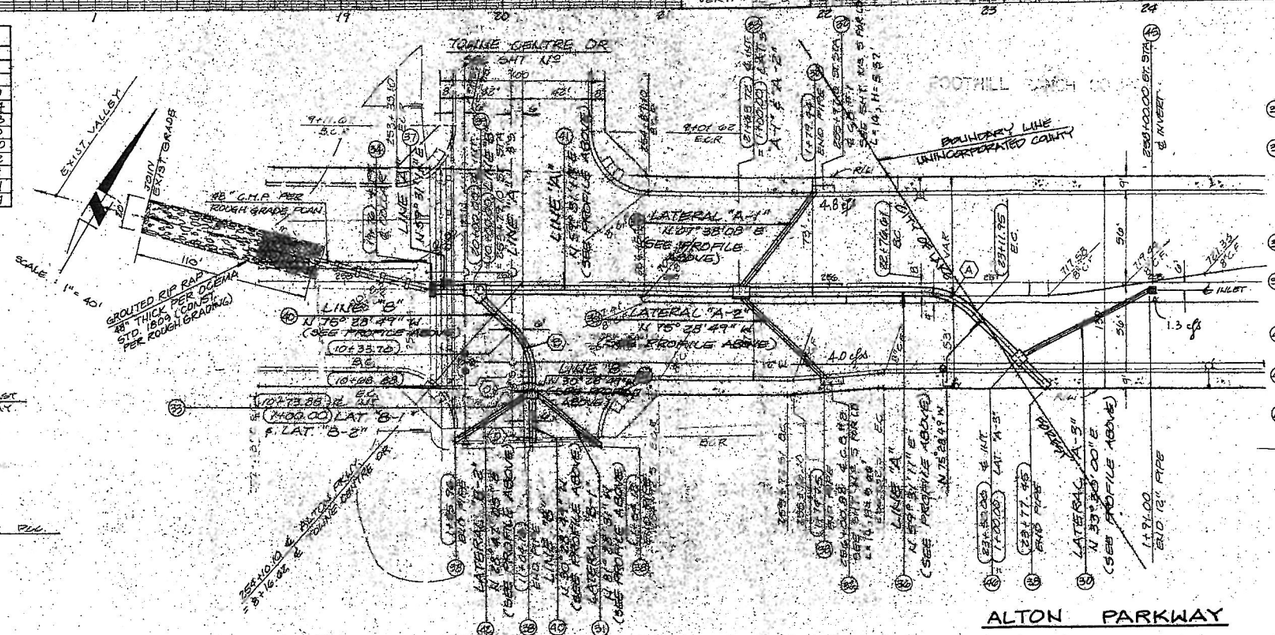
SHEET 31 of 58

D23 - 15538



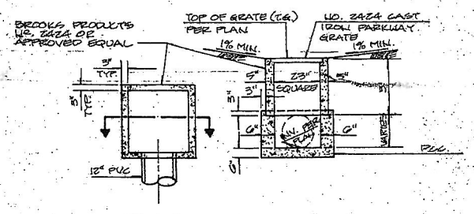
HYDRAULIC DATA

LINE	FROM STA.	TO STA.	Qes	So	n	D	Dn	Vn	Dc	Vc	F
A	18+92.00	19+76.00	216.5	0.031	0.024	48"	2.2	30.8	3.9	17.4	4.1
A	19+76.00	19+98.75	216.5	0.004	0.013	48"	4.0	FULL	3.9	17.4	—
A	20+08.25	21+63.00	49.6	0.061	0.013	36"	1.2	21.4	2.6	9.6	3.9
A	21+67.00	23+77.45	49.9	0.039	0.013	30"	1.6	16.7	2.3	10.9	2.4
LAT. "A-1"	1+02.22	1+79.47	4.8	0.054	0.013	18"	1.5	10.8	2.3	4.7	3.3
LAT. "A-2"	1+02.47	1+74.94	4.0	0.059	0.013	18"	0.8	4.5	2.2	4.4	1.0
LAT. "A-3"	1+01.80	1+91.00	1.3	0.097	0.011	18"	0.3	8.7	0.4	3.1	5.0
LAT. "B-1"	1+02.28	1+84.72	27.9	0.138	0.013	24"	0.8	23.1	1.6	9.3	3.2
LAT. "B-2"	1+02.02	1+85.92	28.9	0.070	0.013	27"	0.3	7.6	1.9	8.2	—
B	10+04.6	10+72.43	162.4	0.018	0.013	48"		18.0	3.7	13.4	2.1
B	10+77.43	11+05.43	107.6	0.100	0.013	42"	1.	29.8	3.2	12.0	5.1



CONSTRUCTION NOTES

(30) — CONST. 18" RCP CLASSIFICATION PER PROFILE
(31) — CONST. 24" RCP CLASSIFICATION PER PROFILE
(32) — CONST. INLET TYPE II PER OCEMA STD. PLAN NO. 1302
(33) — CONST. JUNCTION STRUCTURE TYPE I PER OCEMA STD. PLAN NO. 1310 (OHT SHAFT)
(34) — CONST. CONC. COLLAR PER OCEMA STD. PLAN NO. 1317
(36) — CONST. 30" RCP CLASSIFICATION PER PROFILE
(37) — CONST. 48" RCP CLASSIFICATION PER PROFILE
(38) — CONST. PIPE END PLUG WITH BRICK & MORTAR
(39) — CONST. JUNCTION STRUCTURE TYPE III PER OCEMA STD. PLAN NO. 1312
(40) — CONST. 42" RCP CLASSIFICATION PER PROFILE
(41) — CONST. 36" RCP CLASSIFICATION PER PROFILE
(42) — CONST. 27" RCP CLASSIFICATION PER PROFILE
(43) — CONST. 39" RCP CLASSIFICATION PER PROFILE
(46) — CONST. GRATE INLET PER DETAIL HEREON
(47) — CONST. JUNCTION STRUCTURE TYPE II PER OCEMA STD. PLAN NO. 1315



GRATE INLET DETAIL

N.T.S.

CURVE DATA

	REFERENCE	Δ	R	L	T
(A)	℄ S.D. LINE "A"	46° 00' 00"	45.00'	36.34'	18.64'
(B)	℄ S.D. LINE "B"	44° 47' 34"	45.00'	35.14'	18.64'
(C)	℄ S.D. LINE "B"	00° 09' 35"	1,794.00'	5.00'	2.60'
(D)	℄ S.D. LINE "B"	00° 58' 02"	1,794.00'	30.28'	15.14'

REGISTERED PROFESSIONAL ENGINEER MOHAMMAD B. KASHANI No. C49247 Exp. 9-30-96 STATE OF CALIFORNIA

Robert Bein, William Frost & Associates
PROFESSIONAL ENGINEERS, PLANNERS & SURVEYORS
P.O. BOX 18789 • 14725 ALTON PARKWAY, IRVINE, CALIFORNIA 92718
714/477 3505

MOHAMMAD B. KASHANI — DATE 10-23-97 — RCE No. 49247

DATE	BY	DESCRIPTION	APP'D	DATE
		REVISIONS		

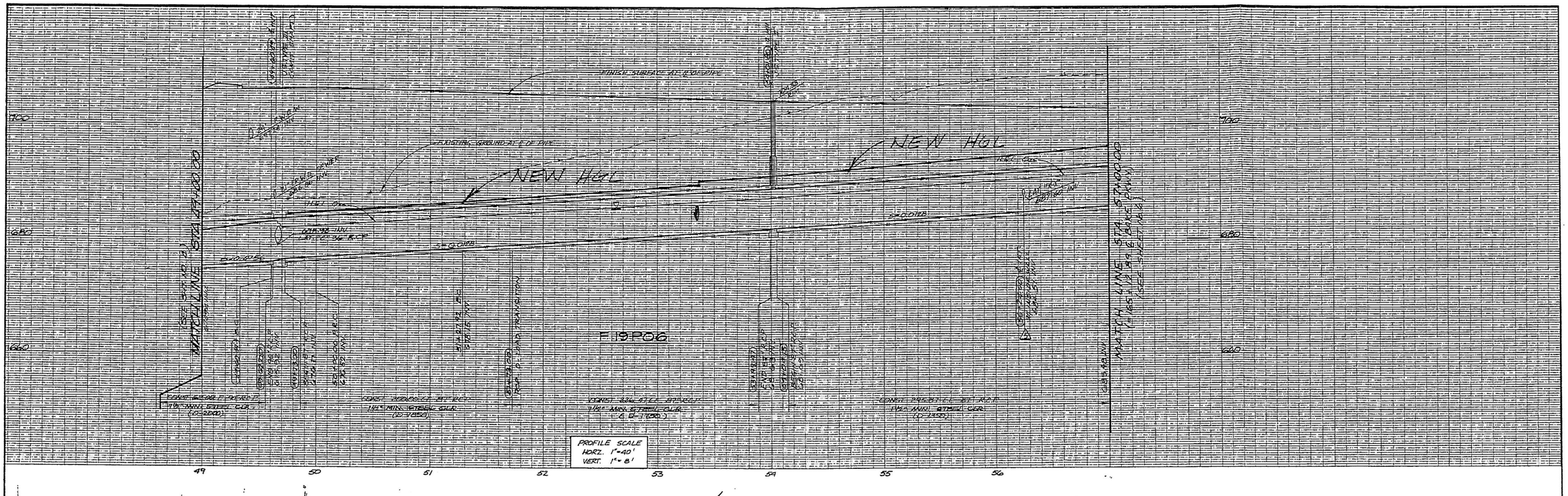
FIELD BOOK	SCALE AS NOTED
DESIGNED RS	DRAWN MS
CHECKED ML	DATE 10-7-96

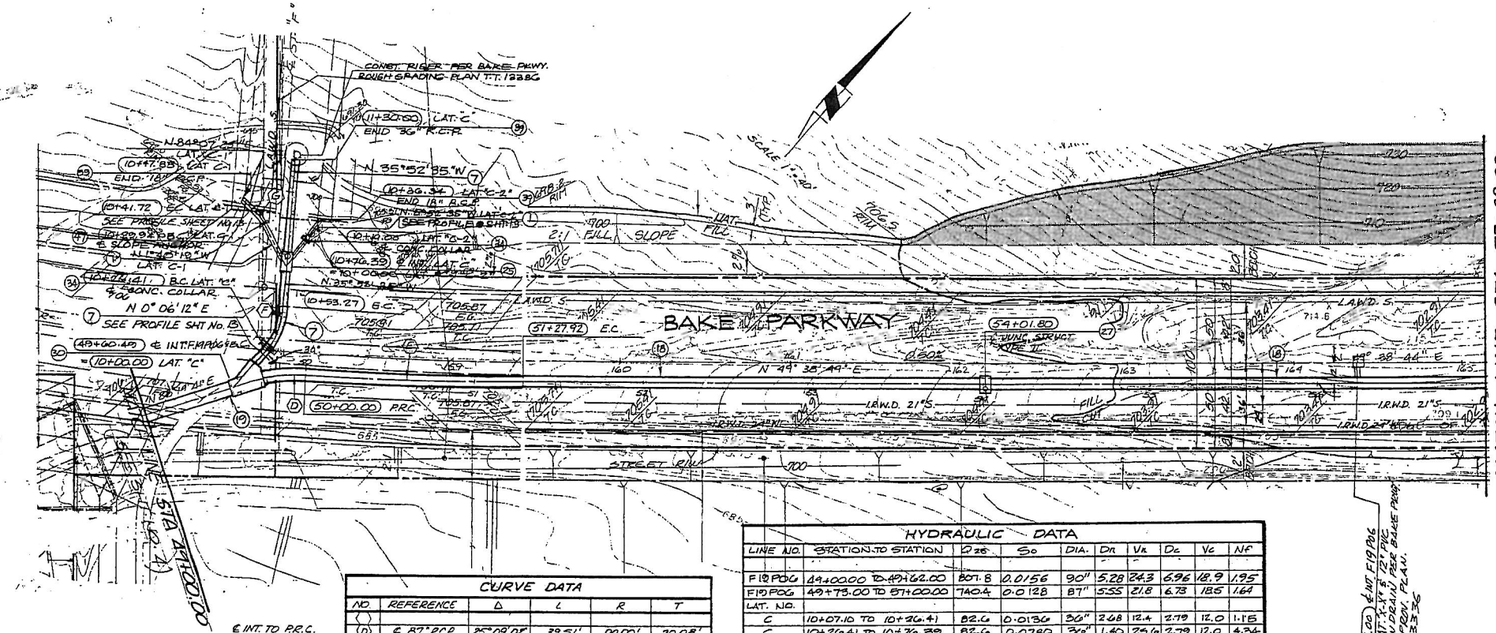
PLAN AND PROFILE FOR THE IMPROVEMENT OF
STORM DRAIN
ALTON PARKWAY
LINE "A", LINE "B"
LAT's: "A-1", & "A-2" LAT's: "B-1", & "B-2"
FOOTHILL RANCH COMPANY

SHEET 10 OF 14

J.N. 32911

NOV 07 2002 OCT 30 2002





CONSTRUCTION NOTES

1. CONST. 18" R.C.P. (D-LOAD PER PROFILE)
7. CONST. 36" R.C.P. (D-LOAD PER PROFILE)
18. CONST. 87" R.C.P. (D-LOAD PER PROFILE)
19. CONST. 90" R.C.P. (D-LOAD PER PROFILE)
27. CONST. JUNC. STRUCT. TYPE II PER O.C.E.M.A. STD. PLAN No. 1311
32. CONST. JUNC. STRUCT. TYPE III (OMIT SHAFT) PER O.C.E.M.A. STD. PLAN No. 1312.
34. CONST. REIN. CONC. COLLAR PER O.C.E.M.A. STD. PLAN No. 1317
36. CONST. RISER PER O.C.E.M.A. STD. PLAN No. 1327
39. CONST. BRICK AND MORTAR PLUG.
25. CONST JUNCTION STRUCTURE TYPE I PER O.C.E.M.A STD. PLAN. NO. 1310

47. CONST. CONC. PIPE SLOPE ANCHOR PER O.C.E.M.A. STD. PLAN Nº 1323.

1 1/2 0 1 2
3 inches on original drawing

CURVE DATA

NO.	REFERENCE	Δ	L	R	T
(D)	℄ 87" R.C.P.	25°09'05"	39.51'	90.00'	20.08'
(E)	℄ 87" R.C.P.	3°50'00"	127.92'	1912.00'	63.98'
(F)	℄ 36" R.C.P.	34°12'16"	26.86'	45.00'	13.85'
(G)	℄ 18" R.C.P.	30°00'00"	11.78'	22.50'	6.03'

℄ INT. TO P.R.C.
TOTAL CURVE
TOTAL CURVE
TOTAL CURVE

HYDRAULIC DATA

LINE NO.	STATION TO STATION	Q25	So	DIA.	Dn	Vn	Dc	Vc	NF
F19P06	49+00.00 TO 49+62.00	807.8	0.0156	90"	5.28	24.3	6.96	18.9	1.95
F19P06	49+75.00 TO 57+00.00	740.4	0.0128	87"	5.55	21.8	6.73	18.5	1.64
LAT. NO.									
C	10+07.10 TO 10+26.41	82.6	0.0136	36"	2.68	12.4	2.79	12.0	1.15
C	10+26.41 TO 10+76.39	82.6	0.0780	36"	1.40	25.6	2.79	12.0	4.34
C	10+88.39 TO 11+30.00	64.3	0.0780	36"	1.22	23.9	2.57	1.5	4.42
C-1	10+03.00 TO 10+47.83	11.2	0.2100	18"	0.49	22.2	1.28	7.0	6.53
C-2	10+03.00 TO 10+18.59	8.6	0.5400	18"	0.34	28.8	1.14	6.0	10.41
C-2	10+18.59 TO 10+36.34	8.6	0.1680	18"	0.45	19.0	1.14	6.0	5.85

(56+24.00) ℄ INT F19P06
CONST. LAT. "C-1" & "C-2" PVC
KEEP MAIN DRAIN PER BAKE PKWY
IMPROVEMENT PLAN.
T.T. 133-36

REGISTERED PROFESSIONAL ENGINEER
ROBERT KALLENBERGER
NO. 37967
EXP. 3-31-90
CIVIL
STATE OF CALIFORNIA

ORANGE COUNTY
ENVIRONMENTAL MANAGEMENT AGENCY

FACILITY NO. F19P06

PLAN AND PLAN

BAKE PARKWAY
STORM DRAIN
FROM STA. 49+00.00 TO STA. 57+00.00

MARK	DATE	DESCRIPTION
2	12-10-91	RELOC. MED. DRAIN P.B.W. STA. 57+03.11 TO STA. 56+28.00

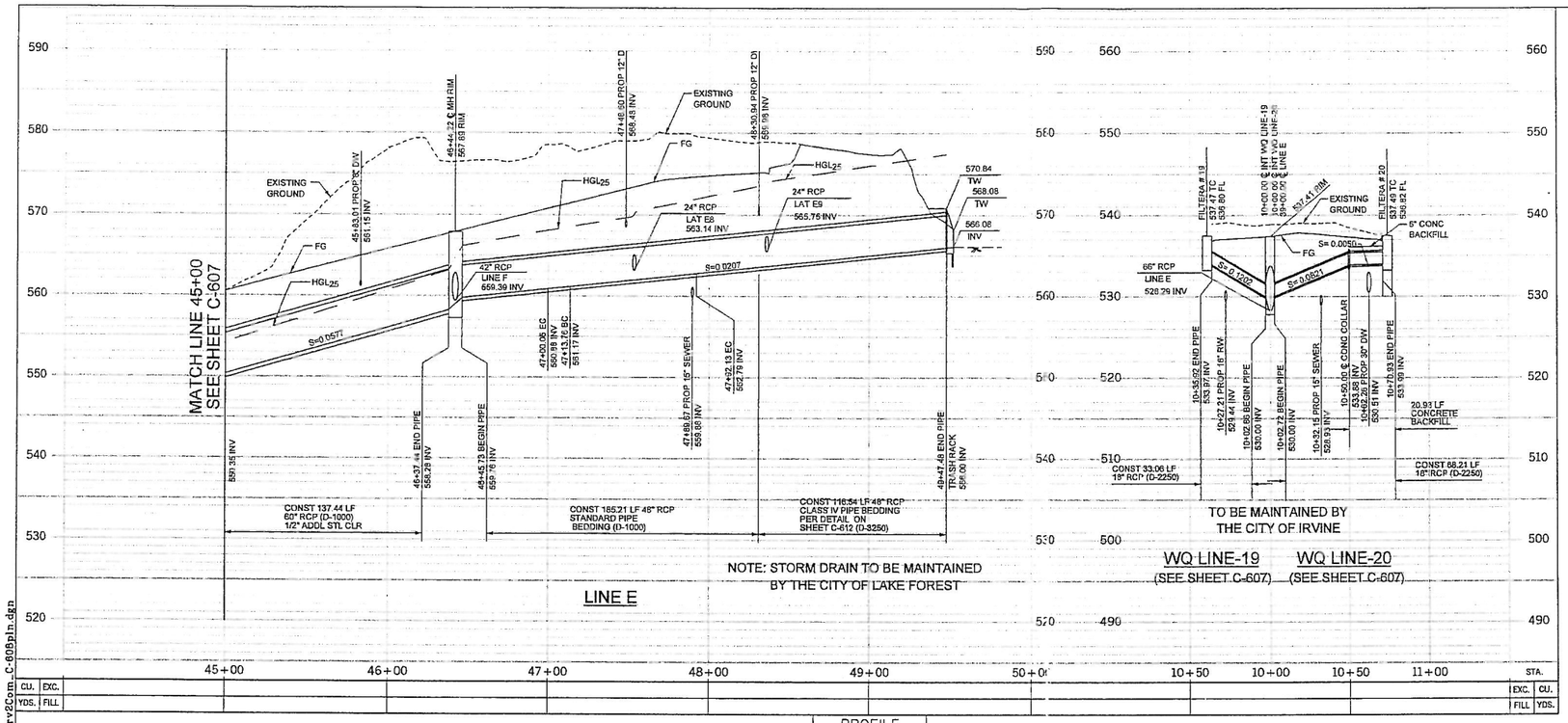
REVISIONS

PREPARED UNDER SUPERVISION OF: R. Kallenberger 4/13/89 DATE

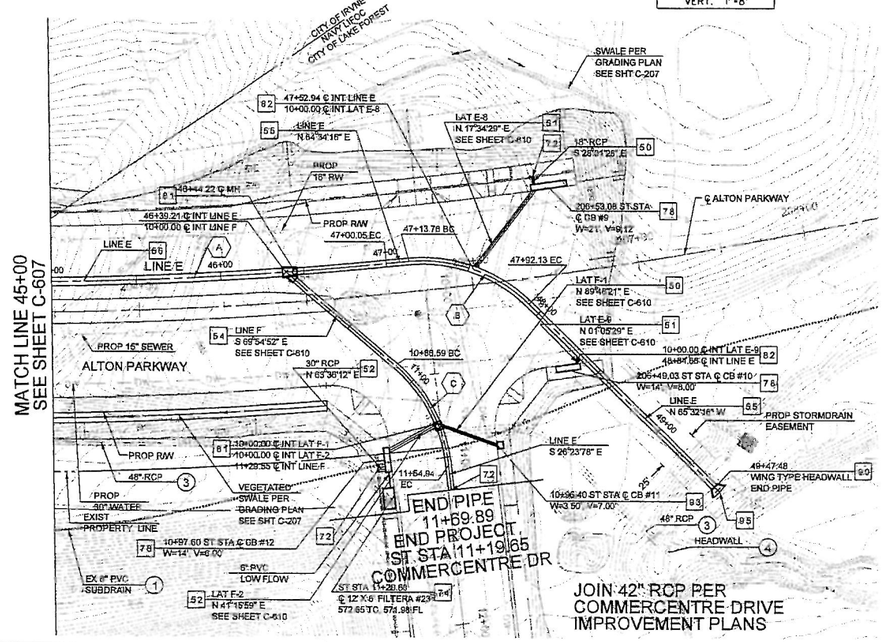
SHEET 5 OF 17

DESIGNED D. VORNBERGER
DRAWN P.S.K. CHECKED B.M.P.
SCALE AS SHOWN
DATE
DWG. NO. F19P06 - 713 - 1

J.N. 24429
24429.09 - IMP.SMFF.



PROFILE
HORIZ. 1"=40'
VERT. 1"=8'



CONSTRUCTION NOTES

STORM DRAIN

- 50 CONSTRUCT 18" RCP (D-LOAD PER PROFILE)
- 51 CONSTRUCT 24" RCP (D-LOAD PER PROFILE)
- 52 CONSTRUCT 30" RCP (D-LOAD PER PROFILE)
- 54 CONSTRUCT 42" RCP (D-LOAD PER PROFILE)
- 55 CONSTRUCT 48" RCP (D-LOAD PER PROFILE)
- 56 CONSTRUCT 60" RCP (D-LOAD PER PROFILE)
- 72 CONSTRUCT BRICK AND MORTAR PLUG
- 74 CONSTRUCT FILTERA BIORETENTION SYSTEM PER DETAIL ON SHEET C-612
- 78 CONSTRUCT INLET TYPE II PER OCPW STD. PLAN NO. 1302
- 81 CONSTRUCT JUNCTION STRUCTURE TYPE III PER OCPW STD. PLAN NO. 1312
- 82 CONSTRUCT JUNCTION STRUCTURE TYPE IV PER OCPW STD. PLAN NO. 1313
- 89 CONSTRUCT 6" CONCRETE BACKFILL PER DETAIL ON SHEET C-616
- 90 CONSTRUCT 48" PIPE WING TYPE HEADWALL PER DETAIL ON SHEET C-612
- 93 CONSTRUCT INLET TYPE I PER OCPW STD PLAN NO. 1301
- 95 CONSTRUCT TRASH RACK PER SPPWC STD. PLAN NO. 361-1

LEGEND

- (3) REMOVE
- (4) REMOVE MISCELLANEOUS CONC. ITEMS BY CONTRACTOR.
- (9) REMOVE INTERFERRING PORTIONS OF DRAINAGE PIPE

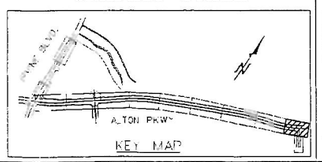
CURVE DATA

NO.	Δ	R	L	T	REFERENCE
A	13°17'22"	2452.00'	568.72'	285.64'	SD CL
B	49°53'28"	90.00'	78.37'	41.86'	SD CL
C	43°30'55"	90.00'	68.35'	35.92'	SD CL

HYDRAULIC DATA

LINE	STATION	Diam	Q_{25}	N	So	dn	dc	Vn	Vc	Sf	Fn
LINE E	45+00.00 TO 46+37.44	60"	399.8	.013	.0577	2.9	4.9	33.8	21.7	.0236	3.9
LINE E	46+45.73 TO 49+47.48	48"	258.1	.013	.0207	FULL	4.1	18.9	18.9	.0239	1.3
LAT E-8	10+03.57 TO 10+59.70	24"	5.4	.013	.0693	0.4	0.8	11.8	4.4	.0006	3.9
LAT E-9	10+03.96 TO 10+06.21	24"	3.2	.013	.4783	0.2	0.6	19.9	3.8	.0002	9.5
LINE F	10+06.94 TO 11+69.89	42"	146.5	.013	.0353	2.3	3.4	21.7	16.0	.0212	2.7
LAT F-1	10+02.35 TO 10+15.97	18"	0.4	.013	.0886	0.1	0.2	6.3	2.3	.0000	3.8
LAT F-2	10+01.76 TO 10+33.43	30"	3.6	.013	.0423	0.4	0.6	8.5	3.8	.0001	3.1

40' 0' 40' 80'
GRAPHIC SCALE



COUNTY OF ORANGE CALIFORNIA

100% SUBMITTAL

MARK	DESCRIPTION	DATE	APPR.

CITY OF IRVINE
PLAN CHECK # 00419992 EMC

CITY OF IRVINE
PERMIT # XXXXXXX

CITY OF LAKE FOREST
PLAN CHECK # XXXXXXX

PREPARED UNDER THE RESPONSIBLE CHARGE OF:
REGISTERED PROFESSIONAL ENGINEER
STEVEN K. GIFFEN
No. C042154
Exp. 3/31/10
CIVIL
STATE OF CALIFORNIA

DATE

DESIGNED BY: TMM
DRAWN BY: C.
CHECKED BY: SKG
DRAWING CODE:
FILE NAME: FD_Alton-Irv2Com_C-608pln.dgn
PLOT DATE: FEBRUARY 2009
SCALE: 1"=40'

PREPARED BY: RBF CONSULTING

ORANGE COUNTY PUBLIC WORKS

ALTON PARKWAY
IRVINE BLVD TO
COMMERCENTRE DR

STORM DRAINAGE

Sheet Reference Number
C-608

Sheet 81 of 130

FD_Alton-Irv2Com_C-608pln.dgn 2/9/2009 5:40:32 PM

H:\Pdata\10106189\CADD\TransPM\Div\Drainage\FD_Alton-Irv2Com_C-608pln.dgn 2/9/2009 5:40:31 PM TWULI