A CEQA LEVEL OF PRELIMINARY DRAINAGE REPORT FOR:

LILAC HILLS RANCH IMPLEMENTING TM TM 5572 RPL-3

San Diego County, California

PREPARED FOR:

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Rev. date: 5-3-13

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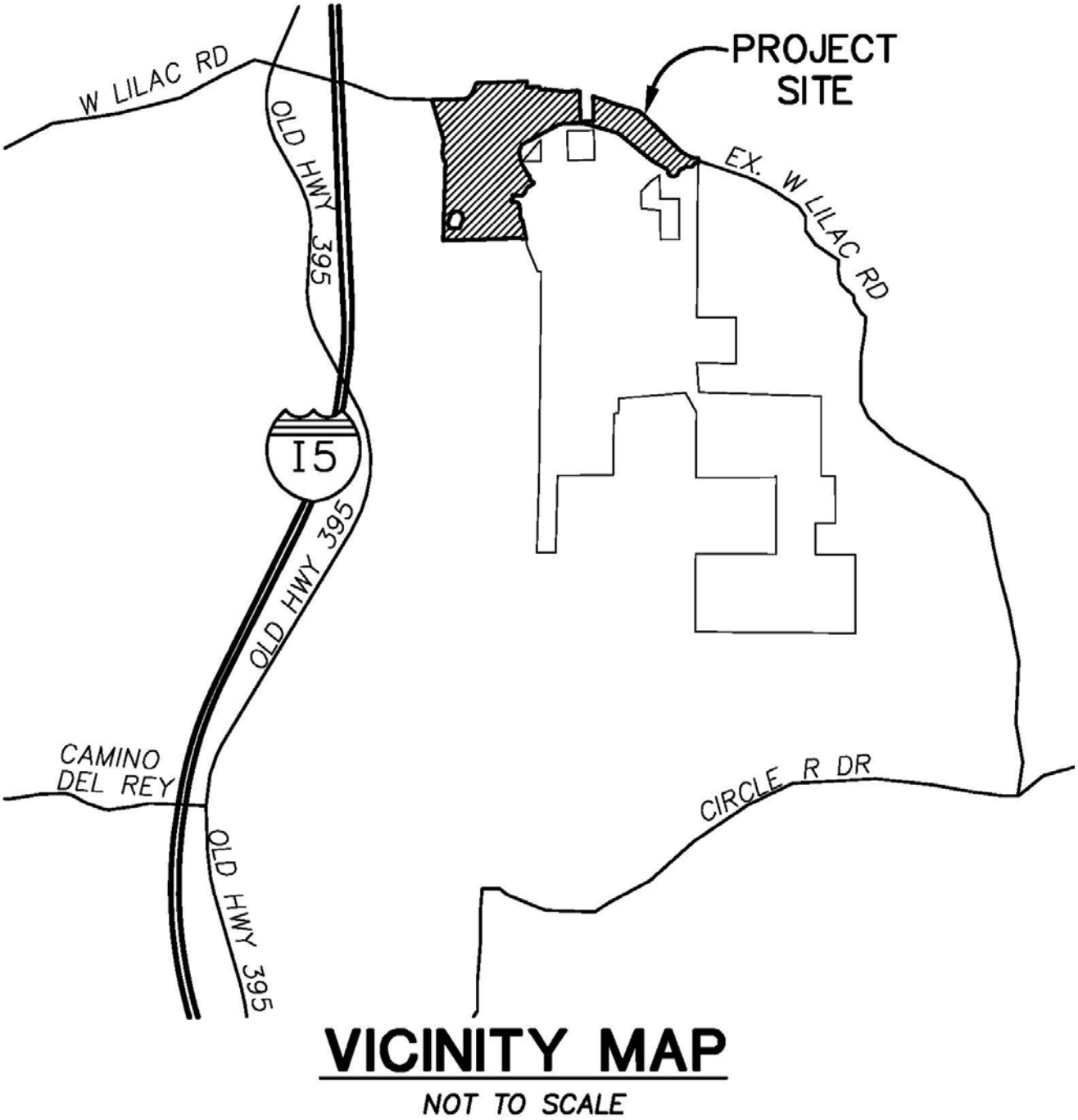
DISCUSSION

PURPOSE FOR PROJECT

The purpose of this project is to subdivide 115 acres of rural land into a master-planned community with residential, parks and extensive open spaces. The project site situated on the northeasterly upstream of a much larger watershed that drains southwesterly into San Luis Rey River.



VICINITY MAP

NOT TO SCALE

DESCRIPTION OF WATERSHED

The project is located on the east side of Interstate 15, southerly of W. Lilac Road in the County of San Diego, State of California.

This project is the first implementing portion of a 1746 lot master-planned community – Lilac Hills Ranch. The project proposes the construction of 350 dwelling units with paved roadways and parks and a sewer treatment plant on the northerly tip of the future master-planned community. The implementing TM consists of 114.9 Acres within the project boundary and approximately 11.0 acres outside of the project boundary that includes approximately the additional grading for the construction of the access road, sewer treatment plant and a detention basin. The total project disturbance footprint is approximately 125.9 acres. For purposes of comparison, only the areas with the disturbance footprint is modeled and analyzed.

The project site is situated within the northerly sub drainage basin – one of three sub basins that flows through the overall master-planned project boundary. The northerly sub drainage basin is approximately 395 acres. Under the pre-development conditions, the runoff from this sub-basin flows into a series of natural channels in a general northeasterly to southwesterly direction. These natural channels confluence into a major natural channel approximately 1300' southerly of the southerly project tip. This confluence point is designated as the project final discharge point.

The overall grading design of the project will follow the existing landform to minimize both on-site and off-site runoff diversion. Under the proposed conditions, the northerly portion of the site, adjacent to the existing W. Lilac Road, drains into a proposed underground storm drainage system that conveys the runoff westerly along the proposed Street Z then southerly along the proposed extension of W. Lilac Road to a proposed detention basin located just southerly of the project boundary. The southerly tip of the westerly half of the project drains to a low point located in the proposed street, then the runoff is conveyed onto the easterly natural terrain via a proposed storm drain, the runoff then flows southerly in the natural channel then confluences with the mitigated runoff from the detention basin before leaving the project southerly boundary at the final discharge point.

The purpose of this report is to determine the peak runoff rates under the post-development conditions and to size the preliminary stormdrain pipes. The runoff volume will also be analyzed to size the detention basin to mitigate the anticipated increase in discharge volume.

METHODOLOGY

3.1 The Rational Method

The Rational Method (RM) is a mathematical formula used to determine the maximum runoff rate from a given rainfall. It has particular application in urban storm drainage, where it is used to estimate peak runoff rates from small urban and rural watersheds for the design of storm drains and small drainage structures. The RM is recommended for analyzing the runoff response from drainage areas up to approximately 1 square mile in size. It should not be used in instances where there is a junction of independent drainage systems or for drainage areas greater than approximately 1 square mile in size. In these instances, the Modified Rational Method (MRM) should be used for junctions of independent drainage systems in watersheds up to approximately 1 square mile in size (see Section 3.4); or the NRCS Hydrologic Method should be used for watersheds greater than approximately 1 square mile in size (see Section 4).

The RM can be applied using any design storm frequency (e.g., 100-year, 50-year, 10-year, etc.). The local agency determines the design storm frequency that must be used based on the type of project and specific local requirements. A discussion of design storm frequency is provided in Section 2.3 of this manual. A procedure has been developed that converts the 6-hour and 24-hour precipitation isopluvial map data to an Intensity-Duration curve that can be used for the rainfall intensity in the RM formula as shown in Figure 3-1. The RM is applicable to a 6-hour storm duration because the procedure uses Intensity-Duration Design Charts that are based on a 6-hour storm duration.

3.1.1 Rational Method Formula

The RM formula estimates the peak rate of runoff at any location in a watershed as a function of the drainage area (A), runoff coefficient (C), and rainfall intensity (I) for a duration equal to the time of concentration (T_c), which is the time required for water to

flow from the most remote point of the basin to the location being analyzed. The RM formula is expressed as follows:

$$Q = C\,I\,A$$

Where: Q = peak discharge, in cubic feet per second (cfs)

C = runoff coefficient, proportion of the rainfall that runs off the surface (no units)

I = average rainfall intensity for a duration equal to the T_c for the area, in inches per hour (Note: If the computed T_c is less than 5 minutes, use 5 minutes for computing the peak discharge, Q)

A = drainage area contributing to the design location, in acres

Combining the units for the expression CIA yields:

$$\left(\frac{1\,\text{acre}\times\text{inch}}{\text{hour}}\right)\left(\frac{43{,}560\,\text{ft}^2}{\text{acre}}\right)\left(\frac{1\,\text{foot}}{12\,\text{inches}}\right)\left(\frac{1\,\text{hour}}{3{,}600\,\text{seconds}}\right) \Rightarrow 1.008\,\text{cfs}$$

For practical purposes the unit conversion coefficient difference of 0.8% can be ignored.

The RM formula is based on the assumption that for constant rainfall intensity, the peak discharge rate at a point will occur when the raindrop that falls at the most upstream point in the tributary drainage basin arrives at the point of interest.

Unlike the MRM (discussed in Section 3.4) or the NRCS hydrologic method (discussed in Section 4), the RM does not create hydrographs and therefore does not add separate subarea hydrographs at collection points. Instead, the RM develops peak discharges in the main line by increasing the T_c as flow travels downstream.

Characteristics of, or assumptions inherent to, the RM are listed below:

- The discharge flow rate resulting from any I is maximum when the I lasts as long as or longer than the T_c.

- The storm frequency of peak discharges is the same as that of I for the given T_c.

- The fraction of rainfall that becomes runoff (or the runoff coefficient, C) is independent of I or precipitation zone number (PZN) condition (PZN Condition is discussed in Section 4.1.2.4).

- The peak rate of runoff is the only information produced by using the RM.

3.1.2 Runoff Coefficient

Table 3-1 lists the estimated runoff coefficients for urban areas. The concepts related to the runoff coefficient were evaluated in a report entitled *Evaluation, Rational Method "C" Values* (Hill, 2002) that was reviewed by the Hydrology Manual Committee. The Report is available at San Diego County Department of Public Works, Flood Control Section and on the San Diego County Department of Public Works web page.

The runoff coefficients are based on land use and soil type. Soil type can be determined from the soil type map provided in Appendix A. An appropriate runoff coefficient (C) for each type of land use in the subarea should be selected from this table and multiplied by the percentage of the total area (A) included in that class. The sum of the products for all land uses is the weighted runoff coefficient (Σ[CA]). Good engineering judgment should be used when applying the values presented in Table 3-1, as adjustments to these values may be appropriate based on site-specific characteristics. In any event, the impervious percentage (% Impervious) as given in the table, for any area, shall govern the selected value for C. The runoff coefficient can also be calculated for an area based on soil type and impervious percentage using the following formula:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where: C_p = Pervious Coefficient Runoff Value for the soil type (shown in Table 3-1 as Undisturbed Natural Terrain/Permanent Open Space, 0% Impervious). Soil type can be determined from the soil type map provided in Appendix A.

The values in Table 3-1 are typical for most urban areas. However, if the basin contains rural or agricultural land use, parks, golf courses, or other types of nonurban land use that are expected to be permanent, the appropriate value should be selected based upon the soil and cover and approved by the local agency.

3.1.4 Time of Concentration

The Time of Concentration (T_c) is the time required for runoff to flow from the most remote part of the drainage area to the point of interest. The T_c is composed of two components: initial time of concentration (T_i) and travel time (T_t). Methods of computation for T_i and T_t are discussed below. The T_i is the time required for runoff to travel across the surface of the most remote subarea in the study, or "initial subarea." Guidelines for designating the initial subarea are provided within the discussion of computation of T_i. The T_t is the time required for the runoff to flow in a watercourse (e.g., swale, channel, gutter, pipe) or series of watercourses from the initial subarea to the point of interest. For the RM, the T_c at any point within the drainage area is given by:

$$T_c = T_i + T_t$$

Methods of calculation differ for natural watersheds (nonurbanized) and for urban drainage systems. When analyzing storm drain systems, the designer must consider the possibility that an existing natural watershed may become urbanized during the useful life of the storm drain system. Future land uses must be used for T_c and runoff calculations, and can be determined from the local Community General Plan.

3.1.4.1 Initial Time of Concentration

The initial time of concentration is typically based on sheet flow at the upstream end of a drainage basin. The Overland Time of Flow (Figure 3-3) is approximated by an equation developed by the Federal Aviation Agency (FAA) for analyzing flow on runaways (FAA, 1970). The usual runway configuration consists of a crown, like most freeways, with sloping pavement that directs flow to either side of the runway. This type of flow is uniform in the direction perpendicular to the velocity and is very shallow. Since these depths are ¼ of an inch (more or less) in magnitude, the relative roughness is high. Some higher relative roughness values for overland flow are presented in Table 3.5 of the *HEC-1 Flood Hydrograph Package User's Manual* (USACE, 1990).

SUMMARY

PEAK DISCHARGE RATE

DIS-CHARGE POINT	PRE-DEVELOPMENT CONDITIONS						DIS-CHARGE POINT	POST-DEVELOPMENT CONDITIONS						PROPOSED MITIGATION
	C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)		C	Tc (Min)	I (in)	A (Ac)	V (fps)	Q (cfs)	
Node 118	0.30	27.8	3.04	395.5	7.3	384.7	Node 1132	0.30	19.5	4.5	391	7.5*	482.9*	Runoff is directed into a proposed detention with a restricted outlet structure such that the discharge from the detention basin is at or less than that of the pre-development conditions.

*unmitigated velocity and runoff rate

RUNOFF VOLUME

	BASIN 100
PRE-DEV (Ac-Ft)	141.1
POST-DEV(Ac-Ft)	150.5
DETENTION VOL(Ac-Ft)	9.4
DESIGN VOL (Ac-Ft)	12.5

The proposed detention pond for each sub-basin is adequately size to store all the excessive runoff volume. Their outlet structures will restrict the peak runoff rate exiting these ponds at or below that of under the pre-development conditions. Based on the minimum volume requirement –a detention pond in the volume of 12.5 Ac-Ft is proposed for the development. The proposed detention basin has adequate storage volume to hold the entire excess runoff from the proposed development, the outlet structure will be designed to release no more than 78 cfs to from the detention basin such that the total peak discharge from the entire project site at the final discharge point is less than that of the pre-development conditions. The proposed development will not adversely affect the downstream drainage facilities.

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the civil Engineer of Work for this project, that I have exercised responsible charge over the design of this project as defined in Section 6703 of the Business and Professions code, and that the design is consistent with current design.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

David Yeh, RCE 62717, EXP 6-30-14

100-YEAR HYDROLOGY CALCULATIONS

PRE-DEVELOPMENT CONDITIONS

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            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2004 Advanced Engineering Software (aes)
              Ver. 2.0 Release Date: 01/01/2004  License ID 1503

                              Analysis prepared by:

                                 LANDMARK CONSULTING
                              9555 GENESEE AVE. SUITE 200
                                 SAN DIEGO, CA 92121
                        TEL:  858-587-8070, FAX:  858-587-8750

  ************************* DESCRIPTION OF STUDY *************************
 * LILAC HILLS RANCH                                                      *
 * IMPLEMENTATION TM                                                      *
 * PRE-DEVELOPMENT, 100-YEAR STORM                                        *
  ************************************************************************

   FILE NAME: 1037EX.DAT
   TIME/DATE OF STUDY: 09:50 02/17/2012
 ----------------------------------------------------------------------------
   USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
 ----------------------------------------------------------------------------
   2003 SAN DIEGO MANUAL CRITERIA

   USER SPECIFIED STORM EVENT(YEAR) = 100.00
   6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
   SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
   SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
   SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
   NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
   *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.*

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****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =   1042.00
  DOWNSTREAM ELEVATION(FEET) =   1038.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.482
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.690
  SUBAREA RUNOFF(CFS) =      0.31
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.31

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1038.00  DOWNSTREAM(FEET) =    826.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2700.00   CHANNEL SLOPE =  0.0785
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.488
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     43.46
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.60
  AVERAGE FLOW DEPTH(FEET) =   0.58   TRAVEL TIME(MIN.) =   9.79
  Tc(MIN.) =  15.27
  SUBAREA AREA(ACRES) =    57.80       SUBAREA RUNOFF(CFS) =   77.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =     57.90         PEAK FLOW RATE(CFS) =      77.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   5.66
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =  2760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 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.) =  15.27
  RAINFALL INTENSITY(INCH/HR) =   4.49
  TOTAL STREAM AREA(ACRES) =    57.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     77.98

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
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```
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    928.00
  DOWNSTREAM ELEVATION(FEET) =    927.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.702
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.450
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    927.00  DOWNSTREAM(FEET) =    826.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1200.00   CHANNEL SLOPE =  0.0842
  CHANNEL BASE(FEET) =   14.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.502
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     14.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.08
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =   6.50
  Tc(MIN.) =  15.20
  SUBAREA AREA(ACRES) =    20.70       SUBAREA RUNOFF(CFS) =   27.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =     20.80         PEAK FLOW RATE(CFS) =      28.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   3.87
  LONGEST FLOWPATH FROM NODE    104.00 TO NODE    103.00 =  1260.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  15.20
  RAINFALL INTENSITY(INCH/HR) =   4.50
  TOTAL STREAM AREA(ACRES) =    20.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.12

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       77.98    15.27        4.488         57.90
      2       28.12    15.20        4.502         20.80

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  2 STREAMS.
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  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      105.74    15.20       4.502
      2      106.02    15.27       4.488

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    106.02   Tc(MIN.) =   15.27
  TOTAL AREA(ACRES) =     78.70
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =  2760.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    826.00  DOWNSTREAM(FEET) =    794.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   780.00   CHANNEL SLOPE =  0.0410
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.017
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    113.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.54
  AVERAGE FLOW DEPTH(FEET) =   0.95   TRAVEL TIME(MIN.) =   2.86
  Tc(MIN.) =  18.13
  SUBAREA AREA(ACRES) =    12.70       SUBAREA RUNOFF(CFS) =   15.31
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =     91.40         PEAK FLOW RATE(CFS) =     110.20

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.93   FLOW VELOCITY(FEET/SEC.) =   4.48
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =  3540.00 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.) =  18.13
  RAINFALL INTENSITY(INCH/HR) =   4.02
  TOTAL STREAM AREA(ACRES) =    91.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    110.20

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    958.00
  DOWNSTREAM ELEVATION(FEET) =    956.00
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  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.467
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.120
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    956.00  DOWNSTREAM(FEET) =    794.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1030.00   CHANNEL SLOPE =  0.1573
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   1.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.370
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      8.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.19
  AVERAGE FLOW DEPTH(FEET) =   0.30   TRAVEL TIME(MIN.) =   4.09
  Tc(MIN.) =  11.56
  SUBAREA AREA(ACRES) =     9.70       SUBAREA RUNOFF(CFS) =   15.63
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =      9.80         PEAK FLOW RATE(CFS) =      15.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   5.29
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    106.00 =  1090.00 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.) =  11.56
  RAINFALL INTENSITY(INCH/HR) =   5.37
  TOTAL STREAM AREA(ACRES) =     9.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.79

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      110.20    18.13        4.017         91.40
      2       15.79    11.56        5.370          9.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       98.23    11.56       5.370
      2      122.01    18.13       4.017
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    122.01   Tc(MIN.) =   18.13
  TOTAL AREA(ACRES) =    101.20
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =  3540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    109.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    794.00  DOWNSTREAM(FEET) =    786.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   144.00   CHANNEL SLOPE =  0.0556
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.968
  TURF FAIR COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  77
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    122.43
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.90
  AVERAGE FLOW DEPTH(FEET) =   1.98   TRAVEL TIME(MIN.) =   0.35
  Tc(MIN.) =  18.48
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    0.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =    101.90         PEAK FLOW RATE(CFS) =     122.01

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.98   FLOW VELOCITY(FEET/SEC.) =   6.88
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =  3684.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    989.00
  DOWNSTREAM ELEVATION(FEET) =    988.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.082
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.765
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
  ELEVATION DATA: UPSTREAM(FEET) =    988.00  DOWNSTREAM(FEET) =    842.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1340.00   CHANNEL SLOPE =  0.1090
  CHANNEL BASE(FEET) =   16.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.183
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.40
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   4.13
  Tc(MIN.) =  12.21
  SUBAREA AREA(ACRES) =    18.20       SUBAREA RUNOFF(CFS) =   33.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =     18.30         PEAK FLOW RATE(CFS) =      34.12

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   7.03
  LONGEST FLOWPATH FROM NODE    110.00 TO NODE    112.00 =  1390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  12.21
  RAINFALL INTENSITY(INCH/HR) =   5.18
  TOTAL STREAM AREA(ACRES) =    18.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.12

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    978.00
  DOWNSTREAM ELEVATION(FEET) =    977.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.476
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    977.00  DOWNSTREAM(FEET) =    842.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1870.00   CHANNEL SLOPE =  0.0722
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.441
```

```
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     17.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.87
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   8.04
  Tc(MIN.) =  15.52
  SUBAREA AREA(ACRES) =    19.90       SUBAREA RUNOFF(CFS) =   31.82
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =     20.00         PEAK FLOW RATE(CFS) =      31.98

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   4.89
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    112.00 =  1920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  15.52
  RAINFALL INTENSITY(INCH/HR) =   4.44
  TOTAL STREAM AREA(ACRES) =    20.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.98

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       34.12    12.21        5.183         18.30
      2       31.98    15.52        4.441         20.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       59.28    12.21       5.183
      2       61.21    15.52       4.441

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     61.21   Tc(MIN.) =   15.52
  TOTAL AREA(ACRES) =     38.30
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    112.00 =  1920.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    109.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    842.00  DOWNSTREAM(FEET) =    786.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   875.00   CHANNEL SLOPE =  0.0640
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.200
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
```

```
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     68.85
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.37
  AVERAGE FLOW DEPTH(FEET) =   1.08   TRAVEL TIME(MIN.) =   1.41
  Tc(MIN.) =  16.93
  SUBAREA AREA(ACRES) =    10.10       SUBAREA RUNOFF(CFS) =   15.27
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =     48.40         PEAK FLOW RATE(CFS) =      73.15

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.11   FLOW VELOCITY(FEET/SEC.) =  10.58
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    109.00 =  2795.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       73.15    16.93        4.200       48.40
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    109.00 =  2795.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1      122.01    18.48        3.968      101.90
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    109.00 =  3684.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     184.91      16.93        4.200
      2     191.13      18.48        3.968

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    191.13   Tc(MIN.) =   18.48
  TOTAL AREA(ACRES) =    150.30

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    109.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    109.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    786.00  DOWNSTREAM(FEET) =    772.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   526.00   CHANNEL SLOPE =  0.0266
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.762
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
```

```
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    194.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.49
  AVERAGE FLOW DEPTH(FEET) =   2.58   TRAVEL TIME(MIN.) =   1.60
  Tc(MIN.) =  20.08
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =    7.56
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.319
  TOTAL AREA(ACRES) =    157.00         PEAK FLOW RATE(CFS) =     191.13

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  2.55   FLOW VELOCITY(FEET/SEC.) =   5.48
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    115.00 =  4210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =  20.08
  RAINFALL INTENSITY(INCH/HR) =   3.76
  TOTAL STREAM AREA(ACRES) =   157.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    191.13

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    895.50
  DOWNSTREAM ELEVATION(FEET) =    894.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.060
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.382
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    894.00  DOWNSTREAM(FEET) =    772.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1120.00   CHANNEL SLOPE =  0.1089
  CHANNEL BASE(FEET) =    6.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.152
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      7.47
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.54
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   5.27
```

```
  Tc(MIN.) =  12.33
  SUBAREA AREA(ACRES) =     9.10       SUBAREA RUNOFF(CFS) =   14.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =      9.20         PEAK FLOW RATE(CFS) =      14.22

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   4.44
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    115.00 =  1170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    115.00 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.) =  12.33
  RAINFALL INTENSITY(INCH/HR) =   5.15
  TOTAL STREAM AREA(ACRES) =     9.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.22

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      191.13    20.08        3.762        157.00
      2       14.22    12.33        5.152          9.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      131.60    12.33       5.152
      2      201.52    20.08       3.762

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    201.52   Tc(MIN.) =   20.08
  TOTAL AREA(ACRES) =    166.20
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    115.00 =  4210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    118.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    772.00  DOWNSTREAM(FEET) =    636.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1966.00   CHANNEL SLOPE =  0.0692
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.269
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    221.20
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.71
  AVERAGE FLOW DEPTH(FEET) =   1.19   TRAVEL TIME(MIN.) =   4.88
  Tc(MIN.) =  24.96
```

```
  SUBAREA AREA(ACRES) =    40.10       SUBAREA RUNOFF(CFS) =   39.33
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.314
  TOTAL AREA(ACRES) =    206.30         PEAK FLOW RATE(CFS) =     211.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.16   FLOW VELOCITY(FEET/SEC.) =   6.62
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =  6176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    120.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    935.50
  DOWNSTREAM ELEVATION(FEET) =    934.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.060
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.382
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    118.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    934.00  DOWNSTREAM(FEET) =    636.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2105.00   CHANNEL SLOPE =  0.1416
  CHANNEL BASE(FEET) =   14.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.449
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     19.24
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.17
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   8.42
  Tc(MIN.) =  15.48
  SUBAREA AREA(ACRES) =    26.90       SUBAREA RUNOFF(CFS) =   35.90
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =     27.00         PEAK FLOW RATE(CFS) =      36.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.46   FLOW VELOCITY(FEET/SEC.) =   5.24
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    118.00 =  2155.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  10
----------------------------------------------------------------------------
```

```
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    937.00
  DOWNSTREAM ELEVATION(FEET) =    936.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.082
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.765
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    936.00  DOWNSTREAM(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1182.00   CHANNEL SLOPE =  0.1151
  CHANNEL BASE(FEET) =   40.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.020   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.991
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     10.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.04
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   4.87
  Tc(MIN.) =  12.95
  SUBAREA AREA(ACRES) =    11.60       SUBAREA RUNOFF(CFS) =   20.84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.359
  TOTAL AREA(ACRES) =     11.70         PEAK FLOW RATE(CFS) =      20.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   5.41
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    123.00 =  1232.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 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.) =  12.95
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =    11.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.99

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =  21
```

```
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =   1015.00
  DOWNSTREAM ELEVATION(FEET) =   1014.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.082
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.765
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   1014.00  DOWNSTREAM(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2690.00   CHANNEL SLOPE =  0.0796
  CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.793
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     35.61
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.82
  AVERAGE FLOW DEPTH(FEET) =   0.54   TRAVEL TIME(MIN.) =  11.74
  Tc(MIN.) =  19.82
  SUBAREA AREA(ACRES) =    49.80       SUBAREA RUNOFF(CFS) =   68.00
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =     49.90         PEAK FLOW RATE(CFS) =      68.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =   4.64
  LONGEST FLOWPATH FROM NODE    124.00 TO NODE    123.00 =  2740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    123.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  19.82
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =    49.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     68.11

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.99    12.95        4.991         11.70
      2       68.11    19.82        3.793         49.90
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       65.50    12.95       4.991
      2       84.07    19.82       3.793

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     84.07   Tc(MIN.) =   19.82
  TOTAL AREA(ACRES) =     61.60
  LONGEST FLOWPATH FROM NODE    124.00 TO NODE    123.00 =  2740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    126.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    800.00  DOWNSTREAM(FEET) =    787.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   542.00   CHANNEL SLOPE =  0.0240
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.554
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     86.25
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.29
  AVERAGE FLOW DEPTH(FEET) =   1.54   TRAVEL TIME(MIN.) =   2.10
  Tc(MIN.) =  21.93
  SUBAREA AREA(ACRES) =     4.10       SUBAREA RUNOFF(CFS) =    4.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.356
  TOTAL AREA(ACRES) =     65.70         PEAK FLOW RATE(CFS) =      84.07

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.51   FLOW VELOCITY(FEET/SEC.) =   4.26
  LONGEST FLOWPATH FROM NODE    124.00 TO NODE    126.00 =  3282.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 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.) =  21.93
  RAINFALL INTENSITY(INCH/HR) =   3.55
  TOTAL STREAM AREA(ACRES) =    65.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     84.07

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    128.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    898.00
  DOWNSTREAM ELEVATION(FEET) =    896.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.415
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.853
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    126.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    896.00  DOWNSTREAM(FEET) =    787.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1470.00   CHANNEL SLOPE =  0.0741
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.208
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     13.00
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.34
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =  10.46
  Tc(MIN.) =  16.88
  SUBAREA AREA(ACRES) =    15.90       SUBAREA RUNOFF(CFS) =   24.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =     16.00         PEAK FLOW RATE(CFS) =      24.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   3.01
  LONGEST FLOWPATH FROM NODE    127.00 TO NODE    126.00 =  1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  16.88
  RAINFALL INTENSITY(INCH/HR) =   4.21
  TOTAL STREAM AREA(ACRES) =    16.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1       84.07    21.93        3.554         65.70
      2       24.21    16.88        4.208         16.00

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
```

```
      1       95.22    16.88       4.208
      2      104.52    21.93       3.554

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    104.52   Tc(MIN.) =   21.93
  TOTAL AREA(ACRES) =     81.70
  LONGEST FLOWPATH FROM NODE    124.00 TO NODE    126.00 =  3282.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    129.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    787.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1205.00   CHANNEL SLOPE =  0.0556
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.178
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    111.10
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.84
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   4.15
  Tc(MIN.) =  26.07
  SUBAREA AREA(ACRES) =    13.80       SUBAREA RUNOFF(CFS) =   13.16
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.349
  TOTAL AREA(ACRES) =     95.50         PEAK FLOW RATE(CFS) =     105.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.81   FLOW VELOCITY(FEET/SEC.) =   4.75
  LONGEST FLOWPATH FROM NODE    124.00 TO NODE    129.00 =  4487.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 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.) =  26.07
  RAINFALL INTENSITY(INCH/HR) =   3.18
  TOTAL STREAM AREA(ACRES) =    95.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    105.80

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    131.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    963.00
  DOWNSTREAM ELEVATION(FEET) =    962.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.476
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
```

```
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    129.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    962.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  3400.00   CHANNEL SLOPE =  0.0712
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.416
  LEGUMES(STRAIGHT ROW) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  81
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     32.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.58
  AVERAGE FLOW DEPTH(FEET) =   0.45   TRAVEL TIME(MIN.) =  15.84
  Tc(MIN.) =  23.32
  SUBAREA AREA(ACRES) =    55.60       SUBAREA RUNOFF(CFS) =   56.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =     55.70         PEAK FLOW RATE(CFS) =      57.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.62   FLOW VELOCITY(FEET/SEC.) =   4.36
  LONGEST FLOWPATH FROM NODE    130.00 TO NODE    129.00 =  3450.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    129.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =  23.32
  RAINFALL INTENSITY(INCH/HR) =   3.42
  TOTAL STREAM AREA(ACRES) =    55.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     57.10

  ** CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY      AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)    (ACRE)
      1      105.80    26.07        3.178         95.50
      2       57.10    23.32        3.416         55.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      155.54    23.32       3.416
      2      158.93    26.07       3.178

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    158.93   Tc(MIN.) =   26.07
  TOTAL AREA(ACRES) =    151.20
```

```
 LONGEST FLOWPATH FROM NODE    124.00 TO NODE    129.00 =  4487.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    129.00 TO NODE    118.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    720.00  DOWNSTREAM(FEET) =    636.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   770.00   CHANNEL SLOPE =  0.1091
 CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.048
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =    163.95
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.35
 AVERAGE FLOW DEPTH(FEET) =   1.17   TRAVEL TIME(MIN.) =   1.75
 Tc(MIN.) =  27.82
 SUBAREA AREA(ACRES) =    11.00       SUBAREA RUNOFF(CFS) =   10.06
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.329
 TOTAL AREA(ACRES) =    162.20         PEAK FLOW RATE(CFS) =     162.48

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.17   FLOW VELOCITY(FEET/SEC.) =   7.30
 LONGEST FLOWPATH FROM NODE    124.00 TO NODE    118.00 =  5257.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1      162.48    27.82       3.048      162.20
 LONGEST FLOWPATH FROM NODE    124.00 TO NODE    118.00 =  5257.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
 STREAM     RUNOFF     Tc      INTENSITY     AREA
 NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
     1      211.84    24.96       3.269      206.30
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =  6176.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1     357.61      24.96        3.269
     2     360.00      27.82        3.048

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =    360.00   Tc(MIN.) =   27.82
 TOTAL AREA(ACRES) =    368.50

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1      360.00    27.82        3.048      368.50
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    118.00 =  6176.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc       INTENSITY     AREA
  NUMBER      (CFS)   (MIN.)   (INCH/HOUR)   (ACRE)
      1       36.03    15.48        4.449       27.00
  LONGEST FLOWPATH FROM NODE    119.00 TO NODE    118.00 =  2155.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     236.35      15.48        4.449
      2     384.69      27.82        3.048

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =    384.69   Tc(MIN.) =   27.82
  TOTAL AREA(ACRES) =    395.50

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    118.00 TO NODE    118.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

100-YEAR HYDROLOGY CALCULATIONS
POST-DEVELOPMENT CONDITIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
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 ************************** DESCRIPTION OF STUDY **************************
* LILAC HILLS RANCH                                                       *
* IMPLEMENTATION TM                                                       *
* POST-DEVELOPMENT, 100-YEAR STORM                                        *
 ****************************************************************************

  FILE NAME: 1037I1P.DAT
  TIME/DATE OF STUDY: 10:23 01/23/2013
----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.500
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *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    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  5.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
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  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    978.00
  DOWNSTREAM ELEVATION(FEET) =    977.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.657
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.515
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    977.00  DOWNSTREAM(FEET) =    894.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1432.00   CHANNEL SLOPE =  0.0580
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   5.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.216
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.71
  AVERAGE FLOW DEPTH(FEET) =   0.18   TRAVEL TIME(MIN.) =   6.44
  Tc(MIN.) =   12.09
  SUBAREA AREA(ACRES) =    13.10       SUBAREA RUNOFF(CFS) =   24.60
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.361
  TOTAL AREA(ACRES) =       13.2         PEAK FLOW RATE(CFS) =      24.88

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   4.59
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1482.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   891.00  DOWNSTREAM(FEET) =   890.00
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.60
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.88
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   12.18
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =    1534.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
```

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================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.18
  RAINFALL INTENSITY(INCH/HR) =   5.19
  TOTAL STREAM AREA(ACRES) =    13.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.88

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    925.90
  DOWNSTREAM ELEVATION(FEET) =    925.00
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.859
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.325
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  922.00  DOWNSTREAM ELEVATION(FEET) =  912.00
  STREET LENGTH(FEET) =   825.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.68
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.69
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.97
  STREET FLOW TRAVEL TIME(MIN.) =   5.11   Tc(MIN.) =   10.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.556
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    2.30      SUBAREA RUNOFF(CFS) =    6.90
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  TOTAL AREA(ACRES) =        2.4        PEAK FLOW RATE(CFS) =       7.20

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.42   HALFSTREET FLOOD WIDTH(FEET) =  14.80
  FLOW VELOCITY(FEET/SEC.) =  3.12   DEPTH*VELOCITY(FT*FT/SEC.) =   1.32
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    107.00 =     875.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   906.00  DOWNSTREAM(FEET) =   890.00
  FLOW LENGTH(FEET) =   231.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.66
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.20
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =   11.27
  LONGEST FLOWPATH FROM NODE    105.00 TO NODE    104.00 =    1106.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 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.) =   11.27
  RAINFALL INTENSITY(INCH/HR) =   5.46
  TOTAL STREAM AREA(ACRES) =     2.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.20

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.88    12.18        5.194         13.20
      2        7.20    11.27        5.459          2.40

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       30.24    11.27       5.459
      2       31.73    12.18       5.194

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      31.73   Tc(MIN.) =   12.18
  TOTAL AREA(ACRES) =       15.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =    1534.00 FEET.

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 FLOW PROCESS FROM NODE    104.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   890.00  DOWNSTREAM(FEET) =   886.00
 FLOW LENGTH(FEET) =    98.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  15.07
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.73
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =   12.28
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =    1632.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =   12.28
 RAINFALL INTENSITY(INCH/HR) =   5.16
 TOTAL STREAM AREA(ACRES) =    15.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.73

****************************************************************************
 FLOW PROCESS FROM NODE    109.00 TO NODE    110.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =    904.30
 DOWNSTREAM ELEVATION(FEET) =    904.00
 ELEVATION DIFFERENCE(FEET) =      0.30
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.451
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.573
 SUBAREA RUNOFF(CFS) =      0.35
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
 FLOW PROCESS FROM NODE    110.00 TO NODE    111.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  896.00  DOWNSTREAM ELEVATION(FEET) =  892.00
 STREET LENGTH(FEET) =   390.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
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  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) =       2.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.04
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.29
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.75
  STREET FLOW TRAVEL TIME(MIN.) =   2.84   Tc(MIN.) =   11.29
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.453
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    4.42
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       4.71

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.93
  FLOW VELOCITY(FEET/SEC.) =  2.63   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    111.00 =     440.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    108.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   886.50  DOWNSTREAM(FEET) =   886.00
  FLOW LENGTH(FEET) =    34.00   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.) =   6.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.71
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.38
  LONGEST FLOWPATH FROM NODE    109.00 TO NODE    108.00 =     474.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.38
  RAINFALL INTENSITY(INCH/HR) =   5.43
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.71

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
     1       31.73    12.28        5.164         15.60
     2        4.71    11.38        5.425          1.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       34.92    11.38       5.425
     2       36.22    12.28       5.164

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.22   Tc(MIN.) =   12.28
  TOTAL AREA(ACRES) =       17.2
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =    1632.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 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) =   886.00  DOWNSTREAM(FEET) =   876.00
  FLOW LENGTH(FEET) =   206.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.59
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.22
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =   12.49
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    112.00 =    1838.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.49
  RAINFALL INTENSITY(INCH/HR) =   5.11
  TOTAL STREAM AREA(ACRES) =    17.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     36.22

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    903.80
  DOWNSTREAM ELEVATION(FEET) =    903.00
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.094
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 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.117
 SUBAREA RUNOFF(CFS) =      0.44
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.44

****************************************************************************
 FLOW PROCESS FROM NODE    114.00 TO NODE    115.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  896.00  DOWNSTREAM ELEVATION(FEET) =  882.00
 STREET LENGTH(FEET) =   380.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.44
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.95
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.16
 STREET FLOW TRAVEL TIME(MIN.) =   1.60   Tc(MIN.) =    7.70
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.981
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
 SUBAREA AREA(ACRES) =    1.50      SUBAREA RUNOFF(CFS) =    5.65
 TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.03

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  10.98
 FLOW VELOCITY(FEET/SEC.) =  4.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.58
 LONGEST FLOWPATH FROM NODE    113.00 TO NODE    115.00 =     430.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    115.00 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) =   876.50  DOWNSTREAM(FEET) =   876.00
 FLOW LENGTH(FEET) =    21.00   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.) =   8.17
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.03
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    7.74
```

```
  LONGEST FLOWPATH FROM NODE    113.00 TO NODE    112.00 =     451.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.74
  RAINFALL INTENSITY(INCH/HR) =   6.96
  TOTAL STREAM AREA(ACRES) =     1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.03

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    117.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    912.00
  DOWNSTREAM ELEVATION(FEET) =    911.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.657
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.515
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    117.00 TO NODE    118.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  911.00  DOWNSTREAM ELEVATION(FEET) =  883.00
  STREET LENGTH(FEET) =   444.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.23
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.88
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   1.52   Tc(MIN.) =    7.17
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.306
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
 SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    5.52
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       5.92

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.70
 FLOW VELOCITY(FEET/SEC.) =  5.59   DEPTH*VELOCITY(FT*FT/SEC.) =   1.79
 LONGEST FLOWPATH FROM NODE    116.00 TO NODE    118.00 =     494.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    118.00 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) =   878.00  DOWNSTREAM(FEET) =   876.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.63
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.92
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.21
 LONGEST FLOWPATH FROM NODE    116.00 TO NODE    112.00 =     519.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    112.00 TO NODE    112.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.21
 RAINFALL INTENSITY(INCH/HR) =   7.28
 TOTAL STREAM AREA(ACRES) =     1.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.92

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       36.22    12.49        5.109         17.20
     2        6.03     7.74        6.956          1.60
     3        5.92     7.21        7.284          1.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  3 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       36.93     7.21       7.284
     2       38.28     7.74       6.956
```

```
      3       44.80    12.49       5.109

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      44.80   Tc(MIN.) =   12.49
  TOTAL AREA(ACRES) =       20.3
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    112.00 =    1838.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 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) =   876.00  DOWNSTREAM(FEET) =   875.50
  FLOW LENGTH(FEET) =    23.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.93
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      44.80
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   12.52
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    119.00 =    1861.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    121.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    990.00
  DOWNSTREAM ELEVATION(FEET) =    989.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.657
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.515
  SUBAREA RUNOFF(CFS) =      0.46
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    123.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    989.00  DOWNSTREAM(FEET) =    910.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    50.00   CHANNEL SLOPE =  1.5800
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.401
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
```

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  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      17.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.96
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.12
  Tc(MIN.) =    5.78
  SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   33.57
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.362
  TOTAL AREA(ACRES) =       11.2         PEAK FLOW RATE(CFS) =      34.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   9.18
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    123.00 =     100.00 FEET.

****************************************************************************
  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) =   905.00  DOWNSTREAM(FEET) =   889.00
  FLOW LENGTH(FEET) =   124.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.05
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      34.02
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.87
  LONGEST FLOWPATH FROM NODE    120.00 TO NODE    124.00 =     224.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 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.) =    5.87
  RAINFALL INTENSITY(INCH/HR) =   8.32
  TOTAL STREAM AREA(ACRES) =    11.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     34.02

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    126.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    919.20
  DOWNSTREAM ELEVATION(FEET) =    918.70
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    124.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  916.00  DOWNSTREAM ELEVATION(FEET) =  894.00
  STREET LENGTH(FEET) =   422.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.37
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.53
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.29
  STREET FLOW TRAVEL TIME(MIN.) =   1.55   Tc(MIN.) =    8.68
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.461
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    5.93
  TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       6.28

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.43
  FLOW VELOCITY(FEET/SEC.) =  5.21   DEPTH*VELOCITY(FT*FT/SEC.) =   1.74
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    124.00 =     472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    124.00 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.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   6.46
  TOTAL STREAM AREA(ACRES) =     1.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.28

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       34.02     5.87        8.318         11.20
```

```
     2        6.28     8.68        6.461          1.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       38.27     5.87       8.318
      2       32.71     8.68       6.461

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      38.27   Tc(MIN.) =    5.87
  TOTAL AREA(ACRES) =       13.0
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    124.00 =     472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   889.00  DOWNSTREAM(FEET) =   888.60
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.49
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      38.27
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    127.00 =     508.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 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.) =    5.93
  RAINFALL INTENSITY(INCH/HR) =   8.26
  TOTAL STREAM AREA(ACRES) =    13.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.27

****************************************************************************
  FLOW PROCESS FROM NODE    128.00 TO NODE    129.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    919.70
  DOWNSTREAM ELEVATION(FEET) =    919.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.371
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.887
```

```
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    129.00 TO NODE    127.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  916.00  DOWNSTREAM ELEVATION(FEET) =  894.00
  STREET LENGTH(FEET) =   422.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.45
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.24
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   1.66   Tc(MIN.) =    8.03
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.794
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    4.04
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       4.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.30   HALFSTREET FLOOD WIDTH(FEET) =   8.90
  FLOW VELOCITY(FEET/SEC.) =  4.83   DEPTH*VELOCITY(FT*FT/SEC.) =   1.47
  LONGEST FLOWPATH FROM NODE    128.00 TO NODE    127.00 =     472.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 TO NODE    127.00 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.) =    8.03
  RAINFALL INTENSITY(INCH/HR) =   6.79
  TOTAL STREAM AREA(ACRES) =     1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
```

```
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       38.27     5.93        8.261         13.00
      2        4.40     8.03        6.794          1.20

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       41.52     5.93       8.261
      2       35.88     8.03       6.794

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      41.52   Tc(MIN.) =    5.93
  TOTAL AREA(ACRES) =       14.2
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    127.00 =     508.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    127.00 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) =   888.60  DOWNSTREAM(FEET) =   879.00
  FLOW LENGTH(FEET) =   296.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.73
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      41.52
  PIPE TRAVEL TIME(MIN.) =   0.33    Tc(MIN.) =    6.26
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    130.00 =     804.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    890.00
  DOWNSTREAM ELEVATION(FEET) =    889.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

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

```
 FLOW PROCESS FROM NODE    132.00 TO NODE    133.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  889.00  DOWNSTREAM ELEVATION(FEET) =  886.00
 STREET LENGTH(FEET) =   327.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       2.70
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.34
   HALFSTREET FLOOD WIDTH(FEET) =   10.51
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.21
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
 STREET FLOW TRAVEL TIME(MIN.) =   2.47   Tc(MIN.) =    9.59
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.057
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
 SUBAREA AREA(ACRES) =    1.40      SUBAREA RUNOFF(CFS) =    4.58
 TOTAL AREA(ACRES) =        1.5        PEAK FLOW RATE(CFS) =       4.91

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.48
 FLOW VELOCITY(FEET/SEC.) =  2.54   DEPTH*VELOCITY(FT*FT/SEC.) =   1.00
 LONGEST FLOWPATH FROM NODE    131.00 TO NODE    133.00 =     377.00 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) =   881.00  DOWNSTREAM(FEET) =   880.50
 FLOW LENGTH(FEET) =    37.00   MANNING'S N =  0.013
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
 DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.28
 ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.91
 PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    9.69
 LONGEST FLOWPATH FROM NODE    131.00 TO NODE    134.00 =     414.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =    9.69
  RAINFALL INTENSITY(INCH/HR) =   6.02
  TOTAL STREAM AREA(ACRES) =     1.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.91

****************************************************************************
  FLOW PROCESS FROM NODE    135.00 TO NODE    136.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    889.00
  DOWNSTREAM ELEVATION(FEET) =    888.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    136.00 TO NODE    134.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  888.00  DOWNSTREAM ELEVATION(FEET) =  886.00
  STREET LENGTH(FEET) =   331.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.92
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.24
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.50
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.41
  STREET FLOW TRAVEL TIME(MIN.) =   3.69   Tc(MIN.) =   10.82
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.606
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
```

```
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.03
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.33

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.30
  FLOW VELOCITY(FEET/SEC.) =  1.69   DEPTH*VELOCITY(FT*FT/SEC.) =   0.53
  LONGEST FLOWPATH FROM NODE    135.00 TO NODE    134.00 =     381.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 TO NODE    134.00 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.) =   10.82
  RAINFALL INTENSITY(INCH/HR) =   5.61
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.33

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        4.91     9.69        6.017          1.50
      2        3.33    10.82        5.606          1.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.89     9.69       6.017
      2        7.90    10.82       5.606

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.90   Tc(MIN.) =   10.82
  TOTAL AREA(ACRES) =        2.6
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    134.00 =     414.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    134.00 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) =   880.50  DOWNSTREAM(FEET) =   879.00
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.10
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.90
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.89
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    130.00 =     457.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.90    10.89       5.582        2.60
  LONGEST FLOWPATH FROM NODE    131.00 TO NODE    130.00 =     457.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       41.52     6.26       7.973       14.20
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    130.00 =     804.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      46.07       6.26        7.973
      2      36.97      10.89        5.582

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      46.07   Tc(MIN.) =    6.26
  TOTAL AREA(ACRES) =       16.8

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 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) =   879.00  DOWNSTREAM(FEET) =   875.50
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.32
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      46.07
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.40
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    119.00 =     924.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
```

```
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       46.07     6.40       7.861       16.80
  LONGEST FLOWPATH FROM NODE    125.00 TO NODE    119.00 =     924.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       44.80    12.52       5.101       20.30
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    119.00 =    1861.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      68.98       6.40        7.861
      2      74.69      12.52        5.101

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      74.69   Tc(MIN.) =   12.52
  TOTAL AREA(ACRES) =       37.1

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    119.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    119.00 TO NODE    137.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   875.50  DOWNSTREAM(FEET) =   866.00
  FLOW LENGTH(FEET) =   206.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  22.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  19.25
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      74.69
  PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =   12.70
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    137.00 =    2067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    137.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.70
  RAINFALL INTENSITY(INCH/HR) =   5.05
  TOTAL STREAM AREA(ACRES) =    37.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     74.69

****************************************************************************
  FLOW PROCESS FROM NODE    138.00 TO NODE    139.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    919.40
  DOWNSTREAM ELEVATION(FEET) =    918.90
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    139.00 TO NODE    140.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
================================================================================
  UPSTREAM ELEVATION(FEET) =  918.90  DOWNSTREAM ELEVATION(FEET) =  871.00
  STREET LENGTH(FEET) =   633.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.05
  STREET FLOW TRAVEL TIME(MIN.) =   2.28   Tc(MIN.) =    9.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.134
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.80      SUBAREA RUNOFF(CFS) =    2.65
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.98

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.78
  FLOW VELOCITY(FEET/SEC.) =  5.16   DEPTH*VELOCITY(FT*FT/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    140.00 =     683.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    137.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   866.50  DOWNSTREAM(FEET) =   866.00
  FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.77
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.98
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE    138.00 TO NODE    137.00 =     693.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    137.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.43
  RAINFALL INTENSITY(INCH/HR) =   6.13
  TOTAL STREAM AREA(ACRES) =     0.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.98

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    142.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    877.00
  DOWNSTREAM ELEVATION(FEET) =    876.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    143.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==========================================================================
  UPSTREAM ELEVATION(FEET) =  876.00  DOWNSTREAM ELEVATION(FEET) =  871.00
  STREET LENGTH(FEET) =   115.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.72
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.92
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.90
  STREET FLOW TRAVEL TIME(MIN.) =   0.52   Tc(MIN.) =    7.65
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.010
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.65
  TOTAL AREA(ACRES) =        0.8        PEAK FLOW RATE(CFS) =       3.03

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.84
  FLOW VELOCITY(FEET/SEC.) =  4.13   DEPTH*VELOCITY(FT*FT/SEC.) =   1.17
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    143.00 =     165.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    143.00 TO NODE    137.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   866.50  DOWNSTREAM(FEET) =   866.00
  FLOW LENGTH(FEET) =    34.00   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.) =   5.69
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.03
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =    7.75
  LONGEST FLOWPATH FROM NODE    141.00 TO NODE    137.00 =     199.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    137.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.75
  RAINFALL INTENSITY(INCH/HR) =   6.95
  TOTAL STREAM AREA(ACRES) =     0.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.03

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       74.69    12.70        5.055         37.10
      2        2.98     9.43        6.126          0.90
      3        3.03     7.75        6.952          0.80
```

```
  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       51.05     7.75       6.952
      2       61.10     9.43       6.126
      3       79.35    12.70       5.055

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      79.35   Tc(MIN.) =   12.70
  TOTAL AREA(ACRES) =       38.8
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    137.00 =    2067.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    137.00 TO NODE    144.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   866.00  DOWNSTREAM(FEET) =   864.00
  FLOW LENGTH(FEET) =   143.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  27.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.55
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      79.35
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =   12.89
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    144.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    144.00 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.) =   12.89
  RAINFALL INTENSITY(INCH/HR) =   5.01
  TOTAL STREAM AREA(ACRES) =    38.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     79.35

****************************************************************************
  FLOW PROCESS FROM NODE    145.00 TO NODE    146.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    914.00
  DOWNSTREAM ELEVATION(FEET) =    913.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
```

```
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    146.00 TO NODE    147.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  913.00  DOWNSTREAM ELEVATION(FEET) =  872.00
  STREET LENGTH(FEET) =   564.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.44
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.20
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.43
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =    8.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.341
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    6.16
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       6.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.32   HALFSTREET FLOOD WIDTH(FEET) =   9.83
  FLOW VELOCITY(FEET/SEC.) =  5.99   DEPTH*VELOCITY(FT*FT/SEC.) =   1.94
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    147.00 =     614.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    147.00 TO NODE    144.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   867.00  DOWNSTREAM(FEET) =   864.00
  FLOW LENGTH(FEET) =    15.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.00
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.51
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    8.95
  LONGEST FLOWPATH FROM NODE    145.00 TO NODE    144.00 =     629.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    144.00 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.) =    8.95
  RAINFALL INTENSITY(INCH/HR) =   6.33
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       79.35    12.89        5.007         38.80
      2        6.51     8.95        6.334          1.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       69.22     8.95       6.334
      2       84.50    12.89       5.007

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      84.50   Tc(MIN.) =   12.89
  TOTAL AREA(ACRES) =       40.7
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    144.00 =    2210.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    144.00 TO NODE    148.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   864.00  DOWNSTREAM(FEET) =   845.00
  FLOW LENGTH(FEET) =   199.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  25.94
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      84.50
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   13.02
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    148.00 =    2409.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 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.) =   13.02
```

```
  RAINFALL INTENSITY(INCH/HR) =   4.97
  TOTAL STREAM AREA(ACRES) =    40.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     84.50

****************************************************************************
  FLOW PROCESS FROM NODE    149.00 TO NODE    150.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    919.40
  DOWNSTREAM ELEVATION(FEET) =    918.90
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    151.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  916.00  DOWNSTREAM ELEVATION(FEET) =  896.00
  STREET LENGTH(FEET) =   370.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       4.14
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.57
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.45
  STREET FLOW TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =    8.40
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.601
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    7.49
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       7.84

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.37
```

```
  FLOW VELOCITY(FEET/SEC.) =  5.56   DEPTH*VELOCITY(FT*FT/SEC.) =   1.97
  LONGEST FLOWPATH FROM NODE    149.00 TO NODE    151.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    151.00 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) =   891.00  DOWNSTREAM(FEET) =   890.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.84
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    8.66
  LONGEST FLOWPATH FROM NODE    149.00 TO NODE    152.00 =     520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    152.00 TO NODE    153.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    890.00  DOWNSTREAM(FEET) =    850.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   730.00   CHANNEL SLOPE =  0.0548
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.967
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.54
  AVERAGE FLOW DEPTH(FEET) =   0.39   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =    9.82
  SUBAREA AREA(ACRES) =     1.30       SUBAREA RUNOFF(CFS) =    4.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =      11.28

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =  10.96
  LONGEST FLOWPATH FROM NODE    149.00 TO NODE    153.00 =    1250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    153.00 TO NODE    148.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   846.00  DOWNSTREAM(FEET) =   845.00
  FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.86
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.28
  PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =   10.06
```

```
 LONGEST FLOWPATH FROM NODE    149.00 TO NODE    148.00 =    1350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    148.00 TO NODE    148.00 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.) =   10.06
 RAINFALL INTENSITY(INCH/HR) =   5.87
 TOTAL STREAM AREA(ACRES) =     3.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.28

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       84.50    13.02        4.975         40.70
     2       11.28    10.06        5.874          3.50

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

 ** PEAK FLOW RATE TABLE **
 STREAM     RUNOFF      Tc      INTENSITY
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
     1       82.84    10.06       5.874
     2       94.05    13.02       4.975

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      94.05   Tc(MIN.) =   13.02
 TOTAL AREA(ACRES) =       44.2
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    148.00 =    2409.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    148.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   845.00  DOWNSTREAM(FEET) =   821.00
 FLOW LENGTH(FEET) =   272.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  26.24
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      94.05
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   13.19
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    154.00 =    2681.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =   13.19
  RAINFALL INTENSITY(INCH/HR) =   4.93
  TOTAL STREAM AREA(ACRES) =    44.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     94.05

****************************************************************************
  FLOW PROCESS FROM NODE    155.00 TO NODE    156.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    884.00
  DOWNSTREAM ELEVATION(FEET) =    880.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.464
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    156.00 TO NODE    157.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  880.00  DOWNSTREAM ELEVATION(FEET) =  828.00
  STREET LENGTH(FEET) =  1237.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      12.01
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.41
    HALFSTREET FLOOD WIDTH(FEET) =   14.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.64
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.31
  STREET FLOW TRAVEL TIME(MIN.) =   3.66   Tc(MIN.) =    5.12
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.083
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.547
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   22.07
  TOTAL AREA(ACRES) =        4.6        PEAK FLOW RATE(CFS) =      22.86
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.49   HALFSTREET FLOOD WIDTH(FEET) =  18.32
  FLOW VELOCITY(FEET/SEC.) =  6.58   DEPTH*VELOCITY(FT*FT/SEC.) =   3.24
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    157.00 =    1287.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    157.00 TO NODE    154.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   822.00  DOWNSTREAM(FEET) =   821.00
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      22.86
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.16
  LONGEST FLOWPATH FROM NODE    155.00 TO NODE    154.00 =    1317.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    154.00 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.) =    5.16
  RAINFALL INTENSITY(INCH/HR) =   9.04
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.86

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       94.05    13.19        4.933         44.20
      2       22.86     5.16        9.038          4.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       74.19     5.16       9.038
      2      106.52    13.19       4.933

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     106.52   Tc(MIN.) =   13.19
  TOTAL AREA(ACRES) =       48.8
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    154.00 =    2681.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    154.00 TO NODE    159.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   821.00  DOWNSTREAM(FEET) =   820.30
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  45.0 INCH PIPE IS  33.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.27
  ESTIMATED PIPE DIAMETER(INCH) =  45.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     106.52
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   13.28
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    159.00 =    2745.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    160.00 TO NODE    161.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    874.00
  DOWNSTREAM ELEVATION(FEET) =    864.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.359
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    161.00 TO NODE    162.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  864.00  DOWNSTREAM ELEVATION(FEET) =  830.00
  STREET LENGTH(FEET) =  1028.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.84
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.13
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.30
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.50
  STREET FLOW TRAVEL TIME(MIN.) =   3.98   Tc(MIN.) =    5.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.837
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    9.99
  TOTAL AREA(ACRES) =        1.4        PEAK FLOW RATE(CFS) =      10.76

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.26
  FLOW VELOCITY(FEET/SEC.) =  5.00   DEPTH*VELOCITY(FT*FT/SEC.) =   2.06
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    162.00 =    1078.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    162.00 TO NODE    159.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   824.00  DOWNSTREAM(FEET) =   820.30
  FLOW LENGTH(FEET) =    98.00   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.) =  11.24
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.76
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    5.49
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    159.00 =    1176.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    163.00 TO NODE    164.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    978.00
  DOWNSTREAM ELEVATION(FEET) =    976.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.415
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.853
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    164.00 TO NODE    165.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    976.00  DOWNSTREAM(FEET) =    910.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   433.00   CHANNEL SLOPE =  0.1524
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.677
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.62
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.72
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   4.19
  Tc(MIN.) =   10.61
  SUBAREA AREA(ACRES) =     1.60       SUBAREA RUNOFF(CFS) =    2.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        1.7         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   2.00
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    165.00 =     483.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    165.00 TO NODE    166.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    910.00  DOWNSTREAM(FEET) =    898.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    25.00   CHANNEL SLOPE =  0.4800
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   0.100
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.90
  FLOW VELOCITY(FEET/SEC.) =  12.16   FLOW DEPTH(FEET) =   0.08
  TRAVEL TIME(MIN.) =   0.03   Tc(MIN.) =   10.64
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    166.00 =     508.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    166.00 TO NODE    167.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  898.00  DOWNSTREAM ELEVATION(FEET) =  876.00
  STREET LENGTH(FEET) =   360.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.89
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.32
    HALFSTREET FLOOD WIDTH(FEET) =    9.77
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.77
  STREET FLOW TRAVEL TIME(MIN.) =   1.09   Tc(MIN.) =   11.73
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.319
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.547
  SUBAREA AREA(ACRES) =    1.30      SUBAREA RUNOFF(CFS) =    6.02
  TOTAL AREA(ACRES) =        3.0        PEAK FLOW RATE(CFS) =       8.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.52
  FLOW VELOCITY(FEET/SEC.) =  6.04   DEPTH*VELOCITY(FT*FT/SEC.) =   2.15
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    167.00 =     868.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    167.00 TO NODE    168.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   870.00  DOWNSTREAM(FEET) =   863.00
  FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.98
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.73
  PIPE TRAVEL TIME(MIN.) =   0.37    Tc(MIN.) =   12.10
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    168.00 =    1090.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    169.00 TO NODE    170.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    934.00
  DOWNSTREAM ELEVATION(FEET) =    930.00
  ELEVATION DIFFERENCE(FEET) =      4.00
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.114
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    170.00 TO NODE    171.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    930.00  DOWNSTREAM(FEET) =    902.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   274.00   CHANNEL SLOPE =  0.1022
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  20.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.323
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.18
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   3.88
  Tc(MIN.) =    8.98
  SUBAREA AREA(ACRES) =     0.70       SUBAREA RUNOFF(CFS) =    1.33
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       1.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   1.45
  LONGEST FLOWPATH FROM NODE    169.00 TO NODE    171.00 =     324.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    171.00 TO NODE    172.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   900.00  DOWNSTREAM(FEET) =   898.80
  FLOW LENGTH(FEET) =   121.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   4.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.07
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.52
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    9.47
  LONGEST FLOWPATH FROM NODE    169.00 TO NODE    172.00 =     445.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 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.) =    9.47
  RAINFALL INTENSITY(INCH/HR) =   6.11
  TOTAL STREAM AREA(ACRES) =     0.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.52

****************************************************************************
  FLOW PROCESS FROM NODE    173.00 TO NODE    174.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    940.00
  DOWNSTREAM ELEVATION(FEET) =    938.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.415
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.853
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    174.00 TO NODE    172.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    938.00  DOWNSTREAM(FEET) =    908.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   863.00   CHANNEL SLOPE =  0.0348
  CHANNEL BASE(FEET) =    2.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.381
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.91
  AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   2.43
  Tc(MIN.) =    8.85
  SUBAREA AREA(ACRES) =     2.60       SUBAREA RUNOFF(CFS) =    4.98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        2.7         PEAK FLOW RATE(CFS) =       5.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   7.27
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    172.00 =     913.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    172.00 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.) =    8.85
  RAINFALL INTENSITY(INCH/HR) =   6.38
  TOTAL STREAM AREA(ACRES) =     2.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.17
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.52     9.47        6.108          0.80
      2        5.17     8.85        6.381          2.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.59     8.85       6.381
      2        6.46     9.47       6.108

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.59   Tc(MIN.) =    8.85
  TOTAL AREA(ACRES) =        3.5
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    172.00 =     913.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    172.00 TO NODE    175.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   898.80  DOWNSTREAM(FEET) =   897.60
  FLOW LENGTH(FEET) =   112.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.19
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.59
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    9.15
  LONGEST FLOWPATH FROM NODE    173.00 TO NODE    175.00 =    1025.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 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.) =    9.15
  RAINFALL INTENSITY(INCH/HR) =   6.24
  TOTAL STREAM AREA(ACRES) =     3.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.59

****************************************************************************
  FLOW PROCESS FROM NODE    176.00 TO NODE    177.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
```

```
  UPSTREAM ELEVATION(FEET) =    930.70
  DOWNSTREAM ELEVATION(FEET) =    930.00
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.371
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.887
  SUBAREA RUNOFF(CFS) =      0.43
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
  FLOW PROCESS FROM NODE    177.00 TO NODE    175.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  928.00  DOWNSTREAM ELEVATION(FEET) =  888.00
  STREET LENGTH(FEET) =  1200.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

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

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.11
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    8.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.85
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.18
  STREET FLOW TRAVEL TIME(MIN.) =   5.19   Tc(MIN.) =   11.56
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.371
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    4.50      SUBAREA RUNOFF(CFS) =   13.05
  TOTAL AREA(ACRES) =        4.6        PEAK FLOW RATE(CFS) =      13.34

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.68
  FLOW VELOCITY(FEET/SEC.) =  4.50   DEPTH*VELOCITY(FT*FT/SEC.) =   1.62
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    175.00 =    1250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    175.00 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.) =   11.56
  RAINFALL INTENSITY(INCH/HR) =   5.37
```

```
  TOTAL STREAM AREA(ACRES) =     4.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.34

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.59     9.15        6.245          3.50
      2       13.34    11.56        5.371          4.60

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.15     9.15       6.245
      2       19.01    11.56       5.371

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.01   Tc(MIN.) =   11.56
  TOTAL AREA(ACRES) =        8.1
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    175.00 =    1250.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    175.00 TO NODE    178.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  888.00  DOWNSTREAM ELEVATION(FEET) =  870.00
  STREET LENGTH(FEET) =   395.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      22.58
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.48
    HALFSTREET FLOOD WIDTH(FEET) =   17.93
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.78
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    3.29
  STREET FLOW TRAVEL TIME(MIN.) =   0.97   Tc(MIN.) =   12.53
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.098
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.461
  SUBAREA AREA(ACRES) =    2.60      SUBAREA RUNOFF(CFS) =    7.16
  TOTAL AREA(ACRES) =       10.7        PEAK FLOW RATE(CFS) =      25.18
```

```
  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.50   HALFSTREET FLOOD WIDTH(FEET) =  18.73
  FLOW VELOCITY(FEET/SEC.) =  6.96   DEPTH*VELOCITY(FT*FT/SEC.) =   3.48
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    178.00 =    1645.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    178.00 TO NODE    179.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   865.00  DOWNSTREAM(FEET) =   864.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.31
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      25.18
  PIPE TRAVEL TIME(MIN.) =   0.10    Tc(MIN.) =   12.63
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    179.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    179.00 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.) =   12.63
  RAINFALL INTENSITY(INCH/HR) =   5.07
  TOTAL STREAM AREA(ACRES) =    10.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     25.18

****************************************************************************
  FLOW PROCESS FROM NODE    180.00 TO NODE    181.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    931.00
  DOWNSTREAM ELEVATION(FEET) =    930.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    181.00 TO NODE    179.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  930.00  DOWNSTREAM ELEVATION(FEET) =  870.00
  STREET LENGTH(FEET) =  1399.00   CURB HEIGHT(INCHES) =  6.0
```

```
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       6.49
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   10.98
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.91
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.70
  STREET FLOW TRAVEL TIME(MIN.) =   4.75   Tc(MIN.) =   11.88
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.277
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    4.20      SUBAREA RUNOFF(CFS) =   11.97
  TOTAL AREA(ACRES) =        4.3        PEAK FLOW RATE(CFS) =      12.25

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.26
  FLOW VELOCITY(FEET/SEC.) =  5.70   DEPTH*VELOCITY(FT*FT/SEC.) =   2.34
  LONGEST FLOWPATH FROM NODE    180.00 TO NODE    179.00 =    1449.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    179.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.88
  RAINFALL INTENSITY(INCH/HR) =   5.28
  TOTAL STREAM AREA(ACRES) =     4.30
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.25

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       25.18    12.63        5.072         10.70
      2       12.25    11.88        5.277          4.30

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.45    11.88       5.277
```

```
     2       36.95    12.63       5.072

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.95   Tc(MIN.) =   12.63
  TOTAL AREA(ACRES) =       15.0
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    179.00 =    1695.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    179.00 TO NODE    168.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   864.50  DOWNSTREAM(FEET) =   863.00
  FLOW LENGTH(FEET) =     0.36   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  87.45
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      36.95
  PIPE TRAVEL TIME(MIN.) =   0.00    Tc(MIN.) =   12.63
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    168.00 =    1695.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       36.95    12.63       5.072       15.00
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    168.00 =    1695.36 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1        8.73    12.10       5.214        3.00
  LONGEST FLOWPATH FROM NODE    163.00 TO NODE    168.00 =    1090.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1      44.14      12.10        5.214
     2      45.44      12.63        5.072

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      45.44   Tc(MIN.) =   12.63
  TOTAL AREA(ACRES) =       18.0

****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    168.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    168.00 TO NODE    182.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   863.00  DOWNSTREAM(FEET) =   852.00
  FLOW LENGTH(FEET) =   748.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.95
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      45.44
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =   13.77
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    182.00 =    2443.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.77
  RAINFALL INTENSITY(INCH/HR) =   4.80
  TOTAL STREAM AREA(ACRES) =    18.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     45.44

****************************************************************************
  FLOW PROCESS FROM NODE    183.00 TO NODE    184.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    897.30
  DOWNSTREAM ELEVATION(FEET) =    896.80
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    184.00 TO NODE    185.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  896.80  DOWNSTREAM ELEVATION(FEET) =  858.00
  STREET LENGTH(FEET) =   687.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020
```

```
  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) =      12.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.40
    HALFSTREET FLOOD WIDTH(FEET) =   13.48
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.34
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.51
  STREET FLOW TRAVEL TIME(MIN.) =   1.81   Tc(MIN.) =    8.93
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.342
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    6.90      SUBAREA RUNOFF(CFS) =   23.63
  TOTAL AREA(ACRES) =        7.0        PEAK FLOW RATE(CFS) =      23.97

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.48   HALFSTREET FLOOD WIDTH(FEET) =  17.62
  FLOW VELOCITY(FEET/SEC.) =  7.44   DEPTH*VELOCITY(FT*FT/SEC.) =   3.56
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L =  687.0 FT WITH ELEVATION-DROP =  38.8 FT, IS   31.7 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    185.00
  LONGEST FLOWPATH FROM NODE    183.00 TO NODE    185.00 =     737.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    185.00 TO NODE    182.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   852.50  DOWNSTREAM(FEET) =   852.00
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.16
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      23.97
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.00
  LONGEST FLOWPATH FROM NODE    183.00 TO NODE    182.00 =     773.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.00
  RAINFALL INTENSITY(INCH/HR) =   6.31
  TOTAL STREAM AREA(ACRES) =     7.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     23.97

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

```
  FLOW PROCESS FROM NODE    186.00 TO NODE    187.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    870.00
  DOWNSTREAM ELEVATION(FEET) =    869.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    187.00 TO NODE    188.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  869.50  DOWNSTREAM ELEVATION(FEET) =  858.00
  STREET LENGTH(FEET) =   750.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.34
    HALFSTREET FLOOD WIDTH(FEET) =   10.51
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.86
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.96
  STREET FLOW TRAVEL TIME(MIN.) =   4.37   Tc(MIN.) =   11.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.389
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    2.10      SUBAREA RUNOFF(CFS) =    6.11
  TOTAL AREA(ACRES) =        2.2        PEAK FLOW RATE(CFS) =       6.40

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.40   HALFSTREET FLOOD WIDTH(FEET) =  13.48
  FLOW VELOCITY(FEET/SEC.) =  3.31   DEPTH*VELOCITY(FT*FT/SEC.) =   1.31
  LONGEST FLOWPATH FROM NODE    186.00 TO NODE    188.00 =     800.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    182.00 IS CODE =  31
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   852.50  DOWNSTREAM(FEET) =   852.00
  FLOW LENGTH(FEET) =    36.00   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.) =   6.79
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.40
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   11.59
  LONGEST FLOWPATH FROM NODE    186.00 TO NODE    182.00 =     836.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    182.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.59
  RAINFALL INTENSITY(INCH/HR) =   5.36
  TOTAL STREAM AREA(ACRES) =     2.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.40

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       45.44    13.77        4.797         18.00
      2       23.97     9.00        6.312          7.00
      3        6.40    11.59        5.363          2.20

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       58.64     9.00       6.312
      2       65.00    11.59       5.363
      3       69.39    13.77       4.797

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      69.39   Tc(MIN.) =   13.77
  TOTAL AREA(ACRES) =       27.2
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    182.00 =    2443.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    182.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   852.00  DOWNSTREAM(FEET) =   848.50
  FLOW LENGTH(FEET) =    46.00   MANNING'S N =  0.013
```

```
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.91
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      69.39
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   13.80
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    189.00 =    2489.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 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.) =   13.80
  RAINFALL INTENSITY(INCH/HR) =   4.79
  TOTAL STREAM AREA(ACRES) =    27.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     69.39

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    191.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    897.30
  DOWNSTREAM ELEVATION(FEET) =    897.00
  ELEVATION DIFFERENCE(FEET) =      0.30
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.451
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.573
  SUBAREA RUNOFF(CFS) =      0.35
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.35

****************************************************************************
  FLOW PROCESS FROM NODE    191.00 TO NODE    192.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  897.00  DOWNSTREAM ELEVATION(FEET) =  854.00
  STREET LENGTH(FEET) =   656.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.02
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
```

```
    STREET FLOW DEPTH(FEET) =  0.24
    HALFSTREET FLOOD WIDTH(FEET) =    5.78
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.46
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.08
  STREET FLOW TRAVEL TIME(MIN.) =   2.45   Tc(MIN.) =   10.90
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.578
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.10      SUBAREA RUNOFF(CFS) =    3.31
  TOTAL AREA(ACRES) =        1.2        PEAK FLOW RATE(CFS) =       3.61

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.28   HALFSTREET FLOOD WIDTH(FEET) =   7.71
  FLOW VELOCITY(FEET/SEC.) =  5.07   DEPTH*VELOCITY(FT*FT/SEC.) =   1.42
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    192.00 =     706.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    189.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   849.00  DOWNSTREAM(FEET) =   848.50
  FLOW LENGTH(FEET) =    42.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.53
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.61
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   11.03
  LONGEST FLOWPATH FROM NODE    190.00 TO NODE    189.00 =     748.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    189.00 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.) =   11.03
  RAINFALL INTENSITY(INCH/HR) =   5.54
  TOTAL STREAM AREA(ACRES) =     1.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.61

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       69.39    13.80        4.790         27.20
      2        3.61    11.03        5.537          1.20

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

  ** PEAK FLOW RATE TABLE **
```

```
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       63.65    11.03       5.537
      2       72.52    13.80       4.790

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      72.52   Tc(MIN.) =   13.80
  TOTAL AREA(ACRES) =       28.4
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    189.00 =    2489.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    189.00 TO NODE    159.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   848.50  DOWNSTREAM(FEET) =   820.30
  FLOW LENGTH(FEET) =   464.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.48
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      72.52
  PIPE TRAVEL TIME(MIN.) =   0.36    Tc(MIN.) =   14.16
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    159.00 =    2953.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       72.52    14.16       4.711       28.40
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    159.00 =    2953.36 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      106.52    13.28       4.912       48.80
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    159.00 =    2745.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     174.50      13.28        4.912
      2     174.69      14.16        4.711

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     174.69   Tc(MIN.) =   14.16
  TOTAL AREA(ACRES) =       77.2

****************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
```

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

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      174.69    14.16       4.711       77.20
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    159.00 =    2953.36 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.76     5.49       8.686        1.40
  LONGEST FLOWPATH FROM NODE    160.00 TO NODE    159.00 =    1176.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      78.43       5.49        8.686
      2     180.53      14.16        4.711

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     180.53   Tc(MIN.) =   14.16
  TOTAL AREA(ACRES) =       78.6

**************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  12
--------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    159.00 IS CODE =  12
--------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
==========================================================================

**************************************************************************
  FLOW PROCESS FROM NODE    159.00 TO NODE    193.00 IS CODE =  31
--------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   820.30  DOWNSTREAM(FEET) =   807.00
  FLOW LENGTH(FEET) =   370.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  42.0 INCH PIPE IS  34.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.44
  ESTIMATED PIPE DIAMETER(INCH) =  42.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     180.53
  PIPE TRAVEL TIME(MIN.) =   0.29    Tc(MIN.) =   14.45
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    193.00 =    3323.36 FEET.

**************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
==========================================================================
  TOTAL NUMBER OF STREAMS =  3
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.45
  RAINFALL INTENSITY(INCH/HR) =   4.65
  TOTAL STREAM AREA(ACRES) =    78.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    180.53

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    195.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    872.00
  DOWNSTREAM ELEVATION(FEET) =    866.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.359
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    195.00 TO NODE    196.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  866.00  DOWNSTREAM ELEVATION(FEET) =  813.00
  STREET LENGTH(FEET) =   805.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.31
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.92
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.34
  STREET FLOW TRAVEL TIME(MIN.) =   2.73   Tc(MIN.) =    4.09
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
```

```
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    4.81
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       5.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.44
  FLOW VELOCITY(FEET/SEC.) =  5.57   DEPTH*VELOCITY(FT*FT/SEC.) =   1.75
  LONGEST FLOWPATH FROM NODE    194.00 TO NODE    196.00 =     855.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   808.00  DOWNSTREAM(FEET) =   807.00
  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   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.50
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.62
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    4.12
  LONGEST FLOWPATH FROM NODE    194.00 TO NODE    193.00 =     875.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    4.12
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.62

****************************************************************************
  FLOW PROCESS FROM NODE    197.00 TO NODE    198.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    854.00
  DOWNSTREAM ELEVATION(FEET) =    838.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.359
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80

****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    199.00 IS CODE =  62
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  838.00  DOWNSTREAM ELEVATION(FEET) =  813.00
  STREET LENGTH(FEET) =   553.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       3.21
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    7.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.26
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.22
  STREET FLOW TRAVEL TIME(MIN.) =   2.17   Tc(MIN.) =    3.52
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    4.81
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       5.62

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =  10.20
  FLOW VELOCITY(FEET/SEC.) =  4.85   DEPTH*VELOCITY(FT*FT/SEC.) =   1.60
  LONGEST FLOWPATH FROM NODE    197.00 TO NODE    199.00 =     603.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    199.00 TO NODE    193.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   808.00  DOWNSTREAM(FEET) =   807.00
  FLOW LENGTH(FEET) =    15.00   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.) =  11.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.62
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    3.55
  LONGEST FLOWPATH FROM NODE    197.00 TO NODE    193.00 =     618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE    193.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.55
  RAINFALL INTENSITY(INCH/HR) =   9.22
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      180.53    14.45        4.650         78.60
      2        5.62     4.12        9.222          0.70
      3        5.62     3.55        9.222          0.70

  RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
  CONFLUENCE FORMULA USED FOR  3 STREAMS.

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       54.75     3.55       9.222
      2       62.68     4.12       9.222
      3      186.19    14.45       4.650

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     186.19   Tc(MIN.) =   14.45
  TOTAL AREA(ACRES) =       80.0
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE    193.00 =    3323.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    193.00 TO NODE   1100.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   807.00  DOWNSTREAM(FEET) =   788.00
  FLOW LENGTH(FEET) =  1113.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  51.0 INCH PIPE IS  37.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  16.67
  ESTIMATED PIPE DIAMETER(INCH) =  51.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     186.19
  PIPE TRAVEL TIME(MIN.) =   1.11    Tc(MIN.) =   15.56
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1100.00 =    4436.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1100.00 TO NODE   1101.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   788.00  DOWNSTREAM(FEET) =   784.00
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  39.0 INCH PIPE IS  28.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  29.20
```

```
  ESTIMATED PIPE DIAMETER(INCH) =  39.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     186.19
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   15.60
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1101.00 =    4489.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1101.00 TO NODE   1102.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    784.00  DOWNSTREAM(FEET) =    782.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   300.00   CHANNEL SLOPE =  0.0060
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  30.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.151
  LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  74
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     187.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.05
  AVERAGE FLOW DEPTH(FEET) =   1.28   TRAVEL TIME(MIN.) =   1.64
  Tc(MIN.) =   17.24
  SUBAREA AREA(ACRES) =     2.80       SUBAREA RUNOFF(CFS) =    3.49
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.481
  TOTAL AREA(ACRES) =       82.8         PEAK FLOW RATE(CFS) =     186.19

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.27   FLOW VELOCITY(FEET/SEC.) =   3.05
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1102.00 =    4789.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1102.00 TO NODE   1103.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   777.00  DOWNSTREAM(FEET) =   762.00
  FLOW LENGTH(FEET) =    74.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  33.0 INCH PIPE IS  22.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  42.47
  ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =     186.19
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   17.27
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1103.00 =    4863.36 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1103.00 TO NODE   1104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    762.00  DOWNSTREAM(FEET) =    730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   156.00   CHANNEL SLOPE =  0.2051
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =  10.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
  CHANNEL FLOW THRU SUBAREA(CFS) =     186.19
```

```
 FLOW VELOCITY(FEET/SEC.) =   8.75   FLOW DEPTH(FEET) =   1.04
 TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =   17.56
 LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1104.00 =    5019.36 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE   1106.00 TO NODE   1107.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  71
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
 UPSTREAM ELEVATION(FEET) =   1042.00
 DOWNSTREAM ELEVATION(FEET) =   1038.00
 ELEVATION DIFFERENCE(FEET) =      4.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.927
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.264
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE   1107.00 TO NODE   1108.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1038.00  DOWNSTREAM(FEET) =    840.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2420.00   CHANNEL SLOPE =  0.0818
 CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.449
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      33.68
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.22
 AVERAGE FLOW DEPTH(FEET) =   0.50   TRAVEL TIME(MIN.) =   9.55
 Tc(MIN.) =   15.48
 SUBAREA AREA(ACRES) =    46.40       SUBAREA RUNOFF(CFS) =   61.92
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
 TOTAL AREA(ACRES) =       46.5         PEAK FLOW RATE(CFS) =      62.06

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.71   FLOW VELOCITY(FEET/SEC.) =   5.29
 LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1108.00 =    2480.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE   1108.00 TO NODE   1109.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   840.00  DOWNSTREAM(FEET) =   836.00
  FLOW LENGTH(FEET) =   145.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  23.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.99
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.06
  PIPE TRAVEL TIME(MIN.) =   0.16    Tc(MIN.) =   15.64
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1109.00 =    2625.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1109.00 TO NODE   1110.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    836.00  DOWNSTREAM(FEET) =    820.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   599.00   CHANNEL SLOPE =  0.0267
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.935
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      65.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.24
  AVERAGE FLOW DEPTH(FEET) =   0.78   TRAVEL TIME(MIN.) =   3.08
  Tc(MIN.) =   18.72
  SUBAREA AREA(ACRES) =     5.30       SUBAREA RUNOFF(CFS) =    6.26
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       51.8         PEAK FLOW RATE(CFS) =      62.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =   3.19
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1110.00 =    3224.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1110.00 TO NODE   1111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   820.00  DOWNSTREAM(FEET) =   810.00
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  17.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  23.29
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      62.06
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   18.81
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1111.00 =    3344.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1111.00 TO NODE   1112.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    810.00  DOWNSTREAM(FEET) =    787.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   381.00   CHANNEL SLOPE =  0.0604
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.731
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      63.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.16
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   1.53
  Tc(MIN.) =   20.33
  SUBAREA AREA(ACRES) =     2.90       SUBAREA RUNOFF(CFS) =    3.25
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       54.7         PEAK FLOW RATE(CFS) =      62.06

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.59   FLOW VELOCITY(FEET/SEC.) =   4.11
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1112.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1112.00 TO NODE   1112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   20.33
  RAINFALL INTENSITY(INCH/HR) =   3.73
  TOTAL STREAM AREA(ACRES) =    54.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     62.06

****************************************************************************
  FLOW PROCESS FROM NODE   1113.00 TO NODE   1114.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    940.00
  DOWNSTREAM ELEVATION(FEET) =    939.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    8.082
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.765
  SUBAREA RUNOFF(CFS) =      0.20
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.20

****************************************************************************
  FLOW PROCESS FROM NODE   1114.00 TO NODE   1115.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    939.00  DOWNSTREAM(FEET) =    804.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1333.00   CHANNEL SLOPE =  0.1013
  CHANNEL BASE(FEET) =   20.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.068
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.29
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   9.70
  Tc(MIN.) =   17.79
  SUBAREA AREA(ACRES) =    11.40       SUBAREA RUNOFF(CFS) =   13.91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       11.5         PEAK FLOW RATE(CFS) =      14.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   2.93
  LONGEST FLOWPATH FROM NODE   1113.00 TO NODE   1115.00 =    1383.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1115.00 TO NODE   1112.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   804.00  DOWNSTREAM(FEET) =   787.00
  FLOW LENGTH(FEET) =   143.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  18.46
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.03
  PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =   17.91
  LONGEST FLOWPATH FROM NODE   1113.00 TO NODE   1112.00 =    1526.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1112.00 TO NODE   1112.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.91
  RAINFALL INTENSITY(INCH/HR) =   4.05
  TOTAL STREAM AREA(ACRES) =    11.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     14.03

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       62.06    20.33        3.731         54.70
      2       14.03    17.91        4.049         11.50

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

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       68.71    17.91       4.049
      2       74.99    20.33       3.731

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      74.99   Tc(MIN.) =   20.33
  TOTAL AREA(ACRES) =       66.2
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1112.00 =    3725.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1112.00 TO NODE   1116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    787.00  DOWNSTREAM(FEET) =    766.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   748.00   CHANNEL SLOPE =  0.0281
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.362
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      77.11
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.50
  AVERAGE FLOW DEPTH(FEET) =   0.84   TRAVEL TIME(MIN.) =   3.56
  Tc(MIN.) =   23.90
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    4.24
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       70.4         PEAK FLOW RATE(CFS) =      74.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.83   FLOW VELOCITY(FEET/SEC.) =   3.47
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1116.00 =    4473.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1117.00 TO NODE   1118.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    938.00
  DOWNSTREAM ELEVATION(FEET) =    934.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.114
```

```
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE   1118.00 TO NODE   1119.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    934.00  DOWNSTREAM(FEET) =    804.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   900.00   CHANNEL SLOPE =  0.1444
  CHANNEL BASE(FEET) =   18.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.632
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.66
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   5.65
  Tc(MIN.) =   10.74
  SUBAREA AREA(ACRES) =     8.20       SUBAREA RUNOFF(CFS) =   13.86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        8.3         PEAK FLOW RATE(CFS) =      14.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   3.39
  LONGEST FLOWPATH FROM NODE   1117.00 TO NODE   1119.00 =     950.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1119.00 TO NODE   1120.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   804.00  DOWNSTREAM(FEET) =   796.00
  FLOW LENGTH(FEET) =    82.00   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.) =  17.16
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      14.02
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =   10.82
  LONGEST FLOWPATH FROM NODE   1117.00 TO NODE   1120.00 =    1032.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1120.00 TO NODE   1116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    796.00  DOWNSTREAM(FEET) =    766.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   385.00   CHANNEL SLOPE =  0.0779
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.902
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
```

```
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      15.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.57
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   2.50
  Tc(MIN.) =   13.32
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    2.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       10.0         PEAK FLOW RATE(CFS) =      14.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   2.56
  LONGEST FLOWPATH FROM NODE   1117.00 TO NODE   1116.00 =    1417.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1121.00 TO NODE   1122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    916.00
  DOWNSTREAM ELEVATION(FEET) =    914.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.934
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.257
  SUBAREA RUNOFF(CFS) =      2.97
  TOTAL AREA(ACRES) =      1.00   TOTAL RUNOFF(CFS) =      2.97

****************************************************************************
  FLOW PROCESS FROM NODE   1122.00 TO NODE   1123.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  914.00  DOWNSTREAM ELEVATION(FEET) =  825.00
  STREET LENGTH(FEET) =  1736.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      17.98
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.45
    HALFSTREET FLOOD WIDTH(FEET) =   16.05
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.67
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.98
  STREET FLOW TRAVEL TIME(MIN.) =   4.34   Tc(MIN.) =   10.27
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.796
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.523
  SUBAREA AREA(ACRES) =    9.60      SUBAREA RUNOFF(CFS) =   30.05
  TOTAL AREA(ACRES) =       10.6        PEAK FLOW RATE(CFS) =      32.13

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  21.55
  FLOW VELOCITY(FEET/SEC.) =  7.68   DEPTH*VELOCITY(FT*FT/SEC.) =   4.06
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1736.0 FT WITH ELEVATION-DROP =  89.0 FT, IS   43.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1123.00
  LONGEST FLOWPATH FROM NODE   1121.00 TO NODE   1123.00 =    1786.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1123.00 TO NODE   1124.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   820.00  DOWNSTREAM(FEET) =   819.60
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  19.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.35
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.13
  PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =   10.33
  LONGEST FLOWPATH FROM NODE   1121.00 TO NODE   1124.00 =    1821.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1124.00 TO NODE   1124.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.33
  RAINFALL INTENSITY(INCH/HR) =   5.77
  TOTAL STREAM AREA(ACRES) =    10.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.13

****************************************************************************
  FLOW PROCESS FROM NODE   1125.00 TO NODE   1126.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
```

```
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    930.30
  DOWNSTREAM ELEVATION(FEET) =    929.20
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.480
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.692
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE   1126.00 TO NODE   1124.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  929.20  DOWNSTREAM ELEVATION(FEET) =  825.00
  STREET LENGTH(FEET) =  1940.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      17.52
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.44
    HALFSTREET FLOOD WIDTH(FEET) =   15.74
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    6.75
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.98
  STREET FLOW TRAVEL TIME(MIN.) =   4.79   Tc(MIN.) =   10.27
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.796
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =   10.60      SUBAREA RUNOFF(CFS) =   33.18
  TOTAL AREA(ACRES) =       10.7        PEAK FLOW RATE(CFS) =      33.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.53   HALFSTREET FLOOD WIDTH(FEET) =  21.86
  FLOW VELOCITY(FEET/SEC.) =  7.87   DEPTH*VELOCITY(FT*FT/SEC.) =   4.19
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1940.0 FT WITH ELEVATION-DROP = 104.2 FT, IS   48.2 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE   1124.00
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1124.00 =    1990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1124.00 TO NODE   1124.00 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.) =   10.27
  RAINFALL INTENSITY(INCH/HR) =   5.80
  TOTAL STREAM AREA(ACRES) =    10.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     33.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       32.13    10.33        5.773         10.60
      2       33.49    10.27        5.796         10.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       65.43    10.27       5.796
      2       65.49    10.33       5.773

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      65.49   Tc(MIN.) =   10.33
  TOTAL AREA(ACRES) =       21.3
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1124.00 =    1990.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1124.00 TO NODE   1127.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   819.60  DOWNSTREAM(FEET) =   790.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  41.33
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      65.49
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.37
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1127.00 =    2070.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1127.00 TO NODE   1116.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    790.00  DOWNSTREAM(FEET) =    766.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   354.00   CHANNEL SLOPE =  0.0678
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.416
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      66.87
```

```
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.66
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   1.04
  Tc(MIN.) =   11.41
  SUBAREA AREA(ACRES) =     1.70       SUBAREA RUNOFF(CFS) =    2.76
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.514
  TOTAL AREA(ACRES) =       23.0         PEAK FLOW RATE(CFS) =      65.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.97   FLOW VELOCITY(FEET/SEC.) =   5.63
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1116.00 =    2424.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       65.49    11.41       5.416       23.00
  LONGEST FLOWPATH FROM NODE   1125.00 TO NODE   1116.00 =    2424.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       74.99    23.90       3.362       70.40
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1116.00 =    4473.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     101.29      11.41        5.416
      2     115.64      23.90        3.362

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     115.64   Tc(MIN.) =   23.90
  TOTAL AREA(ACRES) =       93.4

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 3 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      115.64    23.90       3.362       93.40
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1116.00 =    4473.00 FEET.

  ** MEMORY BANK #  3 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       14.71    13.32       4.902       10.00
  LONGEST FLOWPATH FROM NODE   1117.00 TO NODE   1116.00 =    1417.00 FEET.
```

```
  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      79.16      13.32        4.902
      2     125.73      23.90        3.362

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     125.73   Tc(MIN.) =   23.90
  TOTAL AREA(ACRES) =      103.4

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1116.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 3 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1116.00 TO NODE   1104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    766.00  DOWNSTREAM(FEET) =    730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   684.00   CHANNEL SLOPE =  0.0526
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.175
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     129.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.15
  AVERAGE FLOW DEPTH(FEET) =   0.94   TRAVEL TIME(MIN.) =   2.21
  Tc(MIN.) =   26.11
  SUBAREA AREA(ACRES) =     7.90       SUBAREA RUNOFF(CFS) =    7.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.344
  TOTAL AREA(ACRES) =      111.3         PEAK FLOW RATE(CFS) =     125.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.92   FLOW VELOCITY(FEET/SEC.) =   5.09
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1104.00 =    5157.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1128.00 TO NODE   1129.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    892.00
  DOWNSTREAM ELEVATION(FEET) =    886.00
  ELEVATION DIFFERENCE(FEET) =      6.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.727
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE   1129.00 TO NODE   1130.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    886.00  DOWNSTREAM(FEET) =    800.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   578.00   CHANNEL SLOPE =  0.1488
  CHANNEL BASE(FEET) =   28.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   2.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.738
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.69
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   5.71
  Tc(MIN.) =   10.43
  SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =    6.54
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        3.9         PEAK FLOW RATE(CFS) =       6.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.17
  LONGEST FLOWPATH FROM NODE   1128.00 TO NODE   1130.00 =     628.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1130.00 TO NODE   1131.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   800.00  DOWNSTREAM(FEET) =   780.00
  FLOW LENGTH(FEET) =   158.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.42
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.71
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.61
  LONGEST FLOWPATH FROM NODE   1128.00 TO NODE   1131.00 =     786.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE   1131.00 TO NODE   1104.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    780.00  DOWNSTREAM(FEET) =    730.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   580.00   CHANNEL SLOPE =  0.0862
  CHANNEL BASE(FEET) =   24.00   "Z" FACTOR =   2.500
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.544
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.21
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   4.37
  Tc(MIN.) =   14.98
  SUBAREA AREA(ACRES) =     3.80       SUBAREA RUNOFF(CFS) =    5.18
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =        7.7         PEAK FLOW RATE(CFS) =      10.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.31
  LONGEST FLOWPATH FROM NODE   1128.00 TO NODE   1104.00 =    1366.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       10.50    14.98       4.544        7.70
  LONGEST FLOWPATH FROM NODE   1128.00 TO NODE   1104.00 =    1366.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      186.19    17.56       4.101       82.80
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1104.00 =    5019.36 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     169.30      14.98        4.544
      2     195.67      17.56        4.101

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     195.67   Tc(MIN.) =   17.56
  TOTAL AREA(ACRES) =       90.5

****************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  11
```

```
--------------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
================================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      195.67    17.56       4.101       90.50
  LONGEST FLOWPATH FROM NODE    176.00 TO NODE   1104.00 =    5019.36 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      125.73    26.11       3.175      111.30
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1104.00 =    5157.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     280.24      17.56        4.101
      2     277.24      26.11        3.175

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     280.24   Tc(MIN.) =   17.56
  TOTAL AREA(ACRES) =      201.8

********************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  12
--------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1104.00 IS CODE =  12
--------------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
================================================================================

********************************************************************************
  FLOW PROCESS FROM NODE   1104.00 TO NODE   1132.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    730.00  DOWNSTREAM(FEET) =    636.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1083.00   CHANNEL SLOPE =  0.0868
  CHANNEL BASE(FEET) =   15.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.827
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     284.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.08
  AVERAGE FLOW DEPTH(FEET) =   1.70   TRAVEL TIME(MIN.) =   1.99
  Tc(MIN.) =   19.55
  SUBAREA AREA(ACRES) =     7.80       SUBAREA RUNOFF(CFS) =    8.95
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.395
  TOTAL AREA(ACRES) =      209.6         PEAK FLOW RATE(CFS) =     316.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.81   FLOW VELOCITY(FEET/SEC.) =   9.39
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1132.00 =    6240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    901.30
  DOWNSTREAM ELEVATION(FEET) =    900.80
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  900.00  DOWNSTREAM ELEVATION(FEET) =  896.00
  STREET LENGTH(FEET) =   315.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       2.06
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.71
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.36
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.71
  STREET FLOW TRAVEL TIME(MIN.) =   2.23   Tc(MIN.) =    9.35
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.156
```

```
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    3.32
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       3.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.13
  FLOW VELOCITY(FEET/SEC.) =  2.69   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =     365.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    204.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   891.00  DOWNSTREAM(FEET) =   890.70
  FLOW LENGTH(FEET) =    24.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.65
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.66
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    204.00 =     389.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.43
  RAINFALL INTENSITY(INCH/HR) =   6.13
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.66

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    925.00
  DOWNSTREAM ELEVATION(FEET) =    924.50
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.128
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.337
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    204.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  924.50  DOWNSTREAM ELEVATION(FEET) =  896.00
  STREET LENGTH(FEET) =   785.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       6.68
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.36
    HALFSTREET FLOOD WIDTH(FEET) =   11.52
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.65
  STREET FLOW TRAVEL TIME(MIN.) =   2.83   Tc(MIN.) =    9.96
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.912
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    3.90      SUBAREA RUNOFF(CFS) =   12.45
  TOTAL AREA(ACRES) =        4.0        PEAK FLOW RATE(CFS) =      12.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.43   HALFSTREET FLOOD WIDTH(FEET) =  14.96
  FLOW VELOCITY(FEET/SEC.) =  5.42   DEPTH*VELOCITY(FT*FT/SEC.) =   2.31
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    204.00 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.) =    9.96
  RAINFALL INTENSITY(INCH/HR) =   5.91
  TOTAL STREAM AREA(ACRES) =     4.00
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.77

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.66     9.43        6.126          1.10
      2       12.77     9.96        5.912          4.00
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       15.74     9.43       6.126
      2       16.30     9.96       5.912

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.30   Tc(MIN.) =    9.96
  TOTAL AREA(ACRES) =        5.1
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    204.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    207.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   890.70  DOWNSTREAM(FEET) =   888.00
  FLOW LENGTH(FEET) =   205.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.16
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.30
  PIPE TRAVEL TIME(MIN.) =   0.42    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 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.) =   10.38
  RAINFALL INTENSITY(INCH/HR) =   5.76
  TOTAL STREAM AREA(ACRES) =     5.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.30

****************************************************************************
  FLOW PROCESS FROM NODE    208.00 TO NODE    209.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    901.00
  DOWNSTREAM ELEVATION(FEET) =    900.00
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.657
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.515
  SUBAREA RUNOFF(CFS) =      0.46
```

```
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.46

****************************************************************************
  FLOW PROCESS FROM NODE    209.00 TO NODE    207.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  900.00  DOWNSTREAM ELEVATION(FEET) =  892.00
  STREET LENGTH(FEET) =   273.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       1.65
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.38
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.15
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.80
  STREET FLOW TRAVEL TIME(MIN.) =   1.45   Tc(MIN.) =    7.10
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.353
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    2.38
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       2.78

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.24
  FLOW VELOCITY(FEET/SEC.) =  3.49   DEPTH*VELOCITY(FT*FT/SEC.) =   1.01
  LONGEST FLOWPATH FROM NODE    208.00 TO NODE    207.00 =     323.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    207.00 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.) =    7.10
  RAINFALL INTENSITY(INCH/HR) =   7.35
  TOTAL STREAM AREA(ACRES) =     0.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.78

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
```

```
      1       16.30    10.38        5.757          5.10
      2        2.78     7.10        7.353          0.70

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       15.54     7.10       7.353
      2       18.48    10.38       5.757

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.48   Tc(MIN.) =   10.38
  TOTAL AREA(ACRES) =        5.8
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    207.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    210.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   888.00  DOWNSTREAM(FEET) =   887.50
  FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.95
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.48
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =   10.42
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    210.00 =    1065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 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.) =   10.42
  RAINFALL INTENSITY(INCH/HR) =   5.74
  TOTAL STREAM AREA(ACRES) =     5.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.48

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    212.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    917.20
  DOWNSTREAM ELEVATION(FEET) =    916.50
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.371
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.887
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE    212.00 TO NODE    210.00 IS CODE =  62
----------------------------------------------------------------------------
 >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
 UPSTREAM ELEVATION(FEET) =  916.50  DOWNSTREAM ELEVATION(FEET) =  892.00
 STREET LENGTH(FEET) =   695.00   CURB HEIGHT(INCHES) =  6.0
 STREET HALFWIDTH(FEET) = 30.00

 DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
 INSIDE STREET CROSSFALL(DECIMAL) =  0.020
 OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

 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) =       3.28
   STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
   STREET FLOW DEPTH(FEET) =  0.30
   HALFSTREET FLOOD WIDTH(FEET) =    8.51
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.89
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.15
 STREET FLOW TRAVEL TIME(MIN.) =   2.97   Tc(MIN.) =    9.35
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.160
 RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  84
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
 SUBAREA AREA(ACRES) =    1.70      SUBAREA RUNOFF(CFS) =    5.66
 TOTAL AREA(ACRES) =        1.8        PEAK FLOW RATE(CFS) =       5.99

 END OF SUBAREA STREET FLOW HYDRAULICS:
 DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.05
 FLOW VELOCITY(FEET/SEC.) =  4.47   DEPTH*VELOCITY(FT*FT/SEC.) =   1.55
 LONGEST FLOWPATH FROM NODE    211.00 TO NODE    210.00 =     745.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 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.) =    9.35
 RAINFALL INTENSITY(INCH/HR) =   6.16
 TOTAL STREAM AREA(ACRES) =     1.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.99

 ** CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.48    10.42        5.742          5.80
      2        5.99     9.35        6.160          1.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       23.21     9.35       6.160
      2       24.06    10.42       5.742

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.06   Tc(MIN.) =   10.42
  TOTAL AREA(ACRES) =        7.6
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    210.00 =    1065.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    213.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   887.50  DOWNSTREAM(FEET) =   864.00
  FLOW LENGTH(FEET) =    58.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  33.43
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.06
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =   10.45
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    213.00 =    1123.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    214.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    864.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2276.00   CHANNEL SLOPE =  0.0633
  CHANNEL BASE(FEET) =   38.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.486
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      43.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.12
  AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =  12.14
  Tc(MIN.) =   22.59
  SUBAREA AREA(ACRES) =    35.30       SUBAREA RUNOFF(CFS) =   36.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.343
  TOTAL AREA(ACRES) =       42.9         PEAK FLOW RATE(CFS) =      51.22
```

```
  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.40   FLOW VELOCITY(FEET/SEC.) =   3.30
  LONGEST FLOWPATH FROM NODE    205.00 TO NODE    214.00 =    3399.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    926.10
  DOWNSTREAM ELEVATION(FEET) =    925.00
  ELEVATION DIFFERENCE(FEET) =      1.10
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.480
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.692
  SUBAREA RUNOFF(CFS) =      0.47
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.47

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    217.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  925.00  DOWNSTREAM ELEVATION(FEET) =  890.00
  STREET LENGTH(FEET) =  1353.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =      13.91
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.46
    HALFSTREET FLOOD WIDTH(FEET) =   16.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.84
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.22
  STREET FLOW TRAVEL TIME(MIN.) =   4.66   Tc(MIN.) =   10.14
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.845
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.540
  SUBAREA AREA(ACRES) =    8.30      SUBAREA RUNOFF(CFS) =   26.20
  TOTAL AREA(ACRES) =        8.4        PEAK FLOW RATE(CFS) =      26.51

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.55   HALFSTREET FLOOD WIDTH(FEET) =  23.89
  FLOW VELOCITY(FEET/SEC.) =  5.62   DEPTH*VELOCITY(FT*FT/SEC.) =   3.10
  *NOTE: INITIAL SUBAREA NOMOGRAPH WITH SUBAREA PARAMETERS,
         AND L = 1353.0 FT WITH ELEVATION-DROP =  35.0 FT, IS   33.5 CFS,
         WHICH EXCEEDS THE TOP-OF-CURB STREET CAPACITY AT NODE    217.00
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    217.00 =    1403.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    218.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   884.00  DOWNSTREAM(FEET) =   883.60
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.75
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.51
  PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =   10.21
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    218.00 =    1439.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 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.) =   10.21
  RAINFALL INTENSITY(INCH/HR) =   5.82
  TOTAL STREAM AREA(ACRES) =     8.40
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     26.51

****************************************************************************
  FLOW PROCESS FROM NODE    219.00 TO NODE    220.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  STREETS & ROADS (CURBS/STORM DRAINS) RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  98
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    912.00
  DOWNSTREAM ELEVATION(FEET) =    910.00
  ELEVATION DIFFERENCE(FEET) =      2.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.844
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.222
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.80
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.80
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    218.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  910.00  DOWNSTREAM ELEVATION(FEET) =  890.00
  STREET LENGTH(FEET) =   873.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 30.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  20.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  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) =       5.05
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.35
    HALFSTREET FLOOD WIDTH(FEET) =   11.29
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.63
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.28
  STREET FLOW TRAVEL TIME(MIN.) =   4.01   Tc(MIN.) =    5.85
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  8.329
  RESIDENTIAL (7.3 DU/AC OR LESS) RUNOFF COEFFICIENT = .5400
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  84
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.557
  SUBAREA AREA(ACRES) =    1.80      SUBAREA RUNOFF(CFS) =    8.10
  TOTAL AREA(ACRES) =        1.9        PEAK FLOW RATE(CFS) =       8.82

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.41   HALFSTREET FLOOD WIDTH(FEET) =  14.18
  FLOW VELOCITY(FEET/SEC.) =  4.14   DEPTH*VELOCITY(FT*FT/SEC.) =   1.70
  LONGEST FLOWPATH FROM NODE    219.00 TO NODE    218.00 =     923.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    218.00 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.) =    5.85
  RAINFALL INTENSITY(INCH/HR) =   8.33
  TOTAL STREAM AREA(ACRES) =     1.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.82

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       26.51    10.21        5.819          8.40
      2        8.82     5.85        8.329          1.90
```

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.03     5.85       8.329
      2       32.67    10.21       5.819

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      32.67   Tc(MIN.) =   10.21
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    218.00 =    1439.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    218.00 TO NODE    221.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   883.60  DOWNSTREAM(FEET) =   872.00
  FLOW LENGTH(FEET) =   179.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  17.87
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.67
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =   10.38
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    221.00 =    1618.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    222.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    872.00  DOWNSTREAM(FEET) =    802.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   651.00   CHANNEL SLOPE =  0.1075
  CHANNEL BASE(FEET) =   32.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.905
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      38.16
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.70
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =   2.93
  Tc(MIN.) =   13.30
  SUBAREA AREA(ACRES) =     7.40       SUBAREA RUNOFF(CFS) =   10.89
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.442
  TOTAL AREA(ACRES) =       17.7         PEAK FLOW RATE(CFS) =      38.34

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   3.72
  LONGEST FLOWPATH FROM NODE    215.00 TO NODE    222.00 =    2269.00 FEET.

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

```
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 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.) =   13.30
 RAINFALL INTENSITY(INCH/HR) =   4.91
 TOTAL STREAM AREA(ACRES) =    17.70
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     38.34

****************************************************************************
 FLOW PROCESS FROM NODE    223.00 TO NODE    224.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  71
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
 UPSTREAM ELEVATION(FEET) =   1016.00
 DOWNSTREAM ELEVATION(FEET) =   1014.00
 ELEVATION DIFFERENCE(FEET) =      2.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.415
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.853
 SUBAREA RUNOFF(CFS) =      0.24
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
 FLOW PROCESS FROM NODE    224.00 TO NODE    222.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1014.00  DOWNSTREAM(FEET) =    802.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2690.00   CHANNEL SLOPE =  0.0788
 CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =  10.000
 MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.045
 RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  76
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      37.63
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
 AVERAGE FLOW DEPTH(FEET) =   0.55   TRAVEL TIME(MIN.) =  11.53
 Tc(MIN.) =   17.94
 SUBAREA AREA(ACRES) =    48.80       SUBAREA RUNOFF(CFS) =   71.06
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
 TOTAL AREA(ACRES) =       48.9         PEAK FLOW RATE(CFS) =      71.18

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.77   FLOW VELOCITY(FEET/SEC.) =   4.66
 LONGEST FLOWPATH FROM NODE    223.00 TO NODE    222.00 =    2740.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    222.00 TO NODE    222.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   17.94
  RAINFALL INTENSITY(INCH/HR) =   4.04
  TOTAL STREAM AREA(ACRES) =    48.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     71.18

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       38.34    13.30        4.905         17.70
      2       71.18    17.94        4.045         48.90

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       91.12    13.30       4.905
      2      102.79    17.94       4.045

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     102.79   Tc(MIN.) =   17.94
  TOTAL AREA(ACRES) =       66.6
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    222.00 =    2740.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    225.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    802.00  DOWNSTREAM(FEET) =    788.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   542.00   CHANNEL SLOPE =  0.0258
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.788
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     105.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.70
  AVERAGE FLOW DEPTH(FEET) =   1.68   TRAVEL TIME(MIN.) =   1.92
  Tc(MIN.) =   19.86
  SUBAREA AREA(ACRES) =     4.20       SUBAREA RUNOFF(CFS) =    4.77
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.377
  TOTAL AREA(ACRES) =       70.8         PEAK FLOW RATE(CFS) =     102.79

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.66   FLOW VELOCITY(FEET/SEC.) =   4.65
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =    3282.00 FEET.

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

```
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   19.86
  RAINFALL INTENSITY(INCH/HR) =   3.79
  TOTAL STREAM AREA(ACRES) =    70.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =    102.79

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    227.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    954.00
  DOWNSTREAM ELEVATION(FEET) =    950.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.114
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    225.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    950.00  DOWNSTREAM(FEET) =    788.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1895.00   CHANNEL SLOPE =  0.0855
  CHANNEL BASE(FEET) =   10.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   3.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.725
  RESIDENTIAL (1. DU/AC OR LESS) RUNOFF COEFFICIENT = .3600
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  76
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.70
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.51
  AVERAGE FLOW DEPTH(FEET) =   0.38   TRAVEL TIME(MIN.) =   9.01
  Tc(MIN.) =   14.10
  SUBAREA AREA(ACRES) =    16.00       SUBAREA RUNOFF(CFS) =   27.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.360
  TOTAL AREA(ACRES) =       16.1         PEAK FLOW RATE(CFS) =      27.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.54   FLOW VELOCITY(FEET/SEC.) =   4.37
  LONGEST FLOWPATH FROM NODE    226.00 TO NODE    225.00 =    1945.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
================================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.10
  RAINFALL INTENSITY(INCH/HR) =   4.72
  TOTAL STREAM AREA(ACRES) =    16.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     27.36

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1      102.79    19.86        3.788         70.80
      2       27.36    14.10        4.725         16.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1      109.77    14.10       4.725
      2      124.72    19.86       3.788

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     124.72   Tc(MIN.) =   19.86
  TOTAL AREA(ACRES) =       86.9
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    225.00 =    3282.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    214.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    788.00  DOWNSTREAM(FEET) =    720.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1205.00   CHANNEL SLOPE =  0.0564
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   3.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   4.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.376
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     131.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   5.17
  AVERAGE FLOW DEPTH(FEET) =   0.92   TRAVEL TIME(MIN.) =   3.89
  Tc(MIN.) =   23.75
  SUBAREA AREA(ACRES) =    13.90       SUBAREA RUNOFF(CFS) =   14.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.363
  TOTAL AREA(ACRES) =      100.8         PEAK FLOW RATE(CFS) =     124.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =   5.08
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE    214.00 =    4487.00 FEET.

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

```
 FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1      124.72    23.75       3.376      100.80
 LONGEST FLOWPATH FROM NODE    223.00 TO NODE    214.00 =    4487.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
 STREAM     RUNOFF      Tc      INTENSITY     AREA
 NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
     1       51.22    22.59       3.486       42.90
 LONGEST FLOWPATH FROM NODE    205.00 TO NODE    214.00 =    3399.00 FEET.

 ** PEAK FLOW RATE TABLE **
 STREAM    RUNOFF       Tc      INTENSITY
 NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
     1     169.88      22.59        3.486
     2     174.32      23.75        3.376

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     174.32   Tc(MIN.) =   23.75
 TOTAL AREA(ACRES) =      143.7

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE    214.00 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    214.00 TO NODE   1132.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    720.00  DOWNSTREAM(FEET) =    636.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   769.00   CHANNEL SLOPE =  0.1092
 CHANNEL BASE(FEET) =   12.00   "Z" FACTOR =   6.000
 MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   4.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.228
 CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
 SOIL CLASSIFICATION IS "C"
 S.C.S. CURVE NUMBER (AMC II) =  71
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =     179.70
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.53
 AVERAGE FLOW DEPTH(FEET) =   1.23   TRAVEL TIME(MIN.) =   1.70
 Tc(MIN.) =   25.45
 SUBAREA AREA(ACRES) =    11.10       SUBAREA RUNOFF(CFS) =   10.75
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.353
 TOTAL AREA(ACRES) =      154.8         PEAK FLOW RATE(CFS) =     176.45

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  1.22   FLOW VELOCITY(FEET/SEC.) =   7.50
```

```
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE   1132.00 =    5256.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE   1133.00 TO NODE   1134.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  LAWNS, GOLF COURSES, ETC. GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  74
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    920.00
  DOWNSTREAM ELEVATION(FEET) =    916.00
  ELEVATION DIFFERENCE(FEET) =      4.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.092
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  9.114
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE   1134.00 TO NODE   1132.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    916.00  DOWNSTREAM(FEET) =    636.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =  2324.00   CHANNEL SLOPE =  0.1205
  CHANNEL BASE(FEET) =   16.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.060   MAXIMUM DEPTH(FEET) =   5.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.523
  CHAPARRAL(BROADLEAF) GOOD COVER RUNOFF COEFFICIENT = .3000
  SOIL CLASSIFICATION IS "C"
  S.C.S. CURVE NUMBER (AMC II) =  71
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      19.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.87
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =  10.00
  Tc(MIN.) =   15.09
  SUBAREA AREA(ACRES) =    26.50       SUBAREA RUNOFF(CFS) =   35.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.300
  TOTAL AREA(ACRES) =       26.6         PEAK FLOW RATE(CFS) =      36.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.45   FLOW VELOCITY(FEET/SEC.) =   4.80
  LONGEST FLOWPATH FROM NODE   1133.00 TO NODE   1132.00 =    2374.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================
```

```
  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       36.09    15.09       4.523       26.60
  LONGEST FLOWPATH FROM NODE   1133.00 TO NODE   1132.00 =    2374.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      316.83    19.55       3.827      209.60
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1132.00 =    6240.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     280.60      15.09        4.523
      2     347.37      19.55        3.827

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     347.37   Tc(MIN.) =   19.55
  TOTAL AREA(ACRES) =      236.2

****************************************************************************
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      347.37    19.55       3.827      236.20
  LONGEST FLOWPATH FROM NODE   1106.00 TO NODE   1132.00 =    6240.00 FEET.

  ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1      176.45    25.45       3.228      154.80
  LONGEST FLOWPATH FROM NODE    223.00 TO NODE   1132.00 =    5256.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1     482.92      19.55        3.827
      2     469.49      25.45        3.228

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =     482.92   Tc(MIN.) =   19.55
  TOTAL AREA(ACRES) =      391.0

****************************************************************************
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

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

```
  FLOW PROCESS FROM NODE   1132.00 TO NODE   1132.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =      391.0  TC(MIN.) =     19.55
  PEAK FLOW RATE(CFS)   =     482.92*
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

- PEAK DISCAHRGE REAT IS UNMITIGATED. The proposed detention basin and its outlet structure will regulate the out flow to no more than 78 cfs such that the overall discharge from the site at the final discharge point is not greater than that under the pre-development conditions.

100-YEAR HYDROGRAPH CALCULATIONS
PRE-DEVELOPMENT CONDITIONS

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

              F L O O D    R O U T I N G     A N A L Y S I S

                      ACCORDING TO COUNTY OF SAN DIEGO
  DEPARTMENT OF PUBLIC WORKS FLOOD CONTROL DIVISION HYDROLOGY MANUAL(2003)
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             Ver. 10.0  Release Date: 01/01/2004  License ID 1503

                           Analysis prepared by:

                             LANDMARK CONSULTING
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                             SAN DIEGO, CA 92121
                      TEL:  858-587-8070, FAX:  858-587-8750

 ************************** DESCRIPTION OF STUDY **************************
* LILAC HILLS RANCH                                                       *
* IMPLEMENTATION TM                                                       *
* PRE-DEVELOPMENT CONDITIONS                                              *
 **************************************************************************

  FILE NAME: 1037I1X.DAT
  TIME/DATE OF STUDY: 15:46 04/04/2012


**************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    118.00 IS CODE =   1
--------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
==========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERCOURSE LENGTH =    6176.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =    2613.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =     406.000 FEET
         BASIN FACTOR = 0.030
         WATERSHED AREA =     396.270 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         WATERCOURSE "LAG" TIME =    0.192 HOURS
         * Instantaneous Unit-Hydrograph Option Selected.
          CAUTION: LAG TIME IS LESS THAN 0.75 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         S.C.S. S-GRAPH SELECTED
         WATERSHED RUNOFF CURVE NUMBER =  85.00

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.77
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.45
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.86
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.74
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.50
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  6.00
         24-HOUR NESTED DESIGN STORM DISTRIBUTION SELECTED
         (Ref: San Diego County Hydrology Manual)
```

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
5-MINUTE FACTOR = 0.993
30-MINUTE FACTOR = 0.993
1-HOUR FACTOR = 0.996
3-HOUR FACTOR = 0.998
6-HOUR FACTOR = 0.998
24-HOUR FACTOR = 0.999

UNIT HYDROGRAPH TIME UNIT = 5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 43.290

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"q/qp" GRAPH VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.474	856.205
2	1.000	1805.093
3	0.672	1213.893
4	0.277	499.926
5	0.125	225.429
6	0.054	97.560
7	0.024	44.050
8	0.011	19.489
9	0.005	8.677
10	0.000	0.000

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0081	0.0081	0.0000
2	0.0081	0.0081	0.0000
3	0.0082	0.0082	0.0000
4	0.0082	0.0082	0.0000
5	0.0082	0.0082	0.0000
6	0.0082	0.0082	0.0000
7	0.0083	0.0083	0.0000
8	0.0083	0.0083	0.0000
9	0.0083	0.0083	0.0000
10	0.0083	0.0083	0.0000
11	0.0084	0.0084	0.0000
12	0.0084	0.0084	0.0000
13	0.0084	0.0084	0.0000
14	0.0085	0.0085	0.0000
15	0.0085	0.0085	0.0000
16	0.0085	0.0085	0.0000
17	0.0086	0.0086	0.0000
18	0.0086	0.0086	0.0000
19	0.0086	0.0086	0.0000
20	0.0086	0.0086	0.0000
21	0.0087	0.0087	0.0000
22	0.0087	0.0087	0.0000
23	0.0087	0.0087	0.0000
24	0.0088	0.0088	0.0000
25	0.0088	0.0088	0.0000
26	0.0088	0.0088	0.0000
27	0.0089	0.0089	0.0000
28	0.0089	0.0089	0.0000
29	0.0089	0.0089	0.0000
30	0.0090	0.0090	0.0000
31	0.0090	0.0090	0.0000
32	0.0090	0.0090	0.0000
33	0.0091	0.0091	0.0000
34	0.0091	0.0091	0.0000
35	0.0091	0.0091	0.0000
36	0.0092	0.0092	0.0000
37	0.0092	0.0092	0.0000
38	0.0092	0.0092	0.0000
39	0.0093	0.0093	0.0000
40	0.0093	0.0093	0.0000
41	0.0094	0.0094	0.0000
42	0.0094	0.0093	0.0001
43	0.0094	0.0092	0.0002
44	0.0095	0.0092	0.0003
45	0.0095	0.0091	0.0004
46	0.0095	0.0091	0.0005
47	0.0096	0.0090	0.0006
48	0.0096	0.0089	0.0007
49	0.0097	0.0089	0.0008
50	0.0097	0.0088	0.0009
51	0.0098	0.0088	0.0010
52	0.0098	0.0087	0.0011
53	0.0098	0.0087	0.0012
54	0.0099	0.0086	0.0013
55	0.0099	0.0086	0.0013

56	0.0100	0.0085	0.0014
57	0.0100	0.0085	0.0015
58	0.0100	0.0084	0.0016
59	0.0101	0.0084	0.0017
60	0.0101	0.0083	0.0018
61	0.0102	0.0083	0.0019
62	0.0102	0.0082	0.0020
63	0.0103	0.0082	0.0021
64	0.0103	0.0081	0.0022
65	0.0104	0.0081	0.0023
66	0.0104	0.0080	0.0024
67	0.0105	0.0080	0.0025
68	0.0105	0.0079	0.0026
69	0.0106	0.0079	0.0027
70	0.0106	0.0079	0.0028
71	0.0107	0.0078	0.0029
72	0.0107	0.0078	0.0030
73	0.0108	0.0077	0.0031
74	0.0108	0.0077	0.0032
75	0.0109	0.0077	0.0033
76	0.0110	0.0076	0.0033
77	0.0110	0.0076	0.0034
78	0.0111	0.0075	0.0035
79	0.0112	0.0075	0.0036
80	0.0112	0.0075	0.0037
81	0.0113	0.0074	0.0038
82	0.0113	0.0074	0.0039
83	0.0114	0.0074	0.0040
84	0.0114	0.0073	0.0041
85	0.0115	0.0073	0.0042
86	0.0116	0.0072	0.0043
87	0.0117	0.0072	0.0044
88	0.0117	0.0072	0.0045
89	0.0118	0.0072	0.0046
90	0.0118	0.0071	0.0047
91	0.0119	0.0071	0.0048
92	0.0120	0.0071	0.0049
93	0.0121	0.0070	0.0050
94	0.0121	0.0070	0.0051
95	0.0122	0.0070	0.0053
96	0.0123	0.0069	0.0054
97	0.0124	0.0069	0.0055
98	0.0124	0.0069	0.0056
99	0.0126	0.0069	0.0057
100	0.0126	0.0068	0.0058
101	0.0127	0.0068	0.0059
102	0.0128	0.0068	0.0060
103	0.0129	0.0068	0.0061
104	0.0129	0.0067	0.0062
105	0.0131	0.0067	0.0064
106	0.0131	0.0067	0.0065
107	0.0133	0.0067	0.0066
108	0.0133	0.0066	0.0067
109	0.0134	0.0066	0.0068
110	0.0135	0.0066	0.0069
111	0.0136	0.0066	0.0071
112	0.0137	0.0065	0.0072
113	0.0139	0.0065	0.0073
114	0.0139	0.0065	0.0074
115	0.0141	0.0065	0.0076

116	0.0141	0.0065	0.0077
117	0.0143	0.0065	0.0078
118	0.0144	0.0064	0.0080
119	0.0145	0.0064	0.0081
120	0.0146	0.0064	0.0082
121	0.0148	0.0064	0.0084
122	0.0149	0.0064	0.0085
123	0.0150	0.0064	0.0087
124	0.0151	0.0063	0.0088
125	0.0153	0.0063	0.0090
126	0.0154	0.0063	0.0091
127	0.0156	0.0063	0.0093
128	0.0157	0.0063	0.0094
129	0.0159	0.0063	0.0096
130	0.0160	0.0062	0.0097
131	0.0162	0.0063	0.0099
132	0.0163	0.0062	0.0101
133	0.0165	0.0062	0.0103
134	0.0166	0.0062	0.0104
135	0.0169	0.0062	0.0106
136	0.0170	0.0062	0.0108
137	0.0172	0.0062	0.0110
138	0.0174	0.0062	0.0112
139	0.0176	0.0062	0.0114
140	0.0178	0.0062	0.0116
141	0.0180	0.0062	0.0118
142	0.0182	0.0062	0.0120
143	0.0185	0.0062	0.0123
144	0.0186	0.0062	0.0125
145	0.0101	0.0033	0.0068
146	0.0176	0.0057	0.0118
147	0.0179	0.0058	0.0121
148	0.0181	0.0057	0.0123
149	0.0184	0.0058	0.0126
150	0.0186	0.0058	0.0128
151	0.0190	0.0058	0.0131
152	0.0192	0.0058	0.0133
153	0.0196	0.0059	0.0137
154	0.0198	0.0059	0.0139
155	0.0202	0.0059	0.0143
156	0.0205	0.0059	0.0146
157	0.0210	0.0060	0.0150
158	0.0212	0.0060	0.0152
159	0.0217	0.0060	0.0157
160	0.0220	0.0060	0.0160
161	0.0226	0.0061	0.0165
162	0.0229	0.0061	0.0168
163	0.0236	0.0062	0.0174
164	0.0239	0.0062	0.0177
165	0.0247	0.0063	0.0183
166	0.0251	0.0063	0.0187
167	0.0259	0.0065	0.0194
168	0.0263	0.0065	0.0199
169	0.0274	0.0066	0.0207
170	0.0279	0.0066	0.0212
171	0.0289	0.0068	0.0222
172	0.0295	0.0068	0.0227
173	0.0308	0.0070	0.0238
174	0.0315	0.0070	0.0245
175	0.0330	0.0072	0.0257

176	0.0338	0.0073	0.0265
177	0.0356	0.0075	0.0281
178	0.0366	0.0076	0.0290
179	0.0389	0.0079	0.0310
180	0.0401	0.0080	0.0321
181	0.0430	0.0084	0.0346
182	0.0447	0.0086	0.0361
183	0.0486	0.0091	0.0395
184	0.0508	0.0093	0.0416
185	0.0573	0.0102	0.0471
186	0.0606	0.0105	0.0501
187	0.0692	0.0116	0.0576
188	0.0749	0.0122	0.0627
189	0.0903	0.0141	0.0762
190	0.1029	0.0154	0.0875
191	0.1511	0.0214	0.1296
192	0.2129	0.0280	0.1849
193	0.7629	0.0833	0.6797
194	0.1212	0.0112	0.1099
195	0.0820	0.0073	0.0746
196	0.0645	0.0056	0.0589
197	0.0534	0.0046	0.0488
198	0.0465	0.0039	0.0426
199	0.0415	0.0034	0.0381
200	0.0377	0.0031	0.0346
201	0.0347	0.0028	0.0319
202	0.0322	0.0026	0.0296
203	0.0301	0.0024	0.0278
204	0.0284	0.0022	0.0262
205	0.0268	0.0021	0.0247
206	0.0255	0.0020	0.0235
207	0.0243	0.0019	0.0224
208	0.0232	0.0018	0.0215
209	0.0223	0.0017	0.0206
210	0.0215	0.0016	0.0199
211	0.0207	0.0015	0.0192
212	0.0200	0.0015	0.0185
213	0.0194	0.0014	0.0179
214	0.0188	0.0014	0.0174
215	0.0182	0.0013	0.0169
216	0.0177	0.0013	0.0164
217	0.0188	0.0014	0.0174
218	0.0183	0.0013	0.0170
219	0.0179	0.0013	0.0166
220	0.0175	0.0012	0.0163
221	0.0171	0.0012	0.0159
222	0.0168	0.0012	0.0156
223	0.0164	0.0011	0.0153
224	0.0161	0.0011	0.0150
225	0.0158	0.0011	0.0147
226	0.0155	0.0011	0.0144
227	0.0152	0.0010	0.0142
228	0.0149	0.0010	0.0139
229	0.0147	0.0010	0.0137
230	0.0145	0.0010	0.0135
231	0.0142	0.0010	0.0133
232	0.0140	0.0009	0.0131
233	0.0138	0.0009	0.0129
234	0.0136	0.0009	0.0127
235	0.0134	0.0009	0.0125

236	0.0132	0.0009	0.0123
237	0.0130	0.0009	0.0122
238	0.0128	0.0008	0.0120
239	0.0127	0.0008	0.0118
240	0.0125	0.0008	0.0117
241	0.0123	0.0008	0.0115
242	0.0122	0.0008	0.0114
243	0.0120	0.0008	0.0113
244	0.0119	0.0008	0.0111
245	0.0118	0.0008	0.0110
246	0.0116	0.0007	0.0109
247	0.0115	0.0007	0.0108
248	0.0114	0.0007	0.0106
249	0.0112	0.0007	0.0105
250	0.0111	0.0007	0.0104
251	0.0110	0.0007	0.0103
252	0.0109	0.0007	0.0102
253	0.0108	0.0007	0.0101
254	0.0107	0.0007	0.0100
255	0.0106	0.0007	0.0099
256	0.0105	0.0006	0.0098
257	0.0104	0.0006	0.0097
258	0.0103	0.0006	0.0096
259	0.0102	0.0006	0.0095
260	0.0101	0.0006	0.0095
261	0.0100	0.0006	0.0094
262	0.0099	0.0006	0.0093
263	0.0098	0.0006	0.0092
264	0.0097	0.0006	0.0091
265	0.0096	0.0006	0.0091
266	0.0096	0.0006	0.0090
267	0.0095	0.0006	0.0089
268	0.0094	0.0006	0.0088
269	0.0093	0.0006	0.0088
270	0.0093	0.0005	0.0087
271	0.0092	0.0005	0.0086
272	0.0091	0.0005	0.0086
273	0.0090	0.0005	0.0085
274	0.0090	0.0005	0.0085
275	0.0089	0.0005	0.0084
276	0.0088	0.0005	0.0083
277	0.0088	0.0005	0.0083
278	0.0087	0.0005	0.0082
279	0.0087	0.0005	0.0082
280	0.0086	0.0005	0.0081
281	0.0085	0.0005	0.0080
282	0.0085	0.0005	0.0080
283	0.0084	0.0005	0.0079
284	0.0084	0.0005	0.0079
285	0.0083	0.0005	0.0078
286	0.0083	0.0005	0.0078
287	0.0082	0.0005	0.0077
288	0.0082	0.0005	0.0077

TOTAL STORM RAINFALL(INCHES) = 5.99
TOTAL SOIL-LOSS(INCHES) = 1.70
TOTAL EFFECTIVE RAINFALL(INCHES) = 4.30

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 56.0411

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    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =     141.1224
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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	425.0	850.0	1275.0	1700.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0000	0.00	Q	.	.	.	.
0.417	0.0000	0.00	Q	.	.	.	.
0.500	0.0000	0.00	Q	.	.	.	.
0.583	0.0000	0.00	Q	.	.	.	.
0.667	0.0000	0.00	Q	.	.	.	.
0.750	0.0000	0.00	Q	.	.	.	.
0.833	0.0000	0.00	Q	.	.	.	.
0.917	0.0000	0.00	Q	.	.	.	.
1.000	0.0000	0.00	Q	.	.	.	.
1.083	0.0000	0.00	Q	.	.	.	.
1.167	0.0000	0.00	Q	.	.	.	.
1.250	0.0000	0.00	Q	.	.	.	.
1.333	0.0000	0.00	Q	.	.	.	.
1.417	0.0000	0.00	Q	.	.	.	.
1.500	0.0000	0.00	Q	.	.	.	.
1.583	0.0000	0.00	Q	.	.	.	.
1.667	0.0000	0.00	Q	.	.	.	.
1.750	0.0000	0.00	Q	.	.	.	.
1.833	0.0000	0.00	Q	.	.	.	.
1.917	0.0000	0.00	Q	.	.	.	.
2.000	0.0000	0.00	Q	.	.	.	.
2.083	0.0000	0.00	Q	.	.	.	.
2.167	0.0000	0.00	Q	.	.	.	.
2.250	0.0000	0.00	Q	.	.	.	.
2.333	0.0000	0.00	Q	.	.	.	.
2.417	0.0000	0.00	Q	.	.	.	.
2.500	0.0000	0.00	Q	.	.	.	.
2.583	0.0000	0.00	Q	.	.	.	.
2.667	0.0000	0.00	Q	.	.	.	.
2.750	0.0000	0.00	Q	.	.	.	.
2.833	0.0000	0.00	Q	.	.	.	.
2.917	0.0000	0.00	Q	.	.	.	.
3.000	0.0000	0.00	Q	.	.	.	.
3.083	0.0000	0.00	Q	.	.	.	.
3.167	0.0000	0.00	Q	.	.	.	.
3.250	0.0000	0.00	Q	.	.	.	.
3.333	0.0000	0.00	Q	.	.	.	.
3.417	0.0000	0.01	Q	.	.	.	.
3.500	0.0006	0.09	Q	.	.	.	.
3.583	0.0029	0.32	Q	.	.	.	.
3.667	0.0076	0.69	Q	.	.	.	.
3.750	0.0152	1.11	Q	.	.	.	.
3.833	0.0260	1.56	Q	.	.	.	.
3.917	0.0398	2.02	Q	.	.	.	.
4.000	0.0569	2.48	Q	.	.	.	.
4.083	0.0771	2.94	Q	.	.	.	.

4.167	0.1006	3.40	Q	.	.	.	.
4.250	0.1272	3.86	Q	.	.	.	.
4.333	0.1570	4.33	Q	.	.	.	.
4.417	0.1899	4.78	Q	.	.	.	.
4.500	0.2260	5.24	Q	.	.	.	.
4.583	0.2653	5.70	Q	.	.	.	.
4.667	0.3077	6.16	Q	.	.	.	.
4.750	0.3532	6.61	Q	.	.	.	.
4.833	0.4019	7.07	Q	.	.	.	.
4.917	0.4537	7.52	Q	.	.	.	.
5.000	0.5087	7.98	Q	.	.	.	.
5.083	0.5667	8.43	Q	.	.	.	.
5.167	0.6279	8.88	Q	.	.	.	.
5.250	0.6922	9.34	Q	.	.	.	.
5.333	0.7596	9.79	Q	.	.	.	.
5.417	0.8302	10.24	Q	.	.	.	.
5.500	0.9038	10.70	Q	.	.	.	.
5.583	0.9806	11.15	Q	.	.	.	.
5.667	1.0605	11.60	Q	.	.	.	.
5.750	1.1435	12.06	Q	.	.	.	.
5.833	1.2297	12.51	Q	.	.	.	.
5.917	1.3190	12.96	Q	.	.	.	.
6.000	1.4114	13.42	Q	.	.	.	.
6.083	1.5069	13.87	Q	.	.	.	.
6.167	1.6056	14.33	Q	.	.	.	.
6.250	1.7075	14.79	Q	.	.	.	.
6.333	1.8125	15.24	Q	.	.	.	.
6.417	1.9206	15.70	Q	.	.	.	.
6.500	2.0319	16.16	Q	.	.	.	.
6.583	2.1464	16.63	Q	.	.	.	.
6.667	2.2641	17.09	Q	.	.	.	.
6.750	2.3850	17.55	Q	.	.	.	.
6.833	2.5091	18.02	Q	.	.	.	.
6.917	2.6364	18.48	Q	.	.	.	.
7.000	2.7669	18.95	Q	.	.	.	.
7.083	2.9007	19.42	Q	.	.	.	.
7.167	3.0378	19.90	Q	.	.	.	.
7.250	3.1781	20.37	Q	.	.	.	.
7.333	3.3217	20.85	Q	.	.	.	.
7.417	3.4686	21.33	Q	.	.	.	.
7.500	3.6188	21.81	QV	.	.	.	.
7.583	3.7724	22.30	QV	.	.	.	.
7.667	3.9293	22.79	QV	.	.	.	.
7.750	4.0896	23.28	QV	.	.	.	.
7.833	4.2533	23.77	QV	.	.	.	.
7.917	4.4204	24.27	QV	.	.	.	.
8.000	4.5910	24.77	QV	.	.	.	.
8.083	4.7651	25.27	QV	.	.	.	.
8.167	4.9426	25.78	QV	.	.	.	.
8.250	5.1237	26.29	QV	.	.	.	.
8.333	5.3083	26.81	QV	.	.	.	.
8.417	5.4964	27.32	QV	.	.	.	.
8.500	5.6883	27.85	QV	.	.	.	.
8.583	5.8837	28.38	QV	.	.	.	.
8.667	6.0828	28.91	QV	.	.	.	.
8.750	6.2856	29.45	QV	.	.	.	.
8.833	6.4922	29.99	QV	.	.	.	.
8.917	6.7025	30.54	QV	.	.	.	.
9.000	6.9167	31.10	QV	.	.	.	.
9.083	7.1347	31.66	Q V	.	.	.	.

9.167	7.3567	32.22	Q V	.	.	.	.
9.250	7.5825	32.80	Q V	.	.	.	.
9.333	7.8124	33.38	Q V	.	.	.	.
9.417	8.0463	33.96	Q V	.	.	.	.
9.500	8.2843	34.56	Q V	.	.	.	.
9.583	8.5264	35.16	Q V	.	.	.	.
9.667	8.7727	35.77	Q V	.	.	.	.
9.750	9.0233	36.38	Q V	.	.	.	.
9.833	9.2782	37.01	Q V	.	.	.	.
9.917	9.5374	37.64	Q V	.	.	.	.
10.000	9.8011	38.29	Q V	.	.	.	.
10.083	10.0693	38.94	Q V	.	.	.	.
10.167	10.3420	39.60	Q V	.	.	.	.
10.250	10.6194	40.27	Q V	.	.	.	.
10.333	10.9015	40.96	Q V	.	.	.	.
10.417	11.1884	41.65	Q V	.	.	.	.
10.500	11.4801	42.36	Q V	.	.	.	.
10.583	11.7769	43.08	.Q V	.	.	.	.
10.667	12.0786	43.82	.Q V	.	.	.	.
10.750	12.3855	44.56	.Q V	.	.	.	.
10.833	12.6976	45.32	.Q V	.	.	.	.
10.917	13.0151	46.09	.Q V	.	.	.	.
11.000	13.3380	46.89	.Q V	.	.	.	.
11.083	13.6664	47.69	.Q V	.	.	.	.
11.167	14.0006	48.52	.Q V	.	.	.	.
11.250	14.3405	49.35	.Q V	.	.	.	.
11.333	14.6863	50.21	.Q V	.	.	.	.
11.417	15.0382	51.09	.Q V	.	.	.	.
11.500	15.3962	51.99	.Q V	.	.	.	.
11.583	15.7606	52.91	.Q V	.	.	.	.
11.667	16.1315	53.85	.Q V	.	.	.	.
11.750	16.5090	54.81	.Q V	.	.	.	.
11.833	16.8933	55.81	.Q V	.	.	.	.
11.917	17.2847	56.82	.Q V	.	.	.	.
12.000	17.6832	57.87	.Q V	.	.	.	.
12.083	18.0538	53.82	.Q V	.	.	.	.
12.167	18.3866	48.31	.Q V	.	.	.	.
12.250	18.7378	50.99	.Q V	.	.	.	.
12.333	19.1169	55.06	.Q V	.	.	.	.
12.417	19.5115	57.28	.Q V	.	.	.	.
12.500	19.9176	58.97	.Q V	.	.	.	.
12.583	20.3334	60.38	.Q V	.	.	.	.
12.667	20.7585	61.72	.Q V	.	.	.	.
12.750	21.1927	63.05	.Q V	.	.	.	.
12.833	21.6364	64.43	.Q V	.	.	.	.
12.917	22.0897	65.81	.Q V	.	.	.	.
13.000	22.5529	67.26	.Q V	.	.	.	.
13.083	23.0264	68.75	.Q V	.	.	.	.
13.167	23.5107	70.32	.Q V	.	.	.	.
13.250	24.0062	71.95	.Q V	.	.	.	.
13.333	24.5135	73.66	.Q V	.	.	.	.
13.417	25.0331	75.44	.Q V	.	.	.	.
13.500	25.5656	77.32	.Q V	.	.	.	.
13.583	26.1116	79.28	.Q V	.	.	.	.
13.667	26.6719	81.35	.Q V	.	.	.	.
13.750	27.2471	83.53	.Q V	.	.	.	.
13.833	27.8383	85.83	. Q V	.	.	.	.
13.917	28.4461	88.26	. Q V	.	.	.	.
14.000	29.0718	90.85	. Q V	.	.	.	.
14.083	29.7167	93.64	. Q V	.	.	.	.

14.167	30.3827	96.70	. Q V . . . .
14.250	31.0707	99.90	. Q V . . . .
14.333	31.7820	103.28	. Q V. . . .
14.417	32.5181	106.88	. Q V. . . .
14.500	33.2809	110.77	. Q V. . . .
14.583	34.0726	114.96	. Q V. . . .
14.667	34.8959	119.54	. Q V. . . .
14.750	35.7534	124.51	. Q V . . .
14.833	36.6488	130.02	. Q V . . .
14.917	37.5860	136.07	. Q V . . .
15.000	38.5698	142.85	. Q V . . .
15.083	39.6058	150.42	. Q .V . . .
15.167	40.7010	159.04	. Q .V . . .
15.250	41.8641	168.87	. Q .V . . .
15.333	43.1058	180.30	. Q . V . . .
15.417	44.4448	194.42	. Q . V . . .
15.500	45.9044	211.93	. Q . V . . .
15.583	47.5065	232.63	. Q . V . . .
15.667	49.2822	257.84	. Q . V . . .
15.750	51.2853	290.84	. Q . V . . .
15.833	53.6005	336.17	. Q . V . . .
15.917	56.4506	413.83	. Q. V . . .
16.000	60.3060	559.80	. . Q V . . .
16.083	68.1844	1143.96	. . V. Q . .
16.167	79.4910	1641.71	. . . V . Q .
16.250	87.9115	1222.66	. . . V Q . .
16.333	92.8605	718.59	. . Q . V . .
16.417	96.1183	473.03	. .Q . V . .
16.500	98.4322	335.98	. Q . V . .
16.583	100.2259	260.45	. Q . V . .
16.667	101.7049	214.75	. Q . V . .
16.750	102.9816	185.38	. Q . V. .
16.833	104.1065	163.33	. Q . V. .
16.917	105.1390	149.93	. Q . V. .
17.000	106.0981	139.26	. Q . V .
17.083	106.9960	130.37	. Q . V .
17.167	107.8414	122.75	. Q . V .
17.250	108.6418	116.22	. Q . V .
17.333	109.4033	110.57	. Q . .V .
17.417	110.1306	105.60	. Q . .V .
17.500	110.8275	101.18	. Q . .V .
17.583	111.4970	97.22	. Q . .V .
17.667	112.1420	93.64	. Q . .V .
17.750	112.7645	90.39	. Q . .V .
17.833	113.3666	87.42	. Q . . V .
17.917	113.9499	84.69	.Q . . V .
18.000	114.5158	82.17	.Q . . V .
18.083	115.0742	81.07	.Q . . V .
18.167	115.6354	81.49	.Q . . V .
18.250	116.1945	81.18	.Q . . V .
18.333	116.7452	79.96	.Q . . . V .
18.417	117.2855	78.45	.Q . . . V .
18.500	117.8148	76.86	.Q . . . V .
18.583	118.3334	75.29	.Q . . . V .
18.667	118.8415	73.78	.Q . . . V .
18.750	119.3397	72.33	.Q . . . V .
18.833	119.8283	70.95	.Q . . . V .
18.917	120.3078	69.63	.Q . . . V .
19.000	120.7787	68.38	.Q . . . V .
19.083	121.2414	67.18	.Q . . . V .

19.167	121.6963	66.04	.Q	.	.	.	V .
19.250	122.1436	64.95	.Q	.	.	.	V .
19.333	122.5838	63.91	.Q	.	.	.	V .
19.417	123.0171	62.91	.Q	.	.	.	V .
19.500	123.4438	61.95	.Q	.	.	.	V .
19.583	123.8641	61.03	.Q	.	.	.	V .
19.667	124.2784	60.15	.Q	.	.	.	V .
19.750	124.6868	59.30	.Q	.	.	.	V .
19.833	125.0895	58.48	.Q	.	.	.	V .
19.917	125.4868	57.69	.Q	.	.	.	V .
20.000	125.8789	56.93	.Q	.	.	.	V .
20.083	126.2659	56.19	.Q	.	.	.	V .
20.167	126.6480	55.48	.Q	.	.	.	V .
20.250	127.0254	54.80	.Q	.	.	.	V .
20.333	127.3982	54.13	.Q	.	.	.	V .
20.417	127.7666	53.49	.Q	.	.	.	V .
20.500	128.1307	52.87	.Q	.	.	.	V .
20.583	128.4906	52.26	.Q	.	.	.	V .
20.667	128.8466	51.68	.Q	.	.	.	V .
20.750	129.1985	51.11	.Q	.	.	.	V .
20.833	129.5467	50.56	.Q	.	.	.	V .
20.917	129.8912	50.02	.Q	.	.	.	V .
21.000	130.2321	49.50	.Q	.	.	.	V .
21.083	130.5696	48.99	.Q	.	.	.	V .
21.167	130.9036	48.50	.Q	.	.	.	V .
21.250	131.2343	48.02	.Q	.	.	.	V .
21.333	131.5618	47.55	.Q	.	.	.	V .
21.417	131.8861	47.09	.Q	.	.	.	V .
21.500	132.2074	46.65	.Q	.	.	.	V .
21.583	132.5257	46.22	.Q	.	.	.	V .
21.667	132.8411	45.80	.Q	.	.	.	V .
21.750	133.1537	45.38	.Q	.	.	.	V .
21.833	133.4635	44.98	.Q	.	.	.	V .
21.917	133.7706	44.59	.Q	.	.	.	V .
22.000	134.0750	44.21	.Q	.	.	.	V .
22.083	134.3769	43.83	.Q	.	.	.	V .
22.167	134.6762	43.46	.Q	.	.	.	V .
22.250	134.9731	43.11	.Q	.	.	.	V .
22.333	135.2676	42.75	.Q	.	.	.	V .
22.417	135.5596	42.41	Q	.	.	.	V .
22.500	135.8494	42.08	Q	.	.	.	V .
22.583	136.1369	41.75	Q	.	.	.	V .
22.667	136.4222	41.42	Q	.	.	.	V .
22.750	136.7053	41.11	Q	.	.	.	V .
22.833	136.9863	40.80	Q	.	.	.	V .
22.917	137.2652	40.50	Q	.	.	.	V .
23.000	137.5421	40.20	Q	.	.	.	V .
23.083	137.8170	39.91	Q	.	.	.	V.
23.167	138.0898	39.62	Q	.	.	.	V.
23.250	138.3608	39.34	Q	.	.	.	V.
23.333	138.6299	39.07	Q	.	.	.	V.
23.417	138.8971	38.80	Q	.	.	.	V.
23.500	139.1625	38.53	Q	.	.	.	V.
23.583	139.4261	38.27	Q	.	.	.	V.
23.667	139.6879	38.02	Q	.	.	.	V.
23.750	139.9480	37.77	Q	.	.	.	V.
23.833	140.2065	37.52	Q	.	.	.	V.
23.917	140.4632	37.28	Q	.	.	.	V.
24.000	140.7183	37.04	Q	.	.	.	V.
24.083	140.9268	30.27	Q	.	.	.	V.

```
  24.167    141.0390     16.29  Q          .          .          .         V.
  24.250    141.0866      6.91  Q          .          .          .         V.
  24.333    141.1076      3.05  Q          .          .          .         V.
  24.417    141.1166      1.31  Q          .          .          .         V.
  24.500    141.1205      0.56  Q          .          .          .         V.
  24.583    141.1219      0.22  Q          .          .          .         V.
  24.667    141.1224      0.07  Q          .          .          .          V
  24.750    141.1224      0.00  Q          .          .          .          V

+-----------------------------------------------------------------------------+
| END OF ANALYSIS                                                             |
|                                                                             |
|                                                                             |
+-----------------------------------------------------------------------------+
===============================================================================

  END OF FLOODSCx ROUTING ANALYSIS
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100-YEAR HYDROGRAPH CALCULATIONS
POST-DEVELOPMENT CONDITIONS

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

              F L O O D    R O U T I N G     A N A L Y S I S

                      ACCORDING TO COUNTY OF SAN DIEGO
  DEPARTMENT OF PUBLIC WORKS FLOOD CONTROL DIVISION HYDROLOGY MANUAL(2003)
         (c) Copyright 1989-2004 Advanced Engineering Software (aes)
             Ver. 10.0  Release Date: 01/01/2004  License ID 1503

                           Analysis prepared by:

                             LANDMARK CONSULTING
                         9555 GENESEE AVE. SUITE 200
                             SAN DIEGO, CA 92121
                    TEL:  858-587-8070, FAX:  858-587-8750

 ************************** DESCRIPTION OF STUDY **************************
* LILAC HILLS RANCH                                                      *
* IMPLEMENTATION TM                                                      *
* POST-DEVELOPMENT CONDITIONS                                            *
 ************************************************************************

  FILE NAME: 1037I1P.DAT
  TIME/DATE OF STUDY: 15:56 04/04/2012


************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =   1
------------------------------------------------------------------------
  >>>>>SUBAREA RUNOFF (UNIT-HYDROGRAPH ANALYSIS)<<<<<
========================================================================

      (UNIT-HYDROGRAPH ADDED TO STREAM #1)

         WATERCOURSE LENGTH =    6606.000 FEET
         LENGTH FROM CONCENTRATION POINT TO CENTROID =    3090.000 FEET
         ELEVATION VARIATION ALONG WATERCOURSE =     406.000 FEET
         BASIN FACTOR = 0.015
         WATERSHED AREA =     396.300 ACRES
         BASEFLOW =   0.000 CFS/SQUARE-MILE
         WATERCOURSE "LAG" TIME =    0.107 HOURS
         * Instantaneous Unit-Hydrograph Option Selected.
          CAUTION: LAG TIME IS LESS THAN 0.75 HOURS.
          THE 5-MINUTE PERIOD UH MODEL (USED IN THIS COMPUTER PROGRAM)
          MAY BE TOO LARGE FOR PEAK FLOW ESTIMATES.
         S.C.S. S-GRAPH SELECTED
         WATERSHED RUNOFF CURVE NUMBER =  87.00

         SPECIFIED PEAK  5-MINUTES RAINFALL(INCH)=  0.77
         SPECIFIED PEAK 30-MINUTES RAINFALL(INCH)=  1.45
         SPECIFIED PEAK  1-HOUR RAINFALL(INCH) =  1.86
         SPECIFIED PEAK  3-HOUR RAINFALL(INCH) =  2.74
         SPECIFIED PEAK  6-HOUR RAINFALL(INCH) =  3.50
         SPECIFIED PEAK 24-HOUR RAINFALL(INCH) =  6.00
```

24-HOUR NESTED DESIGN STORM DISTRIBUTION SELECTED
(Ref: San Diego County Hydrology Manual)

PRECIPITATION DEPTH-AREA REDUCTION FACTORS:
  5-MINUTE FACTOR = 0.993
 30-MINUTE FACTOR = 0.993
  1-HOUR FACTOR = 0.996
  3-HOUR FACTOR = 0.998
  6-HOUR FACTOR = 0.998
 24-HOUR FACTOR = 0.999

UNIT HYDROGRAPH TIME UNIT =   5.000 MINUTES
UNIT INTERVAL PERCENTAGE OF LAG-TIME = 78.179

UNIT HYDROGRAPH DETERMINATION

INTERVAL NUMBER	"q/qp" GRAPH VALUES	UNIT HYDROGRAPH ORDINATES(CFS)
1	0.991	3231.131
2	0.382	1245.081
3	0.089	289.969
4	0.020	65.801
5	0.005	15.186
6	0.000	0.000

UNIT PERIOD (NUMBER)	UNIT RAINFALL (INCHES)	UNIT SOIL-LOSS (INCHES)	EFFECTIVE RAINFALL (INCHES)
1	0.0081	0.0081	0.0000
2	0.0081	0.0081	0.0000
3	0.0082	0.0082	0.0000
4	0.0082	0.0082	0.0000
5	0.0082	0.0082	0.0000
6	0.0082	0.0082	0.0000
7	0.0083	0.0083	0.0000
8	0.0083	0.0083	0.0000
9	0.0083	0.0083	0.0000
10	0.0083	0.0083	0.0000
11	0.0084	0.0084	0.0000
12	0.0084	0.0084	0.0000
13	0.0084	0.0084	0.0000
14	0.0085	0.0085	0.0000
15	0.0085	0.0085	0.0000
16	0.0085	0.0085	0.0000
17	0.0086	0.0086	0.0000
18	0.0086	0.0086	0.0000
19	0.0086	0.0086	0.0000
20	0.0086	0.0086	0.0000
21	0.0087	0.0087	0.0000
22	0.0087	0.0087	0.0000
23	0.0087	0.0087	0.0000
24	0.0088	0.0088	0.0000
25	0.0088	0.0088	0.0000
26	0.0088	0.0088	0.0000
27	0.0089	0.0089	0.0000
28	0.0089	0.0089	0.0000
29	0.0089	0.0089	0.0000
30	0.0090	0.0090	0.0000
31	0.0090	0.0090	0.0000
32	0.0090	0.0090	0.0000
33	0.0091	0.0091	0.0000
34	0.0091	0.0091	0.0000
35	0.0091	0.0091	0.0000
36	0.0092	0.0091	0.0001
37	0.0092	0.0090	0.0002
38	0.0092	0.0089	0.0003
39	0.0093	0.0089	0.0004
40	0.0093	0.0088	0.0005
41	0.0094	0.0087	0.0006
42	0.0094	0.0086	0.0007
43	0.0094	0.0086	0.0008
44	0.0095	0.0085	0.0009
45	0.0095	0.0085	0.0011
46	0.0095	0.0084	0.0012
47	0.0096	0.0083	0.0013
48	0.0096	0.0082	0.0014
49	0.0097	0.0082	0.0015
50	0.0097	0.0081	0.0016
51	0.0098	0.0081	0.0017
52	0.0098	0.0080	0.0018
53	0.0098	0.0080	0.0019
54	0.0099	0.0079	0.0020
55	0.0099	0.0078	0.0021

56	0.0100	0.0078	0.0022
57	0.0100	0.0077	0.0023
58	0.0100	0.0077	0.0024
59	0.0101	0.0076	0.0025
60	0.0101	0.0075	0.0026
61	0.0102	0.0075	0.0027
62	0.0102	0.0074	0.0028
63	0.0103	0.0074	0.0029
64	0.0103	0.0073	0.0030
65	0.0104	0.0073	0.0031
66	0.0104	0.0072	0.0032
67	0.0105	0.0072	0.0033
68	0.0105	0.0071	0.0034
69	0.0106	0.0071	0.0035
70	0.0106	0.0070	0.0036
71	0.0107	0.0070	0.0037
72	0.0107	0.0070	0.0038
73	0.0108	0.0069	0.0039
74	0.0108	0.0069	0.0040
75	0.0109	0.0068	0.0041
76	0.0110	0.0068	0.0042
77	0.0110	0.0067	0.0043
78	0.0111	0.0067	0.0044
79	0.0112	0.0067	0.0045
80	0.0112	0.0066	0.0046
81	0.0113	0.0066	0.0047
82	0.0113	0.0065	0.0048
83	0.0114	0.0065	0.0049
84	0.0114	0.0064	0.0050
85	0.0115	0.0064	0.0051
86	0.0116	0.0064	0.0052
87	0.0117	0.0063	0.0053
88	0.0117	0.0063	0.0054
89	0.0118	0.0063	0.0055
90	0.0118	0.0062	0.0056
91	0.0119	0.0062	0.0057
92	0.0120	0.0062	0.0058
93	0.0121	0.0061	0.0059
94	0.0121	0.0061	0.0060
95	0.0122	0.0061	0.0062
96	0.0123	0.0060	0.0063
97	0.0124	0.0060	0.0064
98	0.0124	0.0060	0.0065
99	0.0126	0.0060	0.0066
100	0.0126	0.0059	0.0067
101	0.0127	0.0059	0.0068
102	0.0128	0.0059	0.0069
103	0.0129	0.0058	0.0071
104	0.0129	0.0058	0.0072
105	0.0131	0.0058	0.0073
106	0.0131	0.0057	0.0074
107	0.0133	0.0057	0.0075
108	0.0133	0.0057	0.0076
109	0.0134	0.0057	0.0078
110	0.0135	0.0056	0.0079
111	0.0136	0.0056	0.0080
112	0.0137	0.0056	0.0081
113	0.0139	0.0056	0.0083
114	0.0139	0.0055	0.0084
115	0.0141	0.0055	0.0085

116	0.0141	0.0055	0.0086
117	0.0143	0.0055	0.0088
118	0.0144	0.0055	0.0089
119	0.0145	0.0055	0.0091
120	0.0146	0.0054	0.0092
121	0.0148	0.0054	0.0094
122	0.0149	0.0054	0.0095
123	0.0150	0.0054	0.0097
124	0.0151	0.0053	0.0098
125	0.0153	0.0053	0.0100
126	0.0154	0.0053	0.0101
127	0.0156	0.0053	0.0103
128	0.0157	0.0053	0.0104
129	0.0159	0.0053	0.0106
130	0.0160	0.0053	0.0107
131	0.0162	0.0053	0.0109
132	0.0163	0.0052	0.0111
133	0.0165	0.0052	0.0113
134	0.0166	0.0052	0.0114
135	0.0169	0.0052	0.0117
136	0.0170	0.0052	0.0118
137	0.0172	0.0052	0.0121
138	0.0174	0.0052	0.0122
139	0.0176	0.0052	0.0125
140	0.0178	0.0051	0.0126
141	0.0180	0.0052	0.0129
142	0.0182	0.0051	0.0131
143	0.0185	0.0052	0.0133
144	0.0186	0.0051	0.0135
145	0.0101	0.0027	0.0073
146	0.0176	0.0047	0.0128
147	0.0179	0.0048	0.0131
148	0.0181	0.0048	0.0133
149	0.0184	0.0048	0.0136
150	0.0186	0.0048	0.0138
151	0.0190	0.0048	0.0142
152	0.0192	0.0048	0.0144
153	0.0196	0.0048	0.0147
154	0.0198	0.0048	0.0150
155	0.0202	0.0049	0.0154
156	0.0205	0.0049	0.0156
157	0.0210	0.0049	0.0160
158	0.0212	0.0049	0.0163
159	0.0217	0.0050	0.0168
160	0.0220	0.0050	0.0171
161	0.0226	0.0050	0.0176
162	0.0229	0.0050	0.0179
163	0.0236	0.0051	0.0185
164	0.0239	0.0051	0.0189
165	0.0247	0.0052	0.0195
166	0.0251	0.0052	0.0199
167	0.0259	0.0052	0.0206
168	0.0263	0.0053	0.0211
169	0.0274	0.0054	0.0220
170	0.0279	0.0054	0.0225
171	0.0289	0.0055	0.0234
172	0.0295	0.0055	0.0240
173	0.0308	0.0057	0.0251
174	0.0315	0.0057	0.0258
175	0.0330	0.0058	0.0271

176	0.0338	0.0059	0.0279
177	0.0356	0.0061	0.0295
178	0.0366	0.0061	0.0305
179	0.0389	0.0064	0.0325
180	0.0401	0.0064	0.0337
181	0.0430	0.0067	0.0363
182	0.0447	0.0068	0.0378
183	0.0486	0.0073	0.0413
184	0.0508	0.0074	0.0434
185	0.0573	0.0081	0.0492
186	0.0606	0.0084	0.0523
187	0.0692	0.0092	0.0600
188	0.0749	0.0096	0.0652
189	0.0903	0.0112	0.0791
190	0.1029	0.0122	0.0907
191	0.1511	0.0169	0.1342
192	0.2129	0.0220	0.1909
193	0.7629	0.0649	0.6981
194	0.1212	0.0087	0.1125
195	0.0820	0.0057	0.0763
196	0.0645	0.0043	0.0602
197	0.0534	0.0035	0.0499
198	0.0465	0.0030	0.0435
199	0.0415	0.0027	0.0389
200	0.0377	0.0024	0.0353
201	0.0347	0.0022	0.0325
202	0.0322	0.0020	0.0302
203	0.0301	0.0018	0.0283
204	0.0284	0.0017	0.0267
205	0.0268	0.0016	0.0252
206	0.0255	0.0015	0.0239
207	0.0243	0.0014	0.0229
208	0.0232	0.0014	0.0219
209	0.0223	0.0013	0.0210
210	0.0215	0.0012	0.0202
211	0.0207	0.0012	0.0195
212	0.0200	0.0011	0.0189
213	0.0194	0.0011	0.0183
214	0.0188	0.0011	0.0177
215	0.0182	0.0010	0.0172
216	0.0177	0.0010	0.0167
217	0.0188	0.0010	0.0178
218	0.0183	0.0010	0.0173
219	0.0179	0.0010	0.0169
220	0.0175	0.0009	0.0166
221	0.0171	0.0009	0.0162
222	0.0168	0.0009	0.0159
223	0.0164	0.0009	0.0155
224	0.0161	0.0009	0.0152
225	0.0158	0.0008	0.0150
226	0.0155	0.0008	0.0147
227	0.0152	0.0008	0.0144
228	0.0149	0.0008	0.0142
229	0.0147	0.0008	0.0139
230	0.0145	0.0007	0.0137
231	0.0142	0.0007	0.0135
232	0.0140	0.0007	0.0133
233	0.0138	0.0007	0.0131
234	0.0136	0.0007	0.0129
235	0.0134	0.0007	0.0127

236	0.0132	0.0007	0.0125
237	0.0130	0.0007	0.0124
238	0.0128	0.0006	0.0122
239	0.0127	0.0006	0.0120
240	0.0125	0.0006	0.0119
241	0.0123	0.0006	0.0117
242	0.0122	0.0006	0.0116
243	0.0120	0.0006	0.0114
244	0.0119	0.0006	0.0113
245	0.0118	0.0006	0.0112
246	0.0116	0.0006	0.0111
247	0.0115	0.0006	0.0109
248	0.0114	0.0005	0.0108
249	0.0112	0.0005	0.0107
250	0.0111	0.0005	0.0106
251	0.0110	0.0005	0.0105
252	0.0109	0.0005	0.0104
253	0.0108	0.0005	0.0103
254	0.0107	0.0005	0.0102
255	0.0106	0.0005	0.0101
256	0.0105	0.0005	0.0100
257	0.0104	0.0005	0.0099
258	0.0103	0.0005	0.0098
259	0.0102	0.0005	0.0097
260	0.0101	0.0005	0.0096
261	0.0100	0.0005	0.0095
262	0.0099	0.0005	0.0094
263	0.0098	0.0005	0.0094
264	0.0097	0.0004	0.0093
265	0.0096	0.0004	0.0092
266	0.0096	0.0004	0.0091
267	0.0095	0.0004	0.0091
268	0.0094	0.0004	0.0090
269	0.0093	0.0004	0.0089
270	0.0093	0.0004	0.0088
271	0.0092	0.0004	0.0088
272	0.0091	0.0004	0.0087
273	0.0090	0.0004	0.0086
274	0.0090	0.0004	0.0086
275	0.0089	0.0004	0.0085
276	0.0088	0.0004	0.0085
277	0.0088	0.0004	0.0084
278	0.0087	0.0004	0.0083
279	0.0087	0.0004	0.0083
280	0.0086	0.0004	0.0082
281	0.0085	0.0004	0.0082
282	0.0085	0.0004	0.0081
283	0.0084	0.0004	0.0081
284	0.0084	0.0004	0.0080
285	0.0083	0.0004	0.0079
286	0.0083	0.0004	0.0079
287	0.0082	0.0004	0.0078
288	0.0082	0.0004	0.0078

TOTAL STORM RAINFALL(INCHES) = 5.99
TOTAL SOIL-LOSS(INCHES) = 1.48
TOTAL EFFECTIVE RAINFALL(INCHES) = 4.51

TOTAL SOIL-LOSS VOLUME(ACRE-FEET) = 48.9587

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    TOTAL STORM RUNOFF VOLUME(ACRE-FEET) =     150.5591
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2 4 - H O U R S T O R M
R U N O F F H Y D R O G R A P H

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HYDROGRAPH IN FIVE-MINUTE UNIT INTERVALS(CFS)
(Note: Time indicated is at END of Each Unit Intervals)

TIME(HRS)	VOLUME(AF)	Q(CFS)	0.	650.0	1300.0	1950.0	2600.0
0.083	0.0000	0.00	Q	.	.	.	.
0.167	0.0000	0.00	Q	.	.	.	.
0.250	0.0000	0.00	Q	.	.	.	.
0.333	0.0000	0.00	Q	.	.	.	.
0.417	0.0000	0.00	Q	.	.	.	.
0.500	0.0000	0.00	Q	.	.	.	.
0.583	0.0000	0.00	Q	.	.	.	.
0.667	0.0000	0.00	Q	.	.	.	.
0.750	0.0000	0.00	Q	.	.	.	.
0.833	0.0000	0.00	Q	.	.	.	.
0.917	0.0000	0.00	Q	.	.	.	.
1.000	0.0000	0.00	Q	.	.	.	.
1.083	0.0000	0.00	Q	.	.	.	.
1.167	0.0000	0.00	Q	.	.	.	.
1.250	0.0000	0.00	Q	.	.	.	.
1.333	0.0000	0.00	Q	.	.	.	.
1.417	0.0000	0.00	Q	.	.	.	.
1.500	0.0000	0.00	Q	.	.	.	.
1.583	0.0000	0.00	Q	.	.	.	.
1.667	0.0000	0.00	Q	.	.	.	.
1.750	0.0000	0.00	Q	.	.	.	.
1.833	0.0000	0.00	Q	.	.	.	.
1.917	0.0000	0.00	Q	.	.	.	.
2.000	0.0000	0.00	Q	.	.	.	.
2.083	0.0000	0.00	Q	.	.	.	.
2.167	0.0000	0.00	Q	.	.	.	.
2.250	0.0000	0.00	Q	.	.	.	.
2.333	0.0000	0.00	Q	.	.	.	.
2.417	0.0000	0.00	Q	.	.	.	.
2.500	0.0000	0.00	Q	.	.	.	.
2.583	0.0000	0.00	Q	.	.	.	.
2.667	0.0000	0.00	Q	.	.	.	.
2.750	0.0000	0.00	Q	.	.	.	.
2.833	0.0000	0.00	Q	.	.	.	.
2.917	0.0001	0.01	Q	.	.	.	.
3.000	0.0019	0.26	Q	.	.	.	.
3.083	0.0068	0.72	Q	.	.	.	.
3.167	0.0154	1.24	Q	.	.	.	.
3.250	0.0275	1.77	Q	.	.	.	.
3.333	0.0433	2.29	Q	.	.	.	.
3.417	0.0628	2.82	Q	.	.	.	.
3.500	0.0858	3.34	Q	.	.	.	.
3.583	0.1124	3.87	Q	.	.	.	.
3.667	0.1426	4.38	Q	.	.	.	.
3.750	0.1764	4.90	Q	.	.	.	.
3.833	0.2136	5.41	Q	.	.	.	.
3.917	0.2544	5.92	Q	.	.	.	.
4.000	0.2986	6.42	Q	.	.	.	.
4.083	0.3464	6.93	Q	.	.	.	.

4.167	0.3976	7.43	Q	.	.	.	.
4.250	0.4522	7.94	Q	.	.	.	.
4.333	0.5103	8.43	Q	.	.	.	.
4.417	0.5718	8.93	Q	.	.	.	.
4.500	0.6368	9.42	Q	.	.	.	.
4.583	0.7051	9.92	Q	.	.	.	.
4.667	0.7768	10.41	Q	.	.	.	.
4.750	0.8519	10.91	Q	.	.	.	.
4.833	0.9304	11.39	Q	.	.	.	.
4.917	1.0122	11.89	Q	.	.	.	.
5.000	1.0974	12.37	Q	.	.	.	.
5.083	1.1860	12.86	Q	.	.	.	.
5.167	1.2778	13.34	Q	.	.	.	.
5.250	1.3731	13.83	Q	.	.	.	.
5.333	1.4716	14.30	Q	.	.	.	.
5.417	1.5735	14.80	Q	.	.	.	.
5.500	1.6787	15.27	Q	.	.	.	.
5.583	1.7873	15.77	Q	.	.	.	.
5.667	1.8991	16.24	Q	.	.	.	.
5.750	2.0143	16.73	Q	.	.	.	.
5.833	2.1328	17.20	Q	.	.	.	.
5.917	2.2547	17.70	Q	.	.	.	.
6.000	2.3798	18.16	Q	.	.	.	.
6.083	2.5083	18.66	Q	.	.	.	.
6.167	2.6400	19.13	Q	.	.	.	.
6.250	2.7752	19.63	Q	.	.	.	.
6.333	2.9137	20.10	Q	.	.	.	.
6.417	3.0555	20.60	Q	.	.	.	.
6.500	3.2006	21.07	Q	.	.	.	.
6.583	3.3492	21.57	Q	.	.	.	.
6.667	3.5010	22.04	Q	.	.	.	.
6.750	3.6564	22.55	Q	.	.	.	.
6.833	3.8149	23.02	QV	.	.	.	.
6.917	3.9770	23.54	QV	.	.	.	.
7.000	4.1424	24.01	QV	.	.	.	.
7.083	4.3113	24.53	QV	.	.	.	.
7.167	4.4836	25.00	QV	.	.	.	.
7.250	4.6594	25.53	QV	.	.	.	.
7.333	4.8385	26.01	QV	.	.	.	.
7.417	5.0212	26.53	QV	.	.	.	.
7.500	5.2073	27.02	QV	.	.	.	.
7.583	5.3970	27.55	QV	.	.	.	.
7.667	5.5902	28.04	QV	.	.	.	.
7.750	5.7870	28.58	QV	.	.	.	.
7.833	5.9872	29.07	QV	.	.	.	.
7.917	6.1912	29.62	QV	.	.	.	.
8.000	6.3987	30.12	QV	.	.	.	.
8.083	6.6099	30.68	QV	.	.	.	.
8.167	6.8247	31.18	QV	.	.	.	.
8.250	7.0433	31.75	QV	.	.	.	.
8.333	7.2655	32.26	QV	.	.	.	.
8.417	7.4916	32.84	QV	.	.	.	.
8.500	7.7213	33.35	Q V	.	.	.	.
8.583	7.9551	33.94	Q V	.	.	.	.
8.667	8.1924	34.47	Q V	.	.	.	.
8.750	8.4340	35.07	Q V	.	.	.	.
8.833	8.6791	35.60	Q V	.	.	.	.
8.917	8.9286	36.22	Q V	.	.	.	.
9.000	9.1817	36.76	Q V	.	.	.	.
9.083	9.4392	37.39	Q V	.	.	.	.

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 9.167      9.7005     37.94  Q V       .         .         .         .
 9.250      9.9663     38.59  Q V       .         .         .         .
 9.333     10.2359     39.15  Q V       .         .         .         .
 9.417     10.5101     39.81  Q V       .         .         .         .
 9.500     10.7883     40.39  Q V       .         .         .         .
 9.583     11.0711     41.07  Q V       .         .         .         .
 9.667     11.3580     41.66  Q  V      .         .         .         .
 9.750     11.6498     42.36  Q  V      .         .         .         .
 9.833     11.9457     42.97  Q  V      .         .         .         .
 9.917     12.2467     43.69  Q  V      .         .         .         .
10.000     12.5518     44.31  Q  V      .         .         .         .
10.083     12.8622     45.06  Q  V      .         .         .         .
10.167     13.1769     45.70  Q  V      .         .         .         .
10.250     13.4969     46.47  Q  V      .         .         .         .
10.333     13.8215     47.13  Q  V      .         .         .         .
10.417     14.1516     47.93  Q  V      .         .         .         .
10.500     14.4864     48.61  Q  V      .         .         .         .
10.583     14.8269     49.44  Q  V      .         .         .         .
10.667     15.1723     50.14  Q   V     .         .         .         .
10.750     15.5235     51.01  Q   V     .         .         .         .
10.833     15.8799     51.74  Q   V     .         .         .         .
10.917     16.2424     52.64  Q   V     .         .         .         .
11.000     16.6101     53.39  Q   V     .         .         .         .
11.083     16.9843     54.33  Q   V     .         .         .         .
11.167     17.3639     55.12  Q   V     .         .         .         .
11.250     17.7502     56.10  Q   V     .         .         .         .
11.333     18.1423     56.92  Q   V     .         .         .         .
11.417     18.5414     57.95  Q   V     .         .         .         .
11.500     18.9464     58.81  Q    V    .         .         .         .
11.583     19.3589     59.89  Q    V    .         .         .         .
11.667     19.7776     60.79  Q    V    .         .         .         .
11.750     20.2041     61.93  Q    V    .         .         .         .
11.833     20.6371     62.88  Q    V    .         .         .         .
11.917     21.0785     64.08  Q    V    .         .         .         .
12.000     21.5267     65.08  .Q   V    .         .         .         .
12.083     21.8396     45.43  Q    V    .         .         .         .
12.167     22.2221     55.54  Q    V    .         .         .         .
12.250     22.6461     61.56  Q     V   .         .         .         .
12.333     23.0849     63.71  Q     V   .         .         .         .
12.417     23.5348     65.32  .Q    V   .         .         .         .
12.500     23.9928     66.51  .Q    V   .         .         .         .
12.583     24.4609     67.97  .Q    V   .         .         .         .
12.667     24.9371     69.15  .Q    V   .         .         .         .
12.750     25.4242     70.73  .Q    V   .         .         .         .
12.833     25.9201     72.00  .Q    V   .         .         .         .
12.917     26.4277     73.70  .Q     V  .         .         .         .
13.000     26.9448     75.08  .Q     V  .         .         .         .
13.083     27.4746     76.93  .Q     V  .         .         .         .
13.167     28.0148     78.43  .Q     V  .         .         .         .
13.250     28.5689     80.46  .Q     V  .         .         .         .
13.333     29.1342     82.09  .Q     V  .         .         .         .
13.417     29.7149     84.32  .Q     V  .         .         .         .
13.500     30.3080     86.11  .Q      V .         .         .         .
13.583     30.9180     88.58  .Q      V .         .         .         .
13.667     31.5417     90.56  .Q      V .         .         .         .
13.750     32.1844     93.31  .Q      V .         .         .         .
13.833     32.8422     95.52  .Q      V .         .         .         .
13.917     33.5214     98.62  .Q      V .         .         .         .
14.000     34.2177    101.10  .Q       V.         .         .         .
14.083     34.9399    104.86  .Q       V.         .         .         .
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14.167	35.6821	107.77	.Q V. . . .
14.250	36.4522	111.81	.Q V. . . .
14.333	37.2446	115.06	.Q V. . . .
14.417	38.0692	119.73	.Q V . . .
14.500	38.9198	123.51	.Q V . . .
14.583	39.8085	129.04	.Q V . . .
14.667	40.7281	133.52	. Q V . . .
14.750	41.6935	140.18	. Q .V . . .
14.833	42.6963	145.61	. Q .V . . .
14.917	43.7557	153.83	. Q .V . . .
15.000	44.8617	160.60	. Q .V . . .
15.083	46.0400	171.08	. Q . V . . .
15.167	47.2783	179.81	. Q . V . . .
15.250	48.6127	193.76	. Q . V . . .
15.333	50.0286	205.59	. Q . V . . .
15.417	51.5986	227.97	. Q . V . . .
15.500	53.2932	246.05	. Q . V . . .
15.583	55.1984	276.63	. Q . V . . .
15.667	57.2954	304.48	. Q . V . . .
15.750	59.7644	358.50	. Q . V . . .
15.833	62.6242	415.26	. Q . V . . .
15.917	66.5817	574.62	. Q . V . . .
16.000	72.2036	816.29	. . Q V. . .
16.083	89.6922	2539.35	. . . V . Q.
16.167	98.6328	1298.17	. . Q. V . .
16.250	102.7895	603.56	. Q. . V . .
16.333	105.3442	370.94	. Q . . V . .
16.417	107.2469	276.27	. Q . . V . .
16.500	108.8092	226.84	. Q . . V . .
16.583	110.1819	199.33	. Q . . V. .
16.667	111.4171	179.35	. Q . . V. .
16.750	112.5463	163.95	. Q . . V. .
16.833	113.5904	151.61	. Q . . V .
16.917	114.5645	141.44	. Q . . V .
17.000	115.4796	132.88	. Q . . V .
17.083	116.3423	125.27	.Q . . V .
17.167	117.1604	118.79	.Q . . .V .
17.250	117.9398	113.16	.Q . . .V .
17.333	118.6850	108.20	.Q . . .V .
17.417	119.3996	103.76	.Q . . .V .
17.500	120.0867	99.77	.Q . . .V .
17.583	120.7489	96.15	.Q . . . V .
17.667	121.3884	92.86	.Q . . . V .
17.750	122.0071	89.84	.Q . . . V .
17.833	122.6067	87.06	.Q . . . V .
17.917	123.1887	84.50	.Q . . . V .
18.000	123.7543	82.13	.Q . . . V .
18.083	124.3373	84.65	.Q . . . V .
18.167	124.9183	84.36	.Q . . . V .
18.250	125.4884	82.79	.Q . . . V .
18.333	126.0463	81.00	.Q . . . V .
18.417	126.5921	79.25	.Q . . . V .
18.500	127.1264	77.58	.Q . . . V .
18.583	127.6498	76.00	.Q . . . V .
18.667	128.1628	74.50	.Q . . . V .
18.750	128.6661	73.07	.Q . . . V .
18.833	129.1600	71.72	.Q . . . V .
18.917	129.6452	70.44	.Q . . . V .
19.000	130.1218	69.21	.Q . . . V .
19.083	130.5904	68.04	.Q . . . V .

19.167	131.0513	66.92	.Q	.	.	.	V	.
19.250	131.5047	65.84	.Q	.	.	.	V	.
19.333	131.9511	64.82	Q	.	.	.	V	.
19.417	132.3908	63.83	Q	.	.	.	V	.
19.500	132.8239	62.88	Q	.	.	.	V	.
19.583	133.2507	61.97	Q	.	.	.	V	.
19.667	133.6715	61.10	Q	.	.	.	V	.
19.750	134.0864	60.26	Q	.	.	.	V	.
19.833	134.4958	59.44	Q	.	.	.	V	.
19.917	134.8998	58.66	Q	.	.	.	V	.
20.000	135.2986	57.90	Q	.	.	.	V	.
20.083	135.6923	57.17	Q	.	.	.	V	.
20.167	136.0811	56.46	Q	.	.	.	V	.
20.250	136.4653	55.78	Q	.	.	.	V	.
20.333	136.8448	55.11	Q	.	.	.	V	.
20.417	137.2200	54.47	Q	.	.	.	V	.
20.500	137.5908	53.85	Q	.	.	.	V	.
20.583	137.9575	53.25	Q	.	.	.	V	.
20.667	138.3202	52.66	Q	.	.	.	V	.
20.750	138.6789	52.09	Q	.	.	.	V	.
20.833	139.0339	51.54	Q	.	.	.	V	.
20.917	139.3851	51.00	Q	.	.	.	V	.
21.000	139.7327	50.48	Q	.	.	.	V	.
21.083	140.0769	49.97	Q	.	.	.	V	.
21.167	140.4176	49.47	Q	.	.	.	V	.
21.250	140.7550	48.99	Q	.	.	.	V	.
21.333	141.0891	48.52	Q	.	.	.	V	.
21.417	141.4201	48.06	Q	.	.	.	V	.
21.500	141.7480	47.61	Q	.	.	.	V	.
21.583	142.0730	47.18	Q	.	.	.	V	.
21.667	142.3949	46.75	Q	.	.	.	V	.
21.750	142.7141	46.34	Q	.	.	.	V	.
21.833	143.0304	45.93	Q	.	.	.	V	.
21.917	143.3440	45.54	Q	.	.	.	V	.
22.000	143.6550	45.15	Q	.	.	.	V	.
22.083	143.9633	44.77	Q	.	.	.	V	.
22.167	144.2691	44.40	Q	.	.	.	V	.
22.250	144.5724	44.04	Q	.	.	.	V	.
22.333	144.8733	43.68	Q	.	.	.	V	.
22.417	145.1718	43.34	Q	.	.	.	V	.
22.500	145.4679	43.00	Q	.	.	.	V	.
22.583	145.7617	42.67	Q	.	.	.	V	.
22.667	146.0533	42.34	Q	.	.	.	V	.
22.750	146.3427	42.02	Q	.	.	.	V	.
22.833	146.6300	41.71	Q	.	.	.	V	.
22.917	146.9151	41.40	Q	.	.	.	V	.
23.000	147.1982	41.10	Q	.	.	.	V	.
23.083	147.4793	40.81	Q	.	.	.	V	.
23.167	147.7583	40.52	Q	.	.	.	V	.
23.250	148.0354	40.23	Q	.	.	.	V	.
23.333	148.3106	39.96	Q	.	.	.	V	.
23.417	148.5839	39.68	Q	.	.	.	V	.
23.500	148.8553	39.41	Q	.	.	.	V	.
23.583	149.1250	39.15	Q	.	.	.	V	.
23.667	149.3928	38.89	Q	.	.	.	V	.
23.750	149.6589	38.64	Q	.	.	.	V	.
23.833	149.9233	38.39	Q	.	.	.	V	.
23.917	150.1860	38.14	Q	.	.	.	V	.
24.000	150.4470	37.90	Q	.	.	.	V	.
24.083	150.5340	12.62	Q	.	.	.	V	.

```
  24.167    150.5539      2.90  Q          .          .          .        V.
  24.250    150.5583      0.63  Q          .          .          .        V.
  24.333    150.5591      0.12  Q          .          .          .        V.
  24.417    150.5591      0.00  Q          .          .          .        V.
================================================================================

  END OF FLOODSCx ROUTING ANALYSIS
```

APPENDIX

HYDROLOGY MAPS

PRE-DEVELOPMENT HYDROLOGY MAP
LILAC HILLS RANCH, IMPLEMENTING TM
TM 5572

LEGEND

PROJECT BOUNDARY

MAJOR BASIN BOUNDARY

TRIBUTARY AREA BOUNDAY

FLOW PATH

NODE NUMBER 101

U/S NODE	D/S NODE	U/S FLEV	D/S FLEV	FLOW LENGTH	AREA	C	t
101	102	1042	1038	60	0.1	0.36	8.7
102	103	1038	826	2700	57.8	0.30	4.5
104	105	928	927	60	0.1	0.36	6.4
105	103	927	826	1200	20.7	0.30	4.5
103	106	826	794	780	12.7	0.30	4.0
107	108	958	956	60	0.1	0.30	7.1
108	106	956	794	1030	9.7	0.30	5.4
106	109	794	786	144	0.7	0.30	4.0
110	111	989	988	50	0.1	0.30	6.8
111	112	988	842	1340	18.2	0.36	5.2
113	114	978	977	50	0.1	0.36	7.5
114	112	977	842	1870	19.9	0.36	4.4
112	109	842	786	875	10.1	0.36	4.2
109	115	786	772	526	6.7	0.30	3.8
116	117	895.5	894	50	0.1	0.30	7.4
117	115	894	772	1120	9.1	0.30	5.1
115	118	772	636	1966	40.1	0.30	3.3
119	120	935.5	934	50	0.1	0.30	7.4
120	118	934	636	2105	26.9	0.30	4.4
121	122	937	936	50	0.1	0.30	6.8
122	123	936	800	1182	11.6	0.36	5.0
124	125	1015	1014	50	0.1	0.30	6.8
125	123	1014	800	2690	49.8	0.36	3.8
123	126	800	787	542	4.1	0.30	3.5
127	128	898	896	50	0.1	0.30	7.8
128	126	896	787	1470	15.9	0.36	4.2
126	129	787	720	1205	13.8	0.30	3.2
130	131	963	962	50	0.1	0.36	7.1
131	129	962	720	3400	55.6	0.30	3.4
129	118	720	636	770	11	0.30	3.0

A=395.5 Ac
V100=7.3 FPS
Q100=384.7 CFS

SCALE: 1"= 200'

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POST-DEVELOPMENT HYDROLOGY MAP
LILAC HILLS RANCH
TM 5572

US NODE	DS NODE	US ELEV.	DS ELEV.	FLOW LENGTH	AREA	C	I
101	102	978	977	50	0.1	0.54	8.5
102	103	977	894	1432	13.1	0.36	5.2
105	106	925.9	925	50	0.1	0.54	8.3
106	107	922	912	825	2.3	0.54	5.5
109	110	904.3	904	50	0.1	0.54	8.4
110	111	896	892	390	1.5	0.54	5.4
113	114	903.8	903	50	0.1	0.54	8.1
114	115	896	882	380	1.5	0.54	7.0
116	117	912	911	50	0.1	0.54	8.5
117	118	911	883	444	1.4	0.54	7.3
120	121	990	989	50	0.1	0.54	8.5
121	123	988	910	648	11.1	0.36	8.4
125	126	919.2	919	50	0.1	0.54	7.3
126	124	916	894	422	1.7	0.54	6.5
128	129	919.7	919	50	0.1	0.54	7.9
129	127	916	894	422	1.1	0.54	6.8
131	132	890	889	50	0.1	0.54	7.3
132	133	888	886	327	1.4	0.54	6.0
135	136	889	888	50	0.1	0.54	7.3
136	134	888	886	351	1.0	0.54	5.6
138	139	919.4	919	50	0.1	0.54	7.3
139	140	919	871	633	0.8	0.54	6.1
141	142	877	876	50	0.1	0.54	7.3
142	143	876	871	115	0.7	0.54	7.0
145	146	914	913	50	0.1	0.54	7.3
146	147	913	872	564	1.8	0.54	6.3
149	150	919.4	919	50	0.1	0.54	7.3
150	151	916	896	370	2.1	0.54	6.6
153	153	890	850	736	1.3	0.54	6.0
155	156	884	880	50	0.1	0.87	9.2
156	157	880	828	1237	4.5	0.54	9.1
160	161	874	864	50	0.1	0.87	9.2
161	162	864	830	1078	1.3	0.87	8.8
163	164	978	976	50	0.1	0.30	7.8
164	165	976	910	433	1.6	0.30	5.8
166	167	898	876	360	1.3	0.87	5.4
169	170	934	930	50	0.1	0.30	9.1
170	171	930	902	271	0.7	0.30	6.3
173	174	940	938	50	0.1	0.30	7.8
174	172	938	908	863	2.6	0.30	6.4
176	177	930.7	930	50	0.1	0.54	7.9
177	175	928	888	1200	4.5	0.54	5.4
175	178	888	870	395	2.6	0.54	5.1
180	181	931	930	50	0.1	0.54	7.3
181	179	930	870	1399	4.7	0.54	5.8
183	184	897.3	897	50	0.1	0.54	7.3
184	185	897	858	687	6.9	0.54	6.3
186	187	870	869	50	0.1	0.54	7.3
187	188	869	585	750	7.1	0.54	5.4
190	191	897.3	897	50	0.1	0.54	6.6

191	192	897	854	656	1.1	0.54	5.6
194	195	877	866	50	0.1	0.87	9.2
195	196	866	813	805	0.6	0.87	9.2
197	198	854	830	50	0.1	0.87	9.2
198	199	838	813	553	0.6	0.87	9.2
1101	1102	784	782.2	350	2.8	0.30	4.3
1103	1104	762	730	156	0		
1106	1107	1042	1038	60	0.1	0.30	8.3
1107	1108	1038	840	2420	46.4	0.30	4.4
1109	1110	836	820	599	5.3	0.30	3.9
1111	1112	810	787	381	2.9	0.30	3.7
1113	1114	940	939	50	0.1	0.30	6.8
1114	1115	939	804	1333	11.4	0.30	4.1
1112	1116	787	766	748	4.2	0.30	3.4
1117	1118	938	934	50	0.1	0.30	9.1
1118	1119	934	804	900	8.2	0.30	5.6
1120	1116	790	766	385	1.7	0.30	4.9
1121	1122	916	914	50	1	0.36	8.2
1122	1123	924	825	1736	9.6	0.54	5.8
1125	1126	930.3	929.2	50	0.1	0.54	8.7
1126	1124	929.2	875	1940	10.6	0.54	5.8
1127	1116	790	766	354	1.7	0.30	5.4
1116	1104	766	730	684	7.9	0.30	3.2
1128	1129	892	886	50	0.1	0.30	9.2
1129	1130	886	800	578	3.8	0.30	5.7
1131	1104	780	730	580	3.8	0.30	4.5
1104	1132	730	636	1083	7.8	0.30	4
201	202	901.3	900	50	0.1	0.54	7.3
202	203	900	896	315	1	0.54	6.1
205	206	925	924.5	50	0.1	0.54	7.3
206	204	924.5	896	785	3.9	0.54	5.9
208	209	901	900	50	0.1	0.54	8.5
209	207	900	892	273	0.6	0.54	7.3
211	212	917.2	916.5	50	0.1	0.54	7.9
212	210	916.5	892	695	1.7	0.54	6.2
213	214	864	770	2776	35.3	0.30	3.5
215	216	926.1	925	50	0.1	0.54	8.7
216	217	925	890	1353	8.3	0.54	5.8
219	220	912	910	50	0.1	0.87	9.2
220	218	910	890	873	1.8	0.54	8.3
221	222	872	802	651	7.4	0.30	4.9
223	224	1016	1014	50	0.1	0.30	7.8
224	222	1014	802	2690	48.8	0.54	4
222	225	807	788	547	4.7	0.30	3.8
226	227	954	950	50	0.1	0.30	9.1
227	225	950	788	1895	16	0.36	4.7
225	214	788	720	1205	13.9	0.30	3.4
214	1132	720	636	769	11.1	0.30	3.7
1133	1134	920	916	50	0.1	0.30	9.1
1134	1132	916	636	2324	26.5	0.30	4.5
					TOTAL	391.0	

NOT A PART

PROPOSED DETENTION BASIN

A=391.0 Ac
V100=7.5 FPS*
Q100=482.9 CFS*
* UNMITIGATED

PEAK DISCHARGE RATE NOTE:
THE PROPOSED DETENTION BASIN AND ITS OUTLET STRUCTURE WILL MITIGATE THE PEAK DISCHARGE FROM THE DETENTION BASIN TO BE NO MORE THAN 78 CFS SUCH THAT THE COMBINED OVERALL PEAK DISCHARGE AT NODE 1132 WILL BE LESS THAN THAT OF THE PRE-DEVELOPMENT CONDITIONS.

LEGEND

- PROJECT BOUNDARY
- MAJOR BASIN BOUNDARY
- TRIBUTARY AREA BOUNDAY
- FLOW PATH
- NODE NUMBER 101

SCALE: 1"= 200'

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ADDENDUM

ALTERNATIVE TO DETENTION BASINS

The developer has proposed a few alternative measures to augment or enhance the storm water runoff volume attenuation methods. In recent years, new technologies have become available to better retain and store excess runoff volume such as rain barrels, bio-retention (see page 166 – Typical Residential Lot Rain Water Capturing Schematic) and permeable pavers (see page 165 – Typical Permeable Paver Section). These rain capturing measures will not only reduce the project's hydrologic and subsequent development footprint but also reduce the water demand of the project since the captured runoff will be used for irrigation.

ASSUMPTIONS:

Bio-retention:

- Average lot size = 4500 sf

- Average impervious coverage per lot = 1500 sf roof + 300 sf walkways and driveway = 1800 sf

-Typical pervious coverage (bio-retention) per lot = 1000 sf with the top 12" layer providing a minimum of 5"/hour infiltration rate.

-Typical void ratio of engineered infiltration material = 0.55

Rain barrels:

-Typical home rain gutter down spout location = 4

-Typical rain barrel capacity = 50 gal.

Permeable pavers:

- Average permeable paver section: 2" bedding+4" no. 57 stone base + 24" no.2 stone subbase

- Average permeable paver base void ratio = 0.4

-Typical storage volume under each squire foot of pavers = 1.0 cf

Project design:

- Proposed residential units = 352 (Phase 1 only)

ANALYSIS:

<u>Typical Lot rainwater capturing/retention calculations:</u>

Bio-retention volume per typical home:1000 sf x 12"/12 x 0.55 void ratio = 550 cf.

Total bio-retention vol. = 550 cf x 352 SFR homes = 193600 cf = **4.4 Ac-Ft.**

Rain barrel capacity = 4 x 50gal = 200 gal = 27 cf

Total rain barrel capturing capacity = 27 cf x 352 SFR homes = 9500 cf = **0.2 Ac-Ft.**

Total lot rain capturing capacity for the development = 4.4 + 0.2 = **4.6 Ac-Ft.**

Permeable Pavers:

The developer proposes to install a total of 23 acres of permeable pavers throughout the entire project, only a portion of the 23 acres of pavers will be deployed for this Implementing tentative map, the rest will be installed in later phases throughout the project.

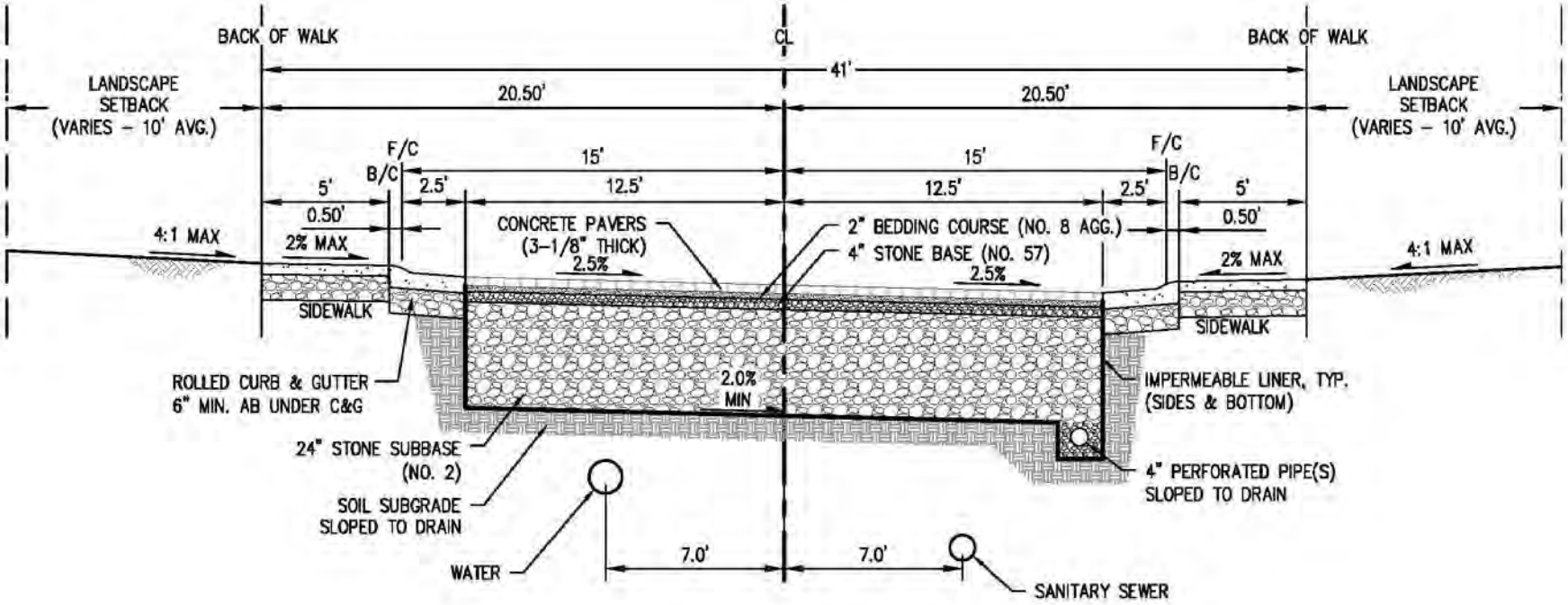
The project will need to install a minimum of **4.8** acres of permeable pavers, in additions to the rain barrels on each lot, to achieve the 9.4 Ac-Ft of total storage space. The combined capacity will eliminate the required detention basin for 100-year runoff attenuation purposes.

Total alternative storage capacity = rain barrels + bio-retention + permeable pavers = 4.6 + 4.8 = **9.4 Ac-Ft.**

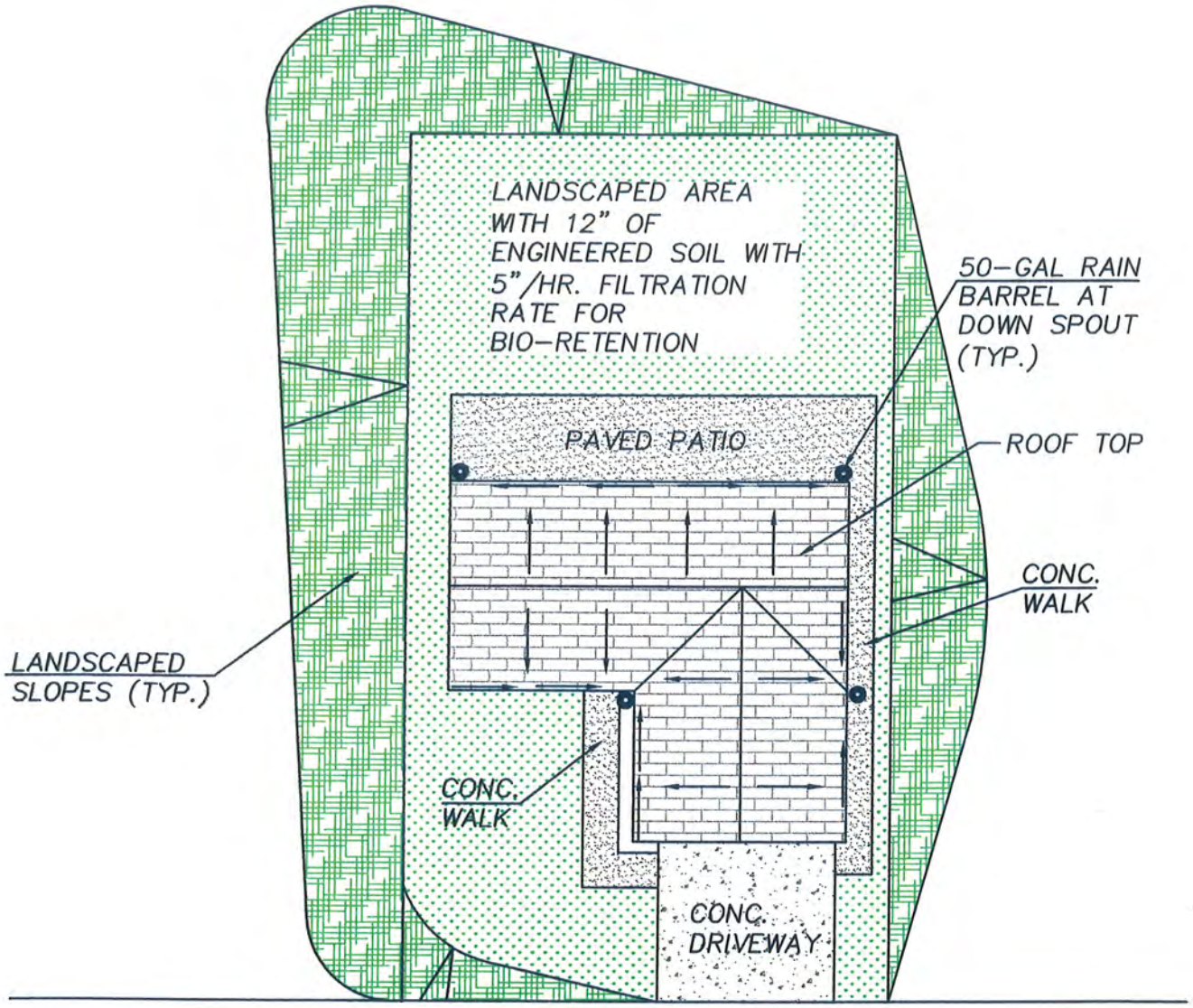
CONCLUSION:

These permeable pavers, bio-retention and rain barrels offer a great alternative to the proposed detention basins for 100-year runoff volume attenuation.

The project developers projected a total of 23 acres of pavers throughout the project. Per the calculations presented in this report, the proposed rain barrels, bio-retention areas and permeable pavers will provide adequate storage capacity to eliminate the required detention basin for 100-year storm water runoff volume attenuation purposes. It is possible to eliminate the proposed large detention basins and reduce the project foot print with the deployment of these alternative methods. Additionally, the captured rainwater in the bio-retention areas and rain barrels will offset the irrigation water demand of the project to make it a more sustainable development.


BACK OF WALK
CL
BACK OF WALK
41'
LANDSCAPE SETBACK (VARIES – 10' AVG.)
20.50'
20.50'
LANDSCAPE SETBACK (VARIES – 10' AVG.)
F/C
B/C
15'
15'
F/C
B/C
5'
2.5'
12.5'
12.5'
2.5'
5'
0.50'
0.50'
4:1 MAX
2% MAX
CONCRETE PAVERS (3-1/8" THICK)
2.5%
2" BEDDING COURSE (NO. 8 AGG.)
4" STONE BASE (NO. 57)
2.5%
2% MAX
4:1 MAX
SIDEWALK
SIDEWALK
ROLLED CURB & GUTTER
6" MIN. AB UNDER C&G
2.0% MIN
IMPERMEABLE LINER, TYP. (SIDES & BOTTOM)
24" STONE SUBBASE (NO. 2)
4" PERFORATED PIPE(S) SLOPED TO DRAIN
SOIL SUBGRADE SLOPED TO DRAIN
WATER
7.0'
7.0'
SANITARY SEWER

LILAC HILLS RANCH
TYPICAL RESIDENTIAL LOT RAIN WATER CAPTURING SCHEMATIC



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PERMEABLE PAVERS ANALYSIS
LILAC HILLS RANCH