APPENDIX H

PRELIMINARY HYDROLOGY AND DRAINAGE STUDY

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Hydrology and Drainage Study

County of Orange
Workforce Reentry Center

Site Address:

561 The City Drive South
Orange, CA 92868

Prepared for:

County of Orange
601 N. Ross Street
Santa Ana, CA 92701
(714) 667-4924

Prepared by:

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Date Prepared:

01/09/2025

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Appendices:

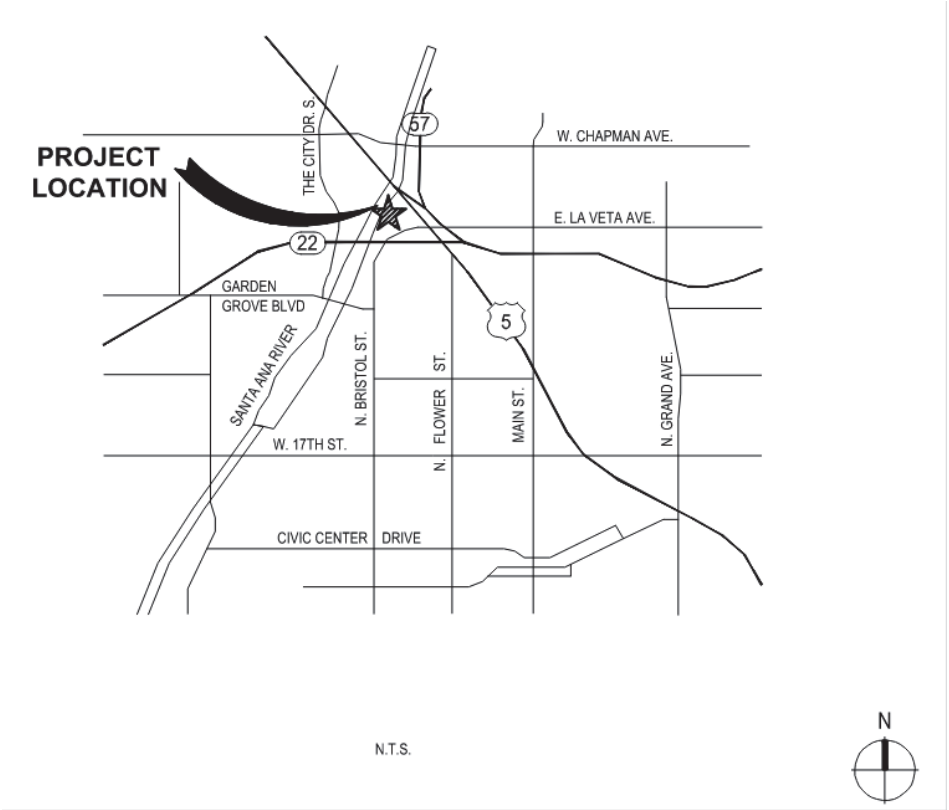
1.0 Introduction

The Workforce Reentry Center project is a 4.61-acre redevelopment project located between The City Drive South and the Santa Ana River, just north of State Route 22, in the City of Orange, CA. Refer to the Vicinity Map in Figure 1. The purpose of this study is to determine the necessary storm drain infrastructure while complying with City of Orange and Orange County design requirements.

The scope of work includes the following:

1. Rational method calculations to determine peak runoff for the 25-year and 100-year storm events for the pre-development and post-development conditions.
2. Unit hydrograph and basin routing calculations to determine the optimal subsurface storage design that mitigates the increase in peak runoff between the pre-development and post-development conditions.
3. Hydraulic calculations to determine the optimal post-development storm drain design and sizing for the 25-year storm event.

Figure 1: Vicinity Map



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2.0 Project Overview and Drainage Conditions

2.1 Project Overview

The Workforce Reentry Center project is considered a redevelopment project, with demolition of several buildings and construction of three new buildings with a total building footprint of approximately 45,500 square feet. The total disturbed area is 4.61 acres and extends to the property boundary on all sides.

2.2 Pre-Development Conditions

The pre-development site is mostly impervious and consists of paved parking lot and several existing buildings with minimal landscaped areas. Existing grades slope generally from north to south with approximately 8 feet of maximum elevation difference across the site.

An existing 45 inch city storm drain pipe travels from west to east through the middle of the site, carrying flows from The City Drive South to the Santa Ana River Channel. An existing 66 inch regional storm drain pipe also travels from west to east, along the southern boundary of the site, carrying flows from The City Drive South to the Santa Ana River Channel. Small drainage areas along the west edge of the site discharge as surface flow into the east gutter of The City Drive South. Gutter flows enter a public storm drain inlet and into the 45 inch storm drain pipe mentioned above.

Storm water discharges into the Santa Ana River Channel, a 270-foot wide channel that is approximately 120 feet east of the eastern project boundary, then travels approximately 11 miles to the Pacific Ocean.

The pre-development site is divided into eight (8) drainage areas, each with their own discharge point leaving the site. The drainage areas are shown in the Pre-Development Hydrology Exhibit in Appendix D, and are as follows:

> Drainage Area A consists of 3.29 acres of parking lot, buildings and a large landscaped areas. Runoff from Area A drains into a series of drain inlets and into the existing 66 inch storm drain pipe at Discharge Point A.
>
> Drainage Areas B, C, D, E and F consists of 0.77 acres of mostly impervious areas. Runoff from these areas all drain as surface flow into the east gutter of The City Drive South at Discharge Points B, C, D, E and F.
>
> Drainage Areas G and H consist of 0.50 acres of mostly impervious areas. Runoff from these areas drain into a series of drain inlets and into the existing 45 inch storm drain pipe at Discharge Points G and H.

Land uses for the pre-development condition are listed in Table 1.

2.3 Post-Development Conditions

The post-development site consists of three new buildings with surrounding parking lots and landscaped areas. The buildings reside within an area with reduced flood risk due to levee. Refer to the FEMA National Flood Hazard Layer FIRMette in Appendix E.

The post-development site is graded so almost the entire property drains from south to north to mimic the pre-development condition. Of the 4.61 acres, runoff from 4.29 acres is captured by storm drain inlets and enters a new underground storm drain system where it is infiltrated in underground retention pipes. Overflow discharges from the retention pipes into the existing storm drain pipes. Runoff from the remaining 0.32 acres cannot be captured due to grading limitations and discharges into the east gutter of The City Drive South where it is picked up by public storm drain facilities.

The post-development hydrology is divided into six (6) drainage areas, each with their own discharge point at the storm drain connection or property boundary. The drainage areas are shown in the Post-Development Hydrology Exhibit in Appendix D, and are as follows:

> Area A is 0.93 acres and encompasses the northwest portion of parking lot. Runoff from Area A enters storm drain inlets into an underground infiltration system, with an overflow pipe connecting to the existing 45 inch storm drain pipe at Discharge Point A.
>
> Area B consists of 1.74 acres that includes two buildings and most of the north and east portions of the site. Runoff from Area B enters storm drain inlets into a second underground infiltration system, with an overflow pipe connecting to the existing 45 inch storm drain pipe and Discharge Point B.

Area C is 1.62 acres and encompasses the southwestern portion of the site, including the third building. Runoff from Area C enters storm drain inlets into a third underground infiltration system, with an overflow pipe connecting to the existing 66 inch storm drain pipe at Discharge Point C.

Areas D, E and F consist of 0.32 acres of parking lot along the western property boundary. Runoff from these areas all drain as surface flow into the east gutter of The City Drive South at Discharge Points D, E and F.

Land uses for the post-development condition are listed in Table 1.

Table 1: Land Use Summary

	Total Area (ac)	Impervious Area (ac)	Impervious Fraction	Pervious Area (ac)	Pervious Fraction
Pre-Development Condition	4.61	3.33	0.72	1.28	0.28
Post-Development Condition	4.61	3.94	0.86	0.66	0.14

3.0 Hydrology

Hydrologic analyses were prepared in accordance with the City Orange, which defers to the requirements of the Orange County Hydrology Manual (1986). Hydrologic analyses were performed for the pre-development and post-development conditions for the 25-year and 100-year post-development conditions for use in calculations in later sections of this report.

The site consists of Type B soils, as obtained from the National Resources Conservation Service (NRCS) WebSoil Survey, and Type A soils, as obtained from the Orange County Technical Guidance Document Exhibit XVI-2a. Type B and A soils generally have low runoff potential and high infiltration rates. For the analyses in this report, Type B soils were used for conservative results. The curve number (CN) corresponding to the soil type and land cover was selected from the hydrology manual Figure C-3 for use in the hydrograph analyses. For impervious areas, a curve number of 98 was used, and for urban landscaped areas, a curve number of 75 was used.

3.1 Rational Method Analysis

The rational method analysis was performed using the Advanced Engineering Software (AES), which follows the computational techniques as outlined by the Orange County Hydrology Manual, Section D.

The flows discharging from the eight separate drainage areas in the pre-development condition, at eight separate points, were combined within the AES software to arrive at a total discharge at the time of concentration for the pre-development entire site. Similarly, the flows discharging from the six separate drainage areas in the post-development condition, at six separate points, were also combined with AES to arrive at a total discharge for the entire post-development site.

For the 25-year storm event, total peak flow increased by 6% and the time of concentration increased by 8%. For the 100-year storm event, total peak flow increased by 6% while the time of concentration decreased by 2%. The results for the rational method analysis are listed in Tables 2 and 3 below. Detailed calculations are included in Appendix A.

The peak flows for each discharge point are shown on the Pre-Development and Post-Development Hydrology Exhibits in Appendix D.

Table 2: Rational Method Results for Pre-Development and Post-Development Conditions for 25-Year Storm Event

	Discharge Point	Peak Flow Q (cfs)	Time of Concentration, Tc (min)
Pre-Development Condition	**A+B+C+D+E+F+G+H**	**15.15**	**6.3**
	A	10.21	
	B	0.76	
	C	0.23	
	D	0.26	
	E	0.23	
	F	1.43	
	G	0.17	
	H	1.71	
	I	0.19	
Post-Development Condition	**A+B+C+D+E+F**	**16.00**	**6.8**
	A	3.22	
	B	6.44	
	C	5.75	
	D	0.84	
	E	0.04	
	F	0.29	

Table 3: Rational Method Results for Pre-Development and Post-Development Conditions for 100-Year Storm Event

	Discharge Point	Peak Flow Q (cfs)	Time of Concentration, Tc (min)
Pre-Development Condition	**A+B+C+D+E+F+G+H**	**19.52**	**6.2**
	A	13.17	
	B	0.97	
	C	0.29	
	D	0.34	
	E	0.29	
	F	1.84	
	G	0.22	
	H	2.19	
	I	0.24	
Post-Development Condition	**A+B+C+D+E+F**	**20.60**	**6.1**
	A	4.14	
	B	8.28	
	C	7.39	
	D	1.08	
	E	0.05	
	F	0.37	

3.2 Unit Hydrograph Analysis

The purpose of the unit hydrograph analysis was to set up input that will be used in the basin routing analysis in Section 3.4. The unit hydrograph was performed for areas A, B and C, for three separate retention systems, which will be sized using the basin routing analyses described in Section 3.3.

The Unit Hydrograph analysis was performed using the Advanced Engineering Software (AES), Computational Hydraulics 1 module, which follows the computational techniques as outlined by the Orange County Hydrology Manual, Section E. Point rainfall values for the Unit Hydrograph were taken from NOAA Atlas 14 historical data for the site location.

Several factors were needed to set up the unit hydrograph analyses. First, the area-averaged low loss fraction, Y bar, must be calculated per the hydrology manual Section C.6. The Computational Hydraulics I module has a feature that calculates the Y bar value based on Orange County Hydrology Manual criteria. Y bar values calculated using this software are in Appendix B. Also needed were the point rainfall values, determined using NOAA Atlas 14, included in Appendix B. The 24-hour rainfall is 4.54 inches for the 25-year storm event, and 5.91 inches for the 100-year storm event. Finally, the Time of Concentration, T_c, was taken from the rational method results for the corresponding storm event.

After obtaining initial unit hydrograph results, an adjustment needed to be made so the peak runoff from the hydrograph results matched the peak runoff from the rational method. The adjustment values, called the “Rational Method Calibration Coefficients” within the software, in addition to the resulting peak flows, are shown in Tables 4 and 5 below. The unit hydrograph calculations are in Appendix B.

3.3 Basin Routing Analysis

The goal of the unit hydrograph analysis was to size underground retention systems for Areas A, B and C that reduce the post-development peak flow to less than or equal to the pre-development peak flow, for the 25-year and 100-year storm events. The total peak flow from the entire site therefore needed to be reduced from 16.00 cfs to less than or equal to 15.15 cfs for the 25-year storm event and from 20.60 cfs to 19.52 cfs for the 100-year storm event.

The basin routing was performed using the Hydraflow Hydrographs Extension for Autodesk Civil3D. The first step for the basin routing was to import hydrograph information from the AES software into the Hydraflow software. The AES hydrograph output was based on inconsistent time intervals, and therefore had to be converted into 5-minute time intervals using Excel. A more detailed description of the conversion is in Appendix B.

After the hydrograph information was imported, the next step was to model the underground retention systems with the corresponding hydrograph modeled as the inflow to each retention system. Each system will have an overflow pipe, and discharge through infiltration. The infiltration rates are 30.20 inches per hour for retention systems A and B, and 38.30 inches per hour for retention system C. Refer to excerpts from the Geotechnical Exploration Report in Appendix B.

For this project, the retention systems will be large to satisfy infiltration requirements, which are documented in a separate WQMP, and therefore sufficiently sized to significantly reduce peak flows. Areas A and C completely capture the 100-year peak flows. The resulting peak flows before and after routing through the retention systems are listed in Table 6.

Table 4: Unit Hydrograph Results for Post-Development Conditions for 25-Year Storm Event

Area	Rational Method Calibration Coefficient	Peak Flow, Q Before Routing through Retention (cfs)	Peak Flow, Q After Routing through Retention (cfs)
A	0.89	3.22	0
B	0.87	6.44	0
C	0.89	5.75	0

Table 5: Unit Hydrograph Results for Post-Development Conditions for 100-Year Storm Event

Area	Rational Method Calibration Coefficient	Peak Flow, Q Before Routing through Retention (cfs)	Peak Flow, Q After Routing through Retention (cfs)
A	1.15	4.14	0
B	1.14	8.28	7.88
C	1.15	7.39	0

The three retention systems are as follows:

- Retention A consists of 70-foot long double 60” diameter HDPE pipes, with gravel all around, and a storage volume of approximately 2900 cubic feet. The pipes completely fill to the top before water discharges through a 15” overflow pipe.
- Retention B consists of 65-foot long double 60” diameter HDPE pipes, with gravel all around, and a storage volume of approximately 4100 cubic feet. The pipes completely fill to the top before water discharges through a 15” overflow pipe.
- Retention C consists of 75-foot long double 60” diameter HDPE pipes, with gravel all around, and a storage volume of approximately 3900 cubic feet. The pipes completely fill to the top before water discharges through a 12” overflow pipe.

Incorporating the post-retention peak flows from Tables 4 and 5 into the original rational method peak flows from Tables 2 and 3 results in a reduction of peak flows from 15.15 cfs to 1.17 cfs for the 25-year storm event, a 92% reduction, and from 19.52 cfs to 9.38 cfs for the 100-year storm event, a 51% reduction.

Basin routing calculations are included in Appendix B.

4.0 Hydraulics and Storm Drain Design

The post-development drainage system is designed to convey the 25-year storm flow through a series of drain inlets, into a new underground storm drain system, through three retention systems, and into overflow pipes into the existing 45” and 66” storm drain pipes beneath the site. The overflow pipes are expected to convey no flows for the 25-year and 100-year storm events, due to the efficiency of the retention systems, with the exception of the overflow pipe for Retention B. The capacity of the 15” overflow pipe for Retention B was evaluated using the Flowmaster software, which uses the Manning’s equation. Because the existing 45” pipe is expected to be deep, the 15” overflow pipe will likely be steep. For these calculations, assuming a slope of 5%, the 15” overflow pipe can accommodate over 17 cfs, which is more than sufficient for the 25-year storm event. Hydraulic calculations are included in Appendix C.

5.0 Conclusions

This hydrology report was prepared to determine the required mitigation measures and storm sizing for the project. The underground retention systems were designed in accordance with Orange County and City of Orange requirements. The resulting discharge from the post-development site is significantly less than the discharge from the pre-development site, with a 51% reduction for the 100-year storm event. The project site is therefore not expected to have an impact on downstream drainage facilities.

6.0 Declaration of Responsible Charge

I hereby declare that I am the Engineer of work for this project, that I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the City of Lake Forest is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.

Engineer of Work

This report was prepared under the supervision of Kathereen Shinkai, PE, Director of Civil Engineering for LPA, Inc.

Kathereen Shinkai RCE 68369 Expires 09-30-2025

Appendix A

Pre-Development Rational Method Analysis

25-Year Storm Event
100-Year Storm Event

Post-Development Rational Method Analysis

25-Year Storm Event

100-Year Storm Event

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1618

                          Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* OCWRE                                                                 *
* 25-YEAR STORM EVENT                                                   *
* EXISTING CONDITION                                                    *
 ************************************************************************

  FILE NAME: OCWRE_EX.DAT
  TIME/DATE OF STUDY: 21:57 12/30/2024
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    128.20  DOWNSTREAM(FEET) =    124.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.710
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.775
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                B        0.32      0.30      0.350    56    7.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      1.06
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.06

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.45  DOWNSTREAM(FEET) =   121.16
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    7.96
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    7.96
  RAINFALL INTENSITY(INCH/HR) =   3.71
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       0.32
  TOTAL STREAM AREA(ACRES) =       0.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.06

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.05 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.30  DOWNSTREAM(FEET) =    123.08

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.780
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.444
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        0.69      0.30      0.100    56    5.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      2.74
```

```
 TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      2.74

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    5.78
 RAINFALL INTENSITY(INCH/HR) =   4.44
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.69
 TOTAL STREAM AREA(ACRES) =       0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.74

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.06    7.96    3.709  0.30( 0.11) 0.35       0.3       1.01
     2        2.74    5.78    4.444  0.30( 0.03) 0.10       0.7       1.03

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.67    5.78    4.444  0.30( 0.05) 0.16       0.9       1.03
     2        3.34    7.96    3.709  0.30( 0.05) 0.18       1.0       1.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.67    Tc(MIN.) =     5.78
 EFFECTIVE AREA(ACRES) =       0.92   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.0
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.16  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.49
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.67
 PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    6.24
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.07 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.07 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
```

```
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   170.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.20  DOWNSTREAM(FEET) =    121.37

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.997
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.352
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               B        0.52      0.30     0.350    56    6.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    0.52   INITIAL SUBAREA RUNOFF(CFS) =    1.99

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    6.24
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.257
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    1.94
  EFFECTIVE AREA(ACRES) =      1.44   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       5.44

****************************************************************************
  FLOW PROCESS FROM NODE      1.07 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   112.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  20.35
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.44
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.27
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 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.) =    6.27
  RAINFALL INTENSITY(INCH/HR) =   4.24
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.44

****************************************************************************
  FLOW PROCESS FROM NODE      1.09 TO NODE      1.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    127.50  DOWNSTREAM(FEET) =    123.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.932
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.271
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.86      0.30     0.850    56    9.93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      2.33
  TOTAL AREA(ACRES) =      0.86   PEAK FLOW RATE(CFS) =      2.33

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    123.50  DOWNSTREAM(FEET) =    120.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   155.00   CHANNEL SLOPE =  0.0174
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.141
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.31      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.77
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.49
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   0.74
  Tc(MIN.) =   10.67
  SUBAREA AREA(ACRES) =     0.31       SUBAREA RUNOFF(CFS) =    0.87
  EFFECTIVE AREA(ACRES) =      1.17     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.65
  TOTAL AREA(ACRES) =        1.2          PEAK FLOW RATE(CFS) =       3.10

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   3.71
  LONGEST FLOWPATH FROM NODE      1.09 TO NODE      1.12 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.67
  RAINFALL INTENSITY(INCH/HR) =   3.14
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.65
  EFFECTIVE STREAM AREA(ACRES) =       1.17
```

```
 TOTAL STREAM AREA(ACRES) =       1.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.10

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    127.20  DOWNSTREAM(FEET) =    120.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.296
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.60      0.30      0.100    56    6.30
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.27
 TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.27

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 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.) =    6.30
 RAINFALL INTENSITY(INCH/HR) =   4.23
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.60
 TOTAL STREAM AREA(ACRES) =       0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.27

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.44    6.27    4.244  0.30( 0.07) 0.23       1.4       1.03
     1        4.84    8.47    3.580  0.30( 0.07) 0.24       1.5       1.01
     2        3.10   10.67    3.141  0.30( 0.20) 0.65       1.2       1.09
     3        2.27    6.30    4.234  0.30( 0.03) 0.10       0.6       1.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       10.21    6.27    4.244  0.30( 0.09) 0.31       2.7       1.03
     2       10.21    6.30    4.234  0.30( 0.09) 0.31       2.7       1.11
     3        9.59    8.47    3.580  0.30( 0.10) 0.34       3.1       1.01
     4        9.02   10.67    3.141  0.30( 0.11) 0.36       3.3       1.09
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      10.21    Tc(MIN.) =     6.30
  EFFECTIVE AREA(ACRES) =       2.73   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   215.00
  ELEVATION DATA: UPSTREAM(FEET) =    129.20  DOWNSTREAM(FEET) =    125.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.971
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.363
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30     0.100    56    5.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20   INITIAL SUBAREA RUNOFF(CFS) =    0.78

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    6.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.76
  EFFECTIVE AREA(ACRES) =      2.93   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =        3.5       PEAK FLOW RATE(CFS) =      10.95

****************************************************************************
  FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.06      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.06      SUBAREA RUNOFF(CFS) =    0.23
  EFFECTIVE AREA(ACRES) =      2.99   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      11.17

****************************************************************************
  FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
```

```
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.07      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.26
 EFFECTIVE AREA(ACRES) =      3.06   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
 TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      11.44

****************************************************************************
 FLOW PROCESS FROM NODE      5.01 TO NODE      5.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.30
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.06      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.06      SUBAREA RUNOFF(CFS) =    0.23
 EFFECTIVE AREA(ACRES) =      3.12   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
 TOTAL AREA(ACRES) =        3.7       PEAK FLOW RATE(CFS) =      11.67

****************************************************************************
 FLOW PROCESS FROM NODE      6.01 TO NODE      6.02 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
 ELEVATION DATA: UPSTREAM(FEET) =    127.40  DOWNSTREAM(FEET) =    124.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.774
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.447
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.38      0.30      0.200    56    5.77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.38   INITIAL SUBAREA RUNOFF(CFS) =    1.50

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =    6.30
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.234
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.43
 EFFECTIVE AREA(ACRES) =      3.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        4.1       PEAK FLOW RATE(CFS) =      13.09

****************************************************************************
 FLOW PROCESS FROM NODE      6.02 TO NODE      7.03 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.) =    6.30
  RAINFALL INTENSITY(INCH/HR) =   4.23
  AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.27
  EFFECTIVE STREAM AREA(ACRES) =       3.50
  TOTAL STREAM AREA(ACRES) =       4.07
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.09

****************************************************************************
  FLOW PROCESS FROM NODE      7.01 TO NODE      7.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.20  DOWNSTREAM(FEET) =    125.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  B        0.04      0.30     0.200    56    5.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.17
  TOTAL AREA(ACRES) =      0.04   PEAK FLOW RATE(CFS) =      0.17

****************************************************************************
  FLOW PROCESS FROM NODE      7.02 TO NODE      7.03 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.70  DOWNSTREAM(FEET) =   122.50
  FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.63
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.17
  PIPE TRAVEL TIME(MIN.) =   0.76    Tc(MIN.) =    5.76
  LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.03 =     160.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.03 TO NODE      8.02 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.) =    5.76
  RAINFALL INTENSITY(INCH/HR) =   4.45
```

```
 AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.04
 TOTAL STREAM AREA(ACRES) =       0.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.17

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.10    6.27    4.244  0.30( 0.08) 0.27       3.5       1.03
     1       13.09    6.30    4.234  0.30( 0.08) 0.27       3.5       1.11
     1       12.03    8.47    3.580  0.30( 0.09) 0.30       3.8       1.01
     1       11.15   10.67    3.141  0.30( 0.10) 0.32       4.1       1.09
     2        0.17    5.76    4.452  0.30( 0.06) 0.20       0.0       7.01

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.81    5.76    4.452  0.30( 0.08) 0.27       3.3       7.01
     2       13.26    6.27    4.244  0.30( 0.08) 0.27       3.5       1.03
     3       13.26    6.30    4.234  0.30( 0.08) 0.27       3.5       1.11
     4       12.16    8.47    3.580  0.30( 0.09) 0.30       3.9       1.01
     5       11.27   10.67    3.141  0.30( 0.10) 0.32       4.1       1.09

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      13.26    Tc(MIN.) =     6.27
 EFFECTIVE AREA(ACRES) =       3.54   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        4.1
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      8.02 =     540.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.01 TO NODE      8.02 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.60  DOWNSTREAM(FEET) =    124.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.954
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.002
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.45      0.30     0.100    56    6.95
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.45   INITIAL SUBAREA RUNOFF(CFS) =    1.61

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =    6.27
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.244
 SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    1.71
 EFFECTIVE AREA(ACRES) =      3.99   AREA-AVERAGED Fm(INCH/HR) =  0.08
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
 TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      14.96

****************************************************************************
 FLOW PROCESS FROM NODE      9.01 TO NODE      9.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.27
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.244
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.05      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.19
 EFFECTIVE AREA(ACRES) =      4.04   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
 TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      15.15
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        4.6  TC(MIN.) =      6.27
 EFFECTIVE AREA(ACRES) =      4.04  AREA-AVERAGED Fm(INCH/HR)=  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.251
 PEAK FLOW RATE(CFS)   =      15.15

 ** PEAK FLOW RATE TABLE **
  STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
     1       14.79    5.76    4.452  0.30( 0.07) 0.25       3.8       7.01
     2       15.15    6.27    4.244  0.30( 0.08) 0.25       4.0       1.03
     3       15.13    6.30    4.234  0.30( 0.08) 0.25       4.0       1.11
     4       13.75    8.47    3.580  0.30( 0.08) 0.27       4.4       1.01
     5       12.66   10.67    3.141  0.30( 0.09) 0.29       4.6       1.09
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

```
*****************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
         (c) Copyright 1983-2016 Advanced Engineering Software (aes)
             Ver. 23.0  Release Date: 07/01/2016  License ID 1618

                          Analysis prepared by:




 ************************** DESCRIPTION OF STUDY **************************
* OCWRE                                                                   *
* 25-YEAR STORM EVENT                                                     *
* PROPOSED CONDITION                                                      *
 *************************************************************************

  FILE NAME: OCWRE_PR.DAT
  TIME/DATE OF STUDY: 14:12 12/31/2024
=============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
=============================================================================
                     --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =   25.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) II ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  ================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

*****************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  21
-----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
=============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   135.00
  ELEVATION DATA: UPSTREAM(FEET) =    127.95  DOWNSTREAM(FEET) =    125.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.643
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.505
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                B        0.15      0.30      0.350    56    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      0.59
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.59

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   122.35  DOWNSTREAM(FEET) =   120.00
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.66
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.59
  PIPE TRAVEL TIME(MIN.) =   1.14    Tc(MIN.) =    6.78
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    6.78
  RAINFALL INTENSITY(INCH/HR) =   4.06
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.59

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    128.20  DOWNSTREAM(FEET) =    123.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.743
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.073
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  MOBILE HOME PARK            B        0.50      0.30      0.250    56    6.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
  SUBAREA RUNOFF(CFS) =      1.80
```

```
 TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      1.80

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.40  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.80
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.81
 LONGEST FLOWPATH FROM NODE      1.03 TO NODE      1.05 =     275.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.81
 RAINFALL INTENSITY(INCH/HR) =   4.05
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.25
 EFFECTIVE STREAM AREA(ACRES) =       0.50
 TOTAL STREAM AREA(ACRES) =       0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        0.59    6.78    4.059  0.30( 0.10) 0.35       0.2       1.01
     2        1.80    6.81    4.049  0.30( 0.08) 0.25       0.5       1.03

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.39    6.78    4.059  0.30( 0.08) 0.27       0.6       1.01
     2        2.39    6.81    4.049  0.30( 0.08) 0.27       0.6       1.03

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       2.39    Tc(MIN.) =     6.81
 EFFECTIVE AREA(ACRES) =       0.65   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        0.6
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   119.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.42
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.39
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.97
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.10 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.97
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.998
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.16      0.30     0.200    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.57
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.86

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   119.50  DOWNSTREAM(FEET) =   119.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.64
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.86
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.08
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.08
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.960
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.11      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.39
  EFFECTIVE AREA(ACRES) =      0.92   AREA-AVERAGED Fm(INCH/HR) =  0.07
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.24
 TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       3.22

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   119.10  DOWNSTREAM(FEET) =   117.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.85
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.22
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.12
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.13 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 ELEVATION DATA: UPSTREAM(FEET) =    130.00  DOWNSTREAM(FEET) =    129.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        0.12      0.30      0.100    56    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.52
 TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.52

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   124.00  DOWNSTREAM(FEET) =   123.20
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.011
```

```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.52
 PIPE TRAVEL TIME(MIN.) =   0.34    Tc(MIN.) =    5.34
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.03 =     155.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.34
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.645
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.12      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.50
 EFFECTIVE AREA(ACRES) =      0.24   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.2       PEAK FLOW RATE(CFS) =       1.00

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.20  DOWNSTREAM(FEET) =   119.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.95
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.00
 PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    5.82
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.04 =     325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.04 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.82
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.426
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.11      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.44
 EFFECTIVE AREA(ACRES) =      0.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.38
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.04 TO NODE      2.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   119.00  DOWNSTREAM(FEET) =   118.50
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.38
 PIPE TRAVEL TIME(MIN.) =   0.18    Tc(MIN.) =    6.00
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.10  DOWNSTREAM(FEET) =    124.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.927
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.381
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.11      0.30     0.200    56    5.93
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.43
 TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.43

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      2.06 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.90  DOWNSTREAM(FEET) =    124.10

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.294
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.235
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        0.42      0.30      0.100    56    6.29
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.42   INITIAL SUBAREA RUNOFF(CFS) =    1.59

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =    5.93
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.381
 SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    1.64
 EFFECTIVE AREA(ACRES) =      0.53   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.12
 TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       2.07

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      2.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.00  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.71
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.07
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.00
 LONGEST FLOWPATH FROM NODE      2.05 TO NODE      2.10 =     195.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.10 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.) =    6.00
 RAINFALL INTENSITY(INCH/HR) =   4.35
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.12
 EFFECTIVE STREAM AREA(ACRES) =       0.53
 TOTAL STREAM AREA(ACRES) =       0.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.07

****************************************************************************
 FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
 ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    124.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.808
```

```
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.38      0.30      0.200    56    6.81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.36
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.36

****************************************************************************
 FLOW PROCESS FROM NODE      2.08 TO NODE      2.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.50  DOWNSTREAM(FEET) =   120.80
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.71
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.36
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    7.06
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.09 =     230.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.09 TO NODE      2.09 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.06
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.969
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.15      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.53
 EFFECTIVE AREA(ACRES) =      0.53   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       1.87

****************************************************************************
 FLOW PROCESS FROM NODE      2.09 TO NODE      2.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.80  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.31
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.87
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    7.12
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.10 =     260.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.10 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.) =    7.12
 RAINFALL INTENSITY(INCH/HR) =   3.95
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.17
 EFFECTIVE STREAM AREA(ACRES) =       0.53
 TOTAL STREAM AREA(ACRES) =       0.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.87

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.07    6.00    4.350  0.30( 0.04) 0.12       0.5       2.05
     2        1.87    7.12    3.948  0.30( 0.05) 0.17       0.5       2.07

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.81    6.00    4.350  0.30( 0.04) 0.14       1.0       2.05
     2        3.75    7.12    3.948  0.30( 0.04) 0.15       1.1       2.07

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.81    Tc(MIN.) =     6.00
 EFFECTIVE AREA(ACRES) =       0.98   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        1.1
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.10 =     260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   119.80
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.1 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.93
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.81
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.06
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.15 =     280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.15 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.) =    6.06
 RAINFALL INTENSITY(INCH/HR) =   4.33
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.14
 EFFECTIVE STREAM AREA(ACRES) =       0.98
 TOTAL STREAM AREA(ACRES) =       1.06
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.81

****************************************************************************
 FLOW PROCESS FROM NODE      2.11 TO NODE      2.12 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.30  DOWNSTREAM(FEET) =    125.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.824
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS               B        0.23      0.30     0.350    56    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      0.98
 TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      0.98

****************************************************************************
 FLOW PROCESS FROM NODE      2.12 TO NODE      2.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.90  DOWNSTREAM(FEET) =   122.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.46
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.98
 PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =    5.63
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.13 =     210.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.13 TO NODE      2.13 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.63
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.508
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.09      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
 SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.36
 EFFECTIVE AREA(ACRES) =      0.32   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.27

****************************************************************************
 FLOW PROCESS FROM NODE      2.13 TO NODE      2.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   122.00  DOWNSTREAM(FEET) =   119.80
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.27
 PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    5.91
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.15 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.15 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.) =    5.91
 RAINFALL INTENSITY(INCH/HR) =   4.39
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.28
 EFFECTIVE STREAM AREA(ACRES) =       0.32
 TOTAL STREAM AREA(ACRES) =       0.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.27

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.81    6.06    4.327  0.30( 0.04) 0.14       1.0       2.05
     1        3.75    7.18    3.930  0.30( 0.04) 0.15       1.1       2.07
     2        1.27    5.91    4.389  0.30( 0.08) 0.28       0.3       2.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.04    5.91    4.389  0.30( 0.05) 0.18       1.3       2.11
     2        5.07    6.06    4.327  0.30( 0.05) 0.18       1.3       2.05
     3        4.89    7.18    3.930  0.30( 0.05) 0.18       1.4       2.07

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.07    Tc(MIN.) =     6.06
 EFFECTIVE AREA(ACRES) =       1.30   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        1.4
```

```
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.15 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   119.80  DOWNSTREAM(FEET) =   118.50
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  17.07
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.07
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.07
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.20 =     320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.04    5.92    4.385  0.30( 0.05) 0.18       1.3       2.11
     2        5.07    6.07    4.323  0.30( 0.05) 0.18       1.3       2.05
     3        4.89    7.19    3.927  0.30( 0.05) 0.18       1.4       2.07
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.20 =     320.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.38    6.00    4.352  0.30( 0.03) 0.10       0.3       2.01
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.42    5.92    4.385  0.30( 0.05) 0.16       1.6       2.11
     2        6.44    6.00    4.352  0.30( 0.05) 0.16       1.6       2.01
     3        6.44    6.07    4.323  0.30( 0.05) 0.16       1.6       2.05
     4        6.14    7.19    3.927  0.30( 0.05) 0.16       1.7       2.07
   TOTAL AREA(ACRES) =         1.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        6.44  Tc(MIN.) =    6.068
 EFFECTIVE AREA(ACRES) =      1.65  AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.7
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   118.50  DOWNSTREAM(FEET) =   118.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.01
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.44
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.11
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.21 =     400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.21 TO NODE      2.21 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.42    5.96    4.366  0.30( 0.05) 0.16       1.6       2.11
     2        6.44    6.04    4.333  0.30( 0.05) 0.16       1.6       2.01
     3        6.44    6.11    4.304  0.30( 0.05) 0.16       1.6       2.05
     4        6.14    7.24    3.913  0.30( 0.05) 0.16       1.7       2.07
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.21 =     400.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.22    7.09    3.960  0.30( 0.07) 0.24       0.9       1.01
     2        3.22    7.12    3.950  0.30( 0.07) 0.24       0.9       1.03
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.21 =     500.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.41    5.96    4.366  0.30( 0.06) 0.19       2.4       2.11
     2        9.45    6.04    4.333  0.30( 0.06) 0.19       2.4       2.01
     3        9.47    6.11    4.304  0.30( 0.06) 0.19       2.4       2.05
     4        9.40    7.09    3.960  0.30( 0.06) 0.19       2.6       1.01
     5        9.39    7.12    3.950  0.30( 0.06) 0.19       2.6       1.03
     6        9.32    7.24    3.913  0.30( 0.06) 0.19       2.6       2.07
   TOTAL AREA(ACRES) =         2.6

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        9.47  Tc(MIN.) =    6.115
 EFFECTIVE AREA(ACRES) =      2.44  AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        2.6
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.21 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.21 TO NODE      2.21 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.00  DOWNSTREAM(FEET) =    123.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.962
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.366
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  B        0.49      0.30     0.200    56    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      1.90
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      1.90

****************************************************************************
  FLOW PROCESS FROM NODE      3.02 TO NODE      3.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   117.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.90
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    6.60
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.10 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.10 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.) =    6.60
  RAINFALL INTENSITY(INCH/HR) =   4.12
  AREA-AVERAGED Fm(INCH/HR) =  0.06
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.49
 TOTAL STREAM AREA(ACRES) =       0.49
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.90

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 ELEVATION DATA: UPSTREAM(FEET) =    130.00  DOWNSTREAM(FEET) =    129.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.102
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.769
 SUBAREA Tc AND LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.17      0.30     0.100    56    5.10
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.73
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.73

****************************************************************************
 FLOW PROCESS FROM NODE      3.04 TO NODE      3.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   124.20  DOWNSTREAM(FEET) =   123.60
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.96
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.73
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    5.35
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =     170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.35
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.640
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.17      0.30     0.350    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.69
 EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.40
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      3.05 TO NODE      3.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.60  DOWNSTREAM(FEET) =   117.90
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.53
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.40
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    5.57
  LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.10 =     280.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.10 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.) =    5.57
  RAINFALL INTENSITY(INCH/HR) =   4.54
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.22
  EFFECTIVE STREAM AREA(ACRES) =       0.34
  TOTAL STREAM AREA(ACRES) =       0.34
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.40

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        1.90    6.60    4.122  0.30( 0.06) 0.20       0.5       3.01
      2        1.40    5.57    4.538  0.30( 0.07) 0.22       0.3       3.03

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
      1        3.17    5.57    4.538  0.30( 0.06) 0.21       0.8       3.03
      2        3.17    6.60    4.122  0.30( 0.06) 0.21       0.8       3.01

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.17    Tc(MIN.) =     6.60
  EFFECTIVE AREA(ACRES) =       0.83   AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.21
  TOTAL AREA(ACRES) =        0.8
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.10 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   117.90  DOWNSTREAM(FEET) =   117.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.17
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    6.75
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.20 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 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.) =    6.75
  RAINFALL INTENSITY(INCH/HR) =   4.07
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =       0.83
  TOTAL STREAM AREA(ACRES) =       0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.17

****************************************************************************
  FLOW PROCESS FROM NODE      3.11 TO NODE      3.12 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    122.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.303
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.893
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.35      0.30      0.100    56    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.22
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE      3.12 TO NODE      3.12 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    122.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.808
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.051
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  B        0.32      0.30     0.200    56    6.81
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.32   INITIAL SUBAREA RUNOFF(CFS) =    1.15

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    7.30
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.893
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.10
  EFFECTIVE AREA(ACRES) =      0.67   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.15
  TOTAL AREA(ACRES) =        0.7       PEAK FLOW RATE(CFS) =       2.32

****************************************************************************
  FLOW PROCESS FROM NODE      3.12 TO NODE      3.14 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   119.90  DOWNSTREAM(FEET) =   119.30
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.77
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.32
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.45
  LONGEST FLOWPATH FROM NODE      3.11 TO NODE      3.14 =     325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.14 TO NODE      3.14 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.45
  *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  3.850
  SUBAREA LOSS RATE DATA(AMC  II):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                  B        0.12      0.30     0.100    56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.41
  EFFECTIVE AREA(ACRES) =      0.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       2.71

****************************************************************************
  FLOW PROCESS FROM NODE      3.14 TO NODE      3.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   119.30  DOWNSTREAM(FEET) =   117.40
  FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.47
```

```
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.71
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.50
 LONGEST FLOWPATH FROM NODE      3.11 TO NODE      3.20 =     360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 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.) =    7.50
 RAINFALL INTENSITY(INCH/HR) =   3.83
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.14
 EFFECTIVE STREAM AREA(ACRES) =       0.79
 TOTAL STREAM AREA(ACRES) =       0.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.71

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.17    5.71    4.473  0.30( 0.06) 0.21       0.8       3.03
     1        3.17    6.75    4.072  0.30( 0.06) 0.21       0.8       3.01
     2        2.71    7.50    3.834  0.30( 0.04) 0.14       0.8       3.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.58    5.71    4.473  0.30( 0.05) 0.18       1.4       3.03
     2        5.75    6.75    4.072  0.30( 0.05) 0.18       1.5       3.01
     3        5.69    7.50    3.834  0.30( 0.05) 0.18       1.6       3.11

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       5.75    Tc(MIN.) =     6.75
 EFFECTIVE AREA(ACRES) =       1.54   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.20 =     435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   117.40  DOWNSTREAM(FEET) =   114.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.8 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  19.48
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       5.75
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.76
```

```
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.21 =     455.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.21 TO NODE      3.21 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        5.58    5.73    4.465  0.30( 0.05) 0.18       1.4       3.03
     2        5.75    6.76    4.066  0.30( 0.05) 0.18       1.5       3.01
     3        5.69    7.52    3.829  0.30( 0.05) 0.18       1.6       3.11
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.21 =     455.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        9.41    5.96    4.366  0.30( 0.06) 0.19       2.4       2.11
     2        9.45    6.04    4.333  0.30( 0.06) 0.19       2.4       2.01
     3        9.47    6.11    4.304  0.30( 0.06) 0.19       2.4       2.05
     4        9.40    7.09    3.960  0.30( 0.06) 0.19       2.6       1.01
     5        9.39    7.12    3.950  0.30( 0.06) 0.19       2.6       1.03
     6        9.32    7.24    3.913  0.30( 0.06) 0.19       2.6       2.07
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      3.21 =     500.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.83    5.73    4.465  0.30( 0.06) 0.18       3.7       3.03
     2       15.03    5.96    4.366  0.30( 0.06) 0.18       3.8       2.11
     3       15.08    6.04    4.333  0.30( 0.06) 0.18       3.8       2.01
     4       15.11    6.11    4.304  0.30( 0.06) 0.18       3.9       2.05
     5       15.17    6.76    4.066  0.30( 0.06) 0.18       4.1       3.01
     6       15.12    7.09    3.960  0.30( 0.06) 0.18       4.2       1.01
     7       15.11    7.12    3.950  0.30( 0.06) 0.18       4.2       1.03
     8       15.04    7.24    3.913  0.30( 0.06) 0.18       4.2       2.07
     9       14.81    7.52    3.829  0.30( 0.06) 0.18       4.3       3.11
   TOTAL AREA(ACRES) =          4.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       15.17  Tc(MIN.) =    6.762
 EFFECTIVE AREA(ACRES) =      4.11  AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      3.21 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.01 TO NODE      4.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.76
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.066
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.23      0.30      0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
```

```
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    0.84
 EFFECTIVE AREA(ACRES) =      4.34   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      15.67

****************************************************************************
 FLOW PROCESS FROM NODE      5.01 TO NODE      5.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.76
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.066
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.01      0.30     0.100    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.04
 EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      15.71

****************************************************************************
 FLOW PROCESS FROM NODE      6.01 TO NODE      6.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.76
 *  25 YEAR RAINFALL INTENSITY(INCH/HR) =  4.066
 SUBAREA LOSS RATE DATA(AMC  II):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.08      0.30     0.350    56
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.29
 EFFECTIVE AREA(ACRES) =      4.43   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      16.00
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        4.6  TC(MIN.) =      6.76
 EFFECTIVE AREA(ACRES) =      4.43  AREA-AVERAGED Fm(INCH/HR)=  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.183
 PEAK FLOW RATE(CFS)   =      16.00

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       15.77    5.73    4.465  0.30( 0.05) 0.18       4.0       3.03
     2       15.93    5.96    4.366  0.30( 0.05) 0.18       4.1       2.11
     3       15.98    6.04    4.333  0.30( 0.05) 0.18       4.1       2.01
     4       16.00    6.11    4.304  0.30( 0.05) 0.18       4.2       2.05
     5       16.00    6.76    4.066  0.30( 0.05) 0.18       4.4       3.01
     6       15.92    7.09    3.960  0.30( 0.05) 0.18       4.5       1.01
     7       15.91    7.12    3.950  0.30( 0.05) 0.18       4.5       1.03
     8       15.83    7.24    3.913  0.30( 0.05) 0.18       4.6       2.07
     9       15.59    7.52    3.829  0.30( 0.05) 0.18       4.6       3.11
```

==========
==========

END OF RATIONAL METHOD ANALYSIS

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1618

                          Analysis prepared by:
```

```
 ************************* DESCRIPTION OF STUDY *************************
* OCWRE                                                                 *
* 100-YEAR STORM EVENT                                                  *
* EXISTING CONDITION                                                    *
 ************************************************************************

  FILE NAME: OCWRE_EX.DAT
  TIME/DATE OF STUDY: 20:02 01/04/2025
==========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
==========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   260.00
  ELEVATION DATA: UPSTREAM(FEET) =    128.20  DOWNSTREAM(FEET) =    124.30

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.710
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.827
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                B        0.32      0.30      0.350    76    7.71
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      1.36
  TOTAL AREA(ACRES) =      0.32   PEAK FLOW RATE(CFS) =      1.36

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.45  DOWNSTREAM(FEET) =   121.16
  FLOW LENGTH(FEET) =    90.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.94
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     350.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    7.94
  RAINFALL INTENSITY(INCH/HR) =   4.75
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       0.32
  TOTAL STREAM AREA(ACRES) =       0.32
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.36

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.05 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   200.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.30  DOWNSTREAM(FEET) =    123.08

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.780
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.694
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        0.69      0.30      0.100    76    5.78
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      3.52
```

```
 TOTAL AREA(ACRES) =      0.69   PEAK FLOW RATE(CFS) =      3.52

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    5.78
 RAINFALL INTENSITY(INCH/HR) =   5.69
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.69
 TOTAL STREAM AREA(ACRES) =       0.69
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.52

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.36    7.94    4.748  0.30( 0.11) 0.35       0.3       1.01
     2        3.52    5.78    5.694  0.30( 0.03) 0.10       0.7       1.03

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.71    5.78    5.694  0.30( 0.05) 0.16       0.9       1.03
     2        4.29    7.94    4.748  0.30( 0.05) 0.18       1.0       1.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.71    Tc(MIN.) =     5.78
 EFFECTIVE AREA(ACRES) =       0.92   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.0
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     350.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.07 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.16  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =   150.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.80
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.71
 PIPE TRAVEL TIME(MIN.) =   0.43    Tc(MIN.) =    6.21
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.07 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.07 TO NODE      1.07 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
```

```
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   170.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.20  DOWNSTREAM(FEET) =    121.37

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.997
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.575
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS               B        0.52      0.30     0.350    76    6.00
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA AREA(ACRES) =    0.52   INITIAL SUBAREA RUNOFF(CFS) =    2.56

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    6.21
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.464
  SUBAREA AREA(ACRES) =    0.52      SUBAREA RUNOFF(CFS) =    2.51
  EFFECTIVE AREA(ACRES) =      1.44   AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.23
  TOTAL AREA(ACRES) =        1.5       PEAK FLOW RATE(CFS) =       7.01

****************************************************************************
  FLOW PROCESS FROM NODE      1.07 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   112.00
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.79
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.01
  PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    6.24
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 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.) =    6.24
  RAINFALL INTENSITY(INCH/HR) =   5.45
  AREA-AVERAGED Fm(INCH/HR) =  0.07
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.23
  EFFECTIVE STREAM AREA(ACRES) =       1.44
  TOTAL STREAM AREA(ACRES) =       1.53
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.01

****************************************************************************
  FLOW PROCESS FROM NODE      1.09 TO NODE      1.10 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   245.00
  ELEVATION DATA: UPSTREAM(FEET) =    127.50  DOWNSTREAM(FEET) =    123.50

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.932
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.176
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  PUBLIC PARK                B        0.86      0.30     0.850    76    9.93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.850
  SUBAREA RUNOFF(CFS) =      3.03
  TOTAL AREA(ACRES) =      0.86   PEAK FLOW RATE(CFS) =      3.03

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.12 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    123.50  DOWNSTREAM(FEET) =    120.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   155.00   CHANNEL SLOPE =  0.0174
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.024
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.31      0.30     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.89
  AVERAGE FLOW DEPTH(FEET) =   0.17   TRAVEL TIME(MIN.) =   0.66
  Tc(MIN.) =   10.60
  SUBAREA AREA(ACRES) =     0.31       SUBAREA RUNOFF(CFS) =    1.11
  EFFECTIVE AREA(ACRES) =      1.17     AREA-AVERAGED Fm(INCH/HR) =   0.20
  AREA-AVERAGED Fp(INCH/HR) =   0.30  AREA-AVERAGED Ap =   0.65
  TOTAL AREA(ACRES) =        1.2          PEAK FLOW RATE(CFS) =       4.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   4.04
  LONGEST FLOWPATH FROM NODE      1.09 TO NODE      1.12 =     400.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.60
  RAINFALL INTENSITY(INCH/HR) =   4.02
  AREA-AVERAGED Fm(INCH/HR) =  0.20
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.65
  EFFECTIVE STREAM AREA(ACRES) =       1.17
```

```
 TOTAL STREAM AREA(ACRES) =       1.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.03

****************************************************************************
 FLOW PROCESS FROM NODE      1.11 TO NODE      1.12 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   290.00
 ELEVATION DATA: UPSTREAM(FEET) =    127.20  DOWNSTREAM(FEET) =    120.80

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.296
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.422
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.60      0.30      0.100    76    6.30
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      2.91
 TOTAL AREA(ACRES) =      0.60   PEAK FLOW RATE(CFS) =      2.91

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 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.) =    6.30
 RAINFALL INTENSITY(INCH/HR) =   5.42
 AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.10
 EFFECTIVE STREAM AREA(ACRES) =       0.60
 TOTAL STREAM AREA(ACRES) =       0.60
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.91

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.01    6.24    5.449  0.30( 0.07) 0.23       1.4       1.03
     1        6.24    8.41    4.593  0.30( 0.07) 0.24       1.5       1.01
     2        4.03   10.60    4.024  0.30( 0.20) 0.65       1.2       1.09
     3        2.91    6.30    5.422  0.30( 0.03) 0.10       0.6       1.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)      Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       13.17    6.24    5.449  0.30( 0.09) 0.31       2.7       1.03
     2       13.17    6.30    5.422  0.30( 0.09) 0.31       2.7       1.11
     3       12.38    8.41    4.593  0.30( 0.10) 0.34       3.1       1.01
     4       11.64   10.60    4.024  0.30( 0.11) 0.36       3.3       1.09
```

```
  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.17    Tc(MIN.) =     6.30
  EFFECTIVE AREA(ACRES) =       2.74   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.31
  TOTAL AREA(ACRES) =        3.3
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   215.00
  ELEVATION DATA: UPSTREAM(FEET) =    129.20  DOWNSTREAM(FEET) =    125.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.971
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.589
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 B        0.20      0.30     0.100    76    5.97
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.20   INITIAL SUBAREA RUNOFF(CFS) =    1.00

  ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
  MAINLINE Tc(MIN.) =    6.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.422
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    0.97
  EFFECTIVE AREA(ACRES) =      2.94   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =        3.5       PEAK FLOW RATE(CFS) =      14.11

****************************************************************************
  FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.422
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap      SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 B        0.06      0.30     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.06      SUBAREA RUNOFF(CFS) =    0.29
  EFFECTIVE AREA(ACRES) =      3.00   AREA-AVERAGED Fm(INCH/HR) =  0.09
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
  TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      14.41

****************************************************************************
  FLOW PROCESS FROM NODE      4.01 TO NODE      4.02 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.422
```

```
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.07      0.30      0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.34
 EFFECTIVE AREA(ACRES) =      3.07   AREA-AVERAGED Fm(INCH/HR) =  0.09
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.29
 TOTAL AREA(ACRES) =        3.6       PEAK FLOW RATE(CFS) =      14.75

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       14.76    6.24    5.449  0.30( 0.09) 0.29       3.1       1.03
     2       14.75    6.30    5.422  0.30( 0.09) 0.29       3.1       1.11
     3       13.72    8.41    4.593  0.30( 0.09) 0.31       3.4       1.01
     4       12.82   10.60    4.024  0.30( 0.10) 0.34       3.6       1.09
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      14.76  Tc(MIN.) =    6.24
 AREA-AVERAGED Fm(INCH/HR) =  0.09  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.29  EFFECTIVE AREA(ACRES) =       3.06

****************************************************************************
 FLOW PROCESS FROM NODE      5.01 TO NODE      5.02 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.24
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.449
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.06      0.30      0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.06      SUBAREA RUNOFF(CFS) =    0.29
 EFFECTIVE AREA(ACRES) =      3.12   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
 TOTAL AREA(ACRES) =        3.7       PEAK FLOW RATE(CFS) =      15.05

****************************************************************************
 FLOW PROCESS FROM NODE      6.01 TO NODE      6.02 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   165.00
 ELEVATION DATA: UPSTREAM(FEET) =    127.40  DOWNSTREAM(FEET) =    124.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.774
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.698
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.38      0.30      0.200    76    5.77
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA AREA(ACRES) =    0.38   INITIAL SUBAREA RUNOFF(CFS) =    1.93
```

```
 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =    6.24
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.449
 SUBAREA AREA(ACRES) =    0.38      SUBAREA RUNOFF(CFS) =    1.84
 EFFECTIVE AREA(ACRES) =      3.50   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        4.1       PEAK FLOW RATE(CFS) =      16.89

****************************************************************************
 FLOW PROCESS FROM NODE      6.02 TO NODE      7.03 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.) =    6.24
 RAINFALL INTENSITY(INCH/HR) =   5.45
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.27
 EFFECTIVE STREAM AREA(ACRES) =       3.50
 TOTAL STREAM AREA(ACRES) =       4.07
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      16.89

****************************************************************************
 FLOW PROCESS FROM NODE      7.01 TO NODE      7.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.20  DOWNSTREAM(FEET) =    125.70

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.04      0.30     0.200    76    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      0.22
 TOTAL AREA(ACRES) =      0.04   PEAK FLOW RATE(CFS) =      0.22

****************************************************************************
 FLOW PROCESS FROM NODE      7.02 TO NODE      7.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.70  DOWNSTREAM(FEET) =   122.50
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   1.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.80
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.22
 PIPE TRAVEL TIME(MIN.) =   0.71    Tc(MIN.) =    5.71
```

```
 LONGEST FLOWPATH FROM NODE      7.01 TO NODE      7.03 =     160.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      7.03 TO NODE      8.02 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.) =    5.71
 RAINFALL INTENSITY(INCH/HR) =   5.73
 AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.04
 TOTAL STREAM AREA(ACRES) =       0.04
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.22

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.89    6.24    5.449  0.30( 0.08) 0.27       3.5       1.03
     1       16.87    6.30    5.422  0.30( 0.08) 0.27       3.5       1.11
     1       15.52    8.41    4.593  0.30( 0.09) 0.30       3.8       1.01
     1       14.39   10.60    4.024  0.30( 0.10) 0.32       4.1       1.09
     2        0.22    5.71    5.732  0.30( 0.06) 0.20       0.0       7.01

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       16.50    5.71    5.732  0.30( 0.08) 0.27       3.2       7.01
     2       17.10    6.24    5.449  0.30( 0.08) 0.27       3.5       1.03
     3       17.08    6.30    5.422  0.30( 0.08) 0.27       3.6       1.11
     4       15.69    8.41    4.593  0.30( 0.09) 0.30       3.9       1.01
     5       14.54   10.60    4.024  0.30( 0.10) 0.32       4.1       1.09

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      17.10    Tc(MIN.) =     6.24
 EFFECTIVE AREA(ACRES) =       3.54   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        4.1
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      8.02 =     540.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      8.01 TO NODE      8.02 IS CODE =  82
----------------------------------------------------------------------------
 >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
 >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.60  DOWNSTREAM(FEET) =    124.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.954
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.122
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
COMMERCIAL                 B        0.45      0.30      0.100    76    6.95
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.45   INITIAL SUBAREA RUNOFF(CFS) =    2.06

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) =    6.24
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.449
SUBAREA AREA(ACRES) =    0.45      SUBAREA RUNOFF(CFS) =    2.19
EFFECTIVE AREA(ACRES) =      3.99   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      19.28

****************************************************************************
FLOW PROCESS FROM NODE      9.01 TO NODE      9.01 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    6.24
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.449
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                 B        0.05      0.30      0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.24
EFFECTIVE AREA(ACRES) =      4.04   AREA-AVERAGED Fm(INCH/HR) =  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.25
TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      19.52
============================================================================
END OF STUDY SUMMARY:
TOTAL AREA(ACRES)     =        4.6  TC(MIN.) =      6.24
EFFECTIVE AREA(ACRES) =      4.04  AREA-AVERAGED Fm(INCH/HR)=  0.08
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap = 0.251
PEAK FLOW RATE(CFS)   =      19.52

** PEAK FLOW RATE TABLE **
 STREAM       Q       Tc   Intensity   Fp(Fm)      Ap      Ae     HEADWATER
 NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)           (ACRES)    NODE
    1       19.05    5.71    5.732  0.30( 0.07) 0.25       3.7       7.01
    2       19.52    6.24    5.449  0.30( 0.08) 0.25       4.0       1.03
    3       19.49    6.30    5.422  0.30( 0.08) 0.25       4.1       1.11
    4       17.74    8.41    4.593  0.30( 0.08) 0.27       4.4       1.01
    5       16.33   10.60    4.024  0.30( 0.09) 0.29       4.6       1.09
============================================================================
============================================================================
END OF RATIONAL METHOD ANALYSIS
```

```
**************************************************************************
            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
           (Reference: 1986 ORANGE COUNTY HYDROLOGY CRITERION)
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             Ver. 23.0  Release Date: 07/01/2016  License ID 1618

                          Analysis prepared by:




 ************************* DESCRIPTION OF STUDY *************************
* OCWRE                                                                 *
* 100-YEAR STORM EVENT                                                  *
* PROPOSED CONDITION                                                    *
 ************************************************************************

  FILE NAME: OCWRE_PR.DAT
  TIME/DATE OF STUDY: 17:07 01/04/2025
========================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
========================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  *DATA BANK RAINFALL USED*
  *ANTECEDENT MOISTURE CONDITION (AMC) III ASSUMED FOR RATIONAL METHOD*

  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
  *USER-SPECIFIED MINIMUM TOPOGRAPHIC SLOPE ADJUSTMENT NOT SELECTED

**************************************************************************
  FLOW PROCESS FROM NODE      1.01 TO NODE      1.02 IS CODE =  21
--------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   135.00
  ELEVATION DATA: UPSTREAM(FEET) =    127.95  DOWNSTREAM(FEET) =    125.35

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.643
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.773
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  CONDOMINIUMS                B        0.15      0.30      0.350    76    5.64
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
  SUBAREA RUNOFF(CFS) =      0.77
  TOTAL AREA(ACRES) =      0.15   PEAK FLOW RATE(CFS) =      0.77

****************************************************************************
  FLOW PROCESS FROM NODE      1.02 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   122.35  DOWNSTREAM(FEET) =   120.00
  FLOW LENGTH(FEET) =   250.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.90
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.77
  PIPE TRAVEL TIME(MIN.) =   1.07    Tc(MIN.) =    6.71
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 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.) =    6.71
  RAINFALL INTENSITY(INCH/HR) =   5.23
  AREA-AVERAGED Fm(INCH/HR) =  0.10
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.35
  EFFECTIVE STREAM AREA(ACRES) =       0.15
  TOTAL STREAM AREA(ACRES) =       0.15
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       0.77

****************************************************************************
  FLOW PROCESS FROM NODE      1.03 TO NODE      1.04 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   250.00
  ELEVATION DATA: UPSTREAM(FEET) =    128.20  DOWNSTREAM(FEET) =    123.40

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.743
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.213
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  MOBILE HOME PARK            B        0.50      0.30      0.250    76    6.74
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.250
  SUBAREA RUNOFF(CFS) =      2.31
```

```
 TOTAL AREA(ACRES) =      0.50   PEAK FLOW RATE(CFS) =      2.31

****************************************************************************
 FLOW PROCESS FROM NODE      1.04 TO NODE      1.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.40  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.42
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.31
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    6.81
 LONGEST FLOWPATH FROM NODE      1.03 TO NODE      1.05 =     275.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.05 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.81
 RAINFALL INTENSITY(INCH/HR) =   5.18
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.25
 EFFECTIVE STREAM AREA(ACRES) =       0.50
 TOTAL STREAM AREA(ACRES) =       0.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.31

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        0.77    6.71    5.227  0.30( 0.10) 0.35       0.2       1.01
     2        2.31    6.81    5.184  0.30( 0.08) 0.25       0.5       1.03

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        3.06    6.71    5.227  0.30( 0.08) 0.27       0.6       1.01
     2        3.07    6.81    5.184  0.30( 0.08) 0.27       0.6       1.03

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.07    Tc(MIN.) =     6.81
 EFFECTIVE AREA(ACRES) =       0.65   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.27
 TOTAL AREA(ACRES) =        0.6
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.05 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.05 TO NODE      1.10 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   119.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.73
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.07
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    6.95
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.10 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.10 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    6.95
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.122
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  APARTMENTS                B        0.16      0.30     0.200    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA AREA(ACRES) =    0.16      SUBAREA RUNOFF(CFS) =    0.73
  EFFECTIVE AREA(ACRES) =      0.81   AREA-AVERAGED Fm(INCH/HR) =  0.08
  AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.26
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.68

****************************************************************************
  FLOW PROCESS FROM NODE      1.10 TO NODE      1.12 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   119.50  DOWNSTREAM(FEET) =   119.10
  FLOW LENGTH(FEET) =    40.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.68
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    7.07
  LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.12 =     475.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.12 TO NODE      1.12 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    7.07
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.075
  SUBAREA LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE           GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                B        0.11      0.30     0.100    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.50
  EFFECTIVE AREA(ACRES) =      0.92   AREA-AVERAGED Fm(INCH/HR) =  0.07
```

```
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.24
 TOTAL AREA(ACRES) =        0.9       PEAK FLOW RATE(CFS) =       4.14

****************************************************************************
 FLOW PROCESS FROM NODE      1.12 TO NODE      1.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   119.10  DOWNSTREAM(FEET) =   117.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  13.78
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.14
 PIPE TRAVEL TIME(MIN.) =   0.03    Tc(MIN.) =    7.10
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      1.13 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  10
----------------------------------------------------------------------------
 >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      1.13 TO NODE      1.13 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE      2.01 TO NODE      2.02 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
 ELEVATION DATA: UPSTREAM(FEET) =    130.00  DOWNSTREAM(FEET) =    129.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        0.12      0.30      0.100    76    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.66
 TOTAL AREA(ACRES) =      0.12   PEAK FLOW RATE(CFS) =      0.66

****************************************************************************
 FLOW PROCESS FROM NODE      2.02 TO NODE      2.03 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   124.00  DOWNSTREAM(FEET) =   123.20
 FLOW LENGTH(FEET) =    75.00   MANNING'S N =  0.011
```

```
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   3.93
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.66
 PIPE TRAVEL TIME(MIN.) =   0.32    Tc(MIN.) =    5.32
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.03 =     155.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.03 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.32
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.972
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.12      0.30     0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.64
 EFFECTIVE AREA(ACRES) =      0.24   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.2       PEAK FLOW RATE(CFS) =       1.28

****************************************************************************
 FLOW PROCESS FROM NODE      2.03 TO NODE      2.04 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.20  DOWNSTREAM(FEET) =   119.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.39
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.28
 PIPE TRAVEL TIME(MIN.) =   0.44    Tc(MIN.) =    5.76
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.04 =     325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.04 TO NODE      2.04 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.76
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.705
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.11      0.30     0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.11      SUBAREA RUNOFF(CFS) =    0.56
 EFFECTIVE AREA(ACRES) =      0.35   AREA-AVERAGED Fm(INCH/HR) =  0.03
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.10
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.79
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.04 TO NODE      2.20 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   119.00  DOWNSTREAM(FEET) =   118.50
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.79
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    5.93
  LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 2 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.05 TO NODE      2.06 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.10  DOWNSTREAM(FEET) =    124.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.927
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.613
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  B        0.11      0.30      0.200    76    5.93
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      0.55
  TOTAL AREA(ACRES) =      0.11   PEAK FLOW RATE(CFS) =      0.55

****************************************************************************
  FLOW PROCESS FROM NODE      2.06 TO NODE      2.06 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.90  DOWNSTREAM(FEET) =    124.10

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.294
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.423
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                  B        0.42      0.30      0.100    76    6.29
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.42   INITIAL SUBAREA RUNOFF(CFS) =    2.04

 ** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
 MAINLINE Tc(MIN.) =    5.93
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.613
 SUBAREA AREA(ACRES) =    0.42      SUBAREA RUNOFF(CFS) =    2.11
 EFFECTIVE AREA(ACRES) =      0.53   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.12
 TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       2.66

****************************************************************************
 FLOW PROCESS FROM NODE      2.06 TO NODE      2.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.00  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   8.25
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.66
 PIPE TRAVEL TIME(MIN.) =   0.07    Tc(MIN.) =    6.00
 LONGEST FLOWPATH FROM NODE      2.05 TO NODE      2.10 =     195.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.10 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.) =    6.00
 RAINFALL INTENSITY(INCH/HR) =   5.57
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.12
 EFFECTIVE STREAM AREA(ACRES) =       0.53
 TOTAL STREAM AREA(ACRES) =       0.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.66

****************************************************************************
 FLOW PROCESS FROM NODE      2.07 TO NODE      2.08 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   160.00
 ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    124.50

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.808
```

```
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.184
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 APARTMENTS                  B        0.38      0.30      0.200    76    6.81
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
 SUBAREA RUNOFF(CFS) =      1.75
 TOTAL AREA(ACRES) =      0.38   PEAK FLOW RATE(CFS) =      1.75

****************************************************************************
 FLOW PROCESS FROM NODE      2.08 TO NODE      2.09 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.50  DOWNSTREAM(FEET) =   120.80
 FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.02
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.75
 PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    7.04
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.09 =     230.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.09 TO NODE      2.09 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    7.04
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.085
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.15      0.30      0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    0.68
 EFFECTIVE AREA(ACRES) =      0.53   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.17
 TOTAL AREA(ACRES) =        0.5       PEAK FLOW RATE(CFS) =       2.40

****************************************************************************
 FLOW PROCESS FROM NODE      2.09 TO NODE      2.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.80  DOWNSTREAM(FEET) =   120.00
 FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.82
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.40
 PIPE TRAVEL TIME(MIN.) =   0.06    Tc(MIN.) =    7.10
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.10 =     260.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.10 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) =   5.06
 AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.17
 EFFECTIVE STREAM AREA(ACRES) =       0.53
 TOTAL STREAM AREA(ACRES) =       0.53
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.40

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.66    6.00    5.575  0.30( 0.04) 0.12       0.5       2.05
     2        2.40    7.10    5.059  0.30( 0.05) 0.17       0.5       2.07

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.90    6.00    5.575  0.30( 0.04) 0.14       1.0       2.05
     2        4.81    7.10    5.059  0.30( 0.04) 0.15       1.1       2.07

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.90    Tc(MIN.) =     6.00
 EFFECTIVE AREA(ACRES) =       0.98   AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
 TOTAL AREA(ACRES) =        1.1
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.10 =     260.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.10 TO NODE      2.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   119.80
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.47
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.90
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    6.05
 LONGEST FLOWPATH FROM NODE      2.07 TO NODE      2.15 =     280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.15 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.) =    6.05
 RAINFALL INTENSITY(INCH/HR) =   5.55
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.14
 EFFECTIVE STREAM AREA(ACRES) =       0.98
 TOTAL STREAM AREA(ACRES) =       1.06
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.90

****************************************************************************
 FLOW PROCESS FROM NODE      2.11 TO NODE      2.12 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    40.00
 ELEVATION DATA: UPSTREAM(FEET) =    126.30  DOWNSTREAM(FEET) =    125.90

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.187
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 CONDOMINIUMS               B        0.23      0.30     0.350    76    5.00
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA RUNOFF(CFS) =      1.26
 TOTAL AREA(ACRES) =      0.23   PEAK FLOW RATE(CFS) =      1.26

****************************************************************************
 FLOW PROCESS FROM NODE      2.12 TO NODE      2.13 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.90  DOWNSTREAM(FEET) =   122.00
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.79
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.26
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    5.59
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.13 =     210.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.13 TO NODE      2.13 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.59
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.803
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.09      0.30     0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
 SUBAREA AREA(ACRES) =    0.09      SUBAREA RUNOFF(CFS) =    0.47
 EFFECTIVE AREA(ACRES) =      0.32   AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.28
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.65

****************************************************************************
 FLOW PROCESS FROM NODE      2.13 TO NODE      2.15 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   122.00  DOWNSTREAM(FEET) =   119.80
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   4.3 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.58
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.65
 PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    5.84
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.15 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.15 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.) =    5.84
 RAINFALL INTENSITY(INCH/HR) =   5.66
 AREA-AVERAGED Fm(INCH/HR) =  0.08
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.28
 EFFECTIVE STREAM AREA(ACRES) =       0.32
 TOTAL STREAM AREA(ACRES) =       0.32
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.65

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.90    6.05    5.548  0.30( 0.04) 0.14       1.0       2.05
     1        4.81    7.16    5.038  0.30( 0.04) 0.15       1.1       2.07
     2        1.65    5.84    5.658  0.30( 0.08) 0.28       0.3       2.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.47    5.84    5.658  0.30( 0.05) 0.18       1.3       2.11
     2        6.51    6.05    5.548  0.30( 0.05) 0.18       1.3       2.05
     3        6.28    7.16    5.038  0.30( 0.05) 0.18       1.4       2.07

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       6.51    Tc(MIN.) =     6.05
 EFFECTIVE AREA(ACRES) =       1.30   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        1.4
```

```
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.15 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.15 TO NODE      2.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   119.80  DOWNSTREAM(FEET) =   118.50
 FLOW LENGTH(FEET) =    10.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  18.24
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       6.51
 PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    6.06
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.20 =     320.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 2 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        6.47    5.85    5.653  0.30( 0.05) 0.18       1.3       2.11
     2        6.51    6.06    5.543  0.30( 0.05) 0.18       1.3       2.05
     3        6.28    7.17    5.035  0.30( 0.05) 0.18       1.4       2.07
 LONGEST FLOWPATH FROM NODE      2.11 TO NODE      2.20 =     320.00 FEET.

 ** MEMORY BANK #  2 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        1.79    5.93    5.613  0.30( 0.03) 0.10       0.3       2.01
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        8.25    5.85    5.653  0.30( 0.05) 0.16       1.6       2.11
     2        8.27    5.93    5.613  0.30( 0.05) 0.16       1.6       2.01
     3        8.28    6.06    5.543  0.30( 0.05) 0.16       1.6       2.05
     4        7.88    7.17    5.035  0.30( 0.05) 0.16       1.7       2.07
   TOTAL AREA(ACRES) =         1.7

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =        8.28  Tc(MIN.) =    6.058
 EFFECTIVE AREA(ACRES) =      1.65  AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.16
 TOTAL AREA(ACRES) =        1.7
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.20 =     375.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 2 <<<<<
============================================================================
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      2.20 TO NODE      2.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   118.50  DOWNSTREAM(FEET) =   118.00
 FLOW LENGTH(FEET) =    25.00   MANNING'S N =  0.011
 DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.50
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       8.28
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    6.10
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.21 =     400.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.21 TO NODE      2.21 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        8.25    5.90    5.629  0.30( 0.05) 0.16       1.6       2.11
     2        8.27    5.97    5.589  0.30( 0.05) 0.16       1.6       2.01
     3        8.28    6.10    5.520  0.30( 0.05) 0.16       1.6       2.05
     4        7.88    7.21    5.017  0.30( 0.05) 0.16       1.7       2.07
 LONGEST FLOWPATH FROM NODE      2.01 TO NODE      2.21 =     400.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.14    7.00    5.103  0.30( 0.07) 0.24       0.9       1.01
     2        4.14    7.10    5.062  0.30( 0.07) 0.24       0.9       1.03
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.21 =     500.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.11    5.90    5.629  0.30( 0.06) 0.19       2.4       2.11
     2       12.15    5.97    5.589  0.30( 0.06) 0.19       2.4       2.01
     3       12.19    6.10    5.520  0.30( 0.06) 0.19       2.4       2.05
     4       12.10    7.00    5.103  0.30( 0.06) 0.19       2.6       1.01
     5       12.06    7.10    5.062  0.30( 0.06) 0.19       2.6       1.03
     6       11.98    7.21    5.017  0.30( 0.06) 0.19       2.6       2.07
   TOTAL AREA(ACRES) =         2.6

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       12.19  Tc(MIN.) =    6.102
 EFFECTIVE AREA(ACRES) =      2.44  AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.19
 TOTAL AREA(ACRES) =        2.6
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      2.21 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      2.21 TO NODE      2.21 IS CODE =  12
----------------------------------------------------------------------------
 >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================
```

```
****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      2.20 TO NODE      2.20 IS CODE =  13
----------------------------------------------------------------------------
  >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE      3.01 TO NODE      3.02 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   185.00
  ELEVATION DATA: UPSTREAM(FEET) =    126.00  DOWNSTREAM(FEET) =    123.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.962
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.594
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  APARTMENTS                  B        0.49      0.30     0.200    76    5.96
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
  SUBAREA RUNOFF(CFS) =      2.44
  TOTAL AREA(ACRES) =      0.49   PEAK FLOW RATE(CFS) =      2.44

****************************************************************************
  FLOW PROCESS FROM NODE      3.02 TO NODE      3.10 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   120.00  DOWNSTREAM(FEET) =   117.90
  FLOW LENGTH(FEET) =   200.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.55
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.44
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    6.56
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.10 =     385.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.10 TO NODE      3.10 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.) =    6.56
  RAINFALL INTENSITY(INCH/HR) =   5.29
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
```

```
 AREA-AVERAGED Ap =  0.20
 EFFECTIVE STREAM AREA(ACRES) =       0.49
 TOTAL STREAM AREA(ACRES) =       0.49
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.44

****************************************************************************
 FLOW PROCESS FROM NODE      3.03 TO NODE      3.04 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
 >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   110.00
 ELEVATION DATA: UPSTREAM(FEET) =    130.00  DOWNSTREAM(FEET) =    129.00

 Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
 SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.102
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.116
 SUBAREA Tc AND LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
 COMMERCIAL                 B        0.17      0.30     0.100    76    5.10
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA RUNOFF(CFS) =      0.93
 TOTAL AREA(ACRES) =      0.17   PEAK FLOW RATE(CFS) =      0.93

****************************************************************************
 FLOW PROCESS FROM NODE      3.04 TO NODE      3.05 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   124.20  DOWNSTREAM(FEET) =   123.60
 FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.9 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.22
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.93
 PIPE TRAVEL TIME(MIN.) =   0.24    Tc(MIN.) =    5.34
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.05 =     170.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.05 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    5.34
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.959
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.17      0.30     0.350    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    0.17      SUBAREA RUNOFF(CFS) =    0.90
 EFFECTIVE AREA(ACRES) =      0.34   AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.22
 TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.80
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      3.05 TO NODE      3.10 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.60  DOWNSTREAM(FEET) =   117.90
 FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.19
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       1.80
 PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.54
 LONGEST FLOWPATH FROM NODE      3.03 TO NODE      3.10 =     280.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.10 TO NODE      3.10 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.) =    5.54
 RAINFALL INTENSITY(INCH/HR) =   5.84
 AREA-AVERAGED Fm(INCH/HR) =  0.07
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.22
 EFFECTIVE STREAM AREA(ACRES) =       0.34
 TOTAL STREAM AREA(ACRES) =       0.34
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       1.80

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        2.44    6.56    5.294  0.30( 0.06) 0.20       0.5       3.01
     2        1.80    5.54    5.835  0.30( 0.07) 0.22       0.3       3.03

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.07    5.54    5.835  0.30( 0.06) 0.21       0.8       3.03
     2        4.07    6.56    5.294  0.30( 0.06) 0.21       0.8       3.01

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       4.07    Tc(MIN.) =     5.54
 EFFECTIVE AREA(ACRES) =       0.75   AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.21
 TOTAL AREA(ACRES) =        0.8
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.10 =     385.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.10 TO NODE      3.20 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   117.90  DOWNSTREAM(FEET) =   117.40
  FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.96
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.07
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    5.68
  LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.20 =     435.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 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.) =    5.68
  RAINFALL INTENSITY(INCH/HR) =   5.75
  AREA-AVERAGED Fm(INCH/HR) =  0.06
  AREA-AVERAGED Fp(INCH/HR) =  0.30
  AREA-AVERAGED Ap =  0.21
  EFFECTIVE STREAM AREA(ACRES) =       0.75
  TOTAL STREAM AREA(ACRES) =       0.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.07

****************************************************************************
  FLOW PROCESS FROM NODE      3.11 TO NODE      3.12 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   275.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    122.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    7.303
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
   DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
       LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                  B        0.35      0.30      0.100    76    7.30
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA RUNOFF(CFS) =      1.56
  TOTAL AREA(ACRES) =      0.35   PEAK FLOW RATE(CFS) =      1.56

****************************************************************************
  FLOW PROCESS FROM NODE      3.12 TO NODE      3.12 IS CODE =  82
----------------------------------------------------------------------------
  >>>>>ADD SUBAREA RUNOFF TO MAINLINE, AT MAINLINE Tc,<<<<<
  >>>>>(AND COMPUTE INITIAL SUBAREA RUNOFF)<<<<<
==========================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   220.00
  ELEVATION DATA: UPSTREAM(FEET) =    125.50  DOWNSTREAM(FEET) =    122.90

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    6.808
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.184
  SUBAREA Tc AND LOSS RATE DATA(AMC III):
```

```
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS   Tc
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
APARTMENTS                  B        0.32      0.30      0.200    76    6.81
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.200
SUBAREA AREA(ACRES) =    0.32   INITIAL SUBAREA RUNOFF(CFS) =    1.48

** ADD SUBAREA RUNOFF TO MAINLINE AT MAINLINE Tc:
MAINLINE Tc(MIN.) =    7.30
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.980
SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    1.42
EFFECTIVE AREA(ACRES) =      0.67   AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.15
TOTAL AREA(ACRES) =        0.7       PEAK FLOW RATE(CFS) =       2.98

****************************************************************************
FLOW PROCESS FROM NODE      3.12 TO NODE      3.14 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   119.90  DOWNSTREAM(FEET) =   119.30
FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.011
DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.1 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =   6.12
ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
PIPE-FLOW(CFS) =       2.98
PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    7.44
LONGEST FLOWPATH FROM NODE      3.11 TO NODE      3.14 =     325.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE      3.14 TO NODE      3.14 IS CODE =  81
----------------------------------------------------------------------------
>>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
MAINLINE Tc(MIN.) =    7.44
* 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.928
SUBAREA LOSS RATE DATA(AMC III):
 DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
     LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
COMMERCIAL                  B        0.12      0.30      0.100    76
SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
SUBAREA AREA(ACRES) =    0.12      SUBAREA RUNOFF(CFS) =    0.53
EFFECTIVE AREA(ACRES) =      0.79   AREA-AVERAGED Fm(INCH/HR) =  0.04
AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.14
TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.47

****************************************************************************
FLOW PROCESS FROM NODE      3.14 TO NODE      3.20 IS CODE =  31
----------------------------------------------------------------------------
>>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
>>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   119.30  DOWNSTREAM(FEET) =   117.40
FLOW LENGTH(FEET) =    35.00   MANNING'S N =  0.011
ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.0 INCHES
PIPE-FLOW VELOCITY(FEET/SEC.) =  11.20
ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
```

```
 PIPE-FLOW(CFS) =       3.47
 PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    7.49
 LONGEST FLOWPATH FROM NODE      3.11 TO NODE      3.20 =     360.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.20 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.) =    7.49
 RAINFALL INTENSITY(INCH/HR) =   4.91
 AREA-AVERAGED Fm(INCH/HR) =  0.04
 AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.14
 EFFECTIVE STREAM AREA(ACRES) =       0.79
 TOTAL STREAM AREA(ACRES) =       0.79
 PEAK FLOW RATE(CFS) AT CONFLUENCE =       3.47

 ** CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        4.07    5.68    5.753  0.30( 0.06) 0.21       0.8       3.03
     1        4.07    6.70    5.231  0.30( 0.06) 0.21       0.8       3.01
     2        3.47    7.49    4.908  0.30( 0.04) 0.14       0.8       3.11

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

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.16    5.68    5.753  0.30( 0.05) 0.18       1.4       3.03
     2        7.39    6.70    5.231  0.30( 0.05) 0.18       1.5       3.01
     3        7.29    7.49    4.908  0.30( 0.05) 0.18       1.6       3.11

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       7.39    Tc(MIN.) =     6.70
 EFFECTIVE AREA(ACRES) =       1.54   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        1.6
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.20 =     435.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      3.20 TO NODE      3.21 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   117.40  DOWNSTREAM(FEET) =   114.00
 FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.011
 ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =  20.81
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       7.39
 PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    6.72
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.21 =     455.00 FEET.
```

```
****************************************************************************
 FLOW PROCESS FROM NODE      3.21 TO NODE      3.21 IS CODE =  11
----------------------------------------------------------------------------
 >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

 ** MAIN STREAM CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1        7.16    5.69    5.743  0.30( 0.05) 0.18       1.4       3.03
     2        7.39    6.72    5.224  0.30( 0.05) 0.18       1.5       3.01
     3        7.29    7.51    4.902  0.30( 0.05) 0.18       1.6       3.11
 LONGEST FLOWPATH FROM NODE      3.01 TO NODE      3.21 =     455.00 FEET.

 ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       12.11    5.90    5.629  0.30( 0.06) 0.19       2.4       2.11
     2       12.15    5.97    5.589  0.30( 0.06) 0.19       2.4       2.01
     3       12.19    6.10    5.520  0.30( 0.06) 0.19       2.4       2.05
     4       12.10    7.00    5.103  0.30( 0.06) 0.19       2.6       1.01
     5       12.06    7.10    5.062  0.30( 0.06) 0.19       2.6       1.03
     6       11.98    7.21    5.017  0.30( 0.06) 0.19       2.6       2.07
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      3.21 =     500.00 FEET.

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       19.09    5.69    5.743  0.30( 0.06) 0.18       3.6       3.03
     2       19.32    5.90    5.629  0.30( 0.06) 0.18       3.8       2.11
     3       19.38    5.97    5.589  0.30( 0.06) 0.18       3.8       2.01
     4       19.44    6.10    5.520  0.30( 0.06) 0.18       3.9       2.05
     5       19.51    6.72    5.224  0.30( 0.06) 0.18       4.1       3.01
     6       19.45    7.00    5.103  0.30( 0.06) 0.18       4.2       1.01
     7       19.41    7.10    5.062  0.30( 0.06) 0.18       4.2       1.03
     8       19.31    7.21    5.017  0.30( 0.06) 0.18       4.2       2.07
     9       19.00    7.51    4.902  0.30( 0.06) 0.18       4.3       3.11
   TOTAL AREA(ACRES) =          4.3

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       19.51  Tc(MIN.) =    6.719
 EFFECTIVE AREA(ACRES) =      4.11  AREA-AVERAGED Fm(INCH/HR) =  0.06
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.3
 LONGEST FLOWPATH FROM NODE      1.01 TO NODE      3.21 =     500.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE      4.01 TO NODE      4.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.72
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.224
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/       SCS SOIL   AREA      Fp         Ap      SCS
      LAND USE             GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                  B        0.23      0.30      0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
```

```
 SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.08
 EFFECTIVE AREA(ACRES) =      4.34   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      20.18

****************************************************************************
 FLOW PROCESS FROM NODE      5.01 TO NODE      5.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.72
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.224
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 COMMERCIAL                 B        0.01      0.30     0.100    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
 SUBAREA AREA(ACRES) =    0.01      SUBAREA RUNOFF(CFS) =    0.05
 EFFECTIVE AREA(ACRES) =      4.35   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.5       PEAK FLOW RATE(CFS) =      20.22

****************************************************************************
 FLOW PROCESS FROM NODE      6.01 TO NODE      6.01 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 MAINLINE Tc(MIN.) =    6.72
 * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.224
 SUBAREA LOSS RATE DATA(AMC III):
  DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
      LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
 CONDOMINIUMS               B        0.08      0.30     0.350    76
 SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.30
 SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.350
 SUBAREA AREA(ACRES) =    0.08      SUBAREA RUNOFF(CFS) =    0.37
 EFFECTIVE AREA(ACRES) =      4.43   AREA-AVERAGED Fm(INCH/HR) =  0.05
 AREA-AVERAGED Fp(INCH/HR) =  0.30  AREA-AVERAGED Ap =  0.18
 TOTAL AREA(ACRES) =        4.6       PEAK FLOW RATE(CFS) =      20.59

 ** PEAK FLOW RATE TABLE **
  STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
  NUMBER     (CFS)   (MIN.) (INCH/HR) (INCH/HR)          (ACRES)    NODE
     1       20.32    5.69    5.743  0.30( 0.05) 0.18       4.0       3.03
     2       20.51    5.90    5.629  0.30( 0.05) 0.18       4.1       2.11
     3       20.56    5.97    5.589  0.30( 0.05) 0.18       4.1       2.01
     4       20.60    6.10    5.520  0.30( 0.05) 0.18       4.2       2.05
     5       20.59    6.72    5.224  0.30( 0.05) 0.18       4.4       3.01
     6       20.51    7.00    5.103  0.30( 0.05) 0.18       4.5       1.01
     7       20.45    7.10    5.062  0.30( 0.05) 0.18       4.5       1.03
     8       20.36    7.21    5.017  0.30( 0.05) 0.18       4.6       2.07
     9       20.02    7.51    4.902  0.30( 0.05) 0.18       4.6       3.11
 NEW PEAK FLOW DATA ARE:
 PEAK FLOW RATE(CFS) =      20.60  Tc(MIN.) =    6.10
 AREA-AVERAGED Fm(INCH/HR) =  0.05  AREA-AVERAGED Fp(INCH/HR) =  0.30
 AREA-AVERAGED Ap =  0.18  EFFECTIVE AREA(ACRES) =       4.19
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =        4.6  TC(MIN.) =      6.10
```

EFFECTIVE AREA(ACRES) = 4.19 AREA-AVERAGED Fm(INCH/HR)= 0.05
AREA-AVERAGED Fp(INCH/HR) = 0.30 AREA-AVERAGED Ap = 0.182
PEAK FLOW RATE(CFS) = 20.60

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	20.32	5.69	5.743	0.30(0.05)	0.18	4.0	3.03
2	20.51	5.90	5.629	0.30(0.05)	0.18	4.1	2.11
3	20.56	5.97	5.589	0.30(0.05)	0.18	4.1	2.01
4	20.60	6.10	5.520	0.30(0.05)	0.18	4.2	2.05
5	20.59	6.72	5.224	0.30(0.05)	0.18	4.4	3.01
6	20.51	7.00	5.103	0.30(0.05)	0.18	4.5	1.01
7	20.45	7.10	5.062	0.30(0.05)	0.18	4.5	1.03
8	20.36	7.21	5.017	0.30(0.05)	0.18	4.6	2.07
9	20.02	7.51	4.902	0.30(0.05)	0.18	4.6	3.11

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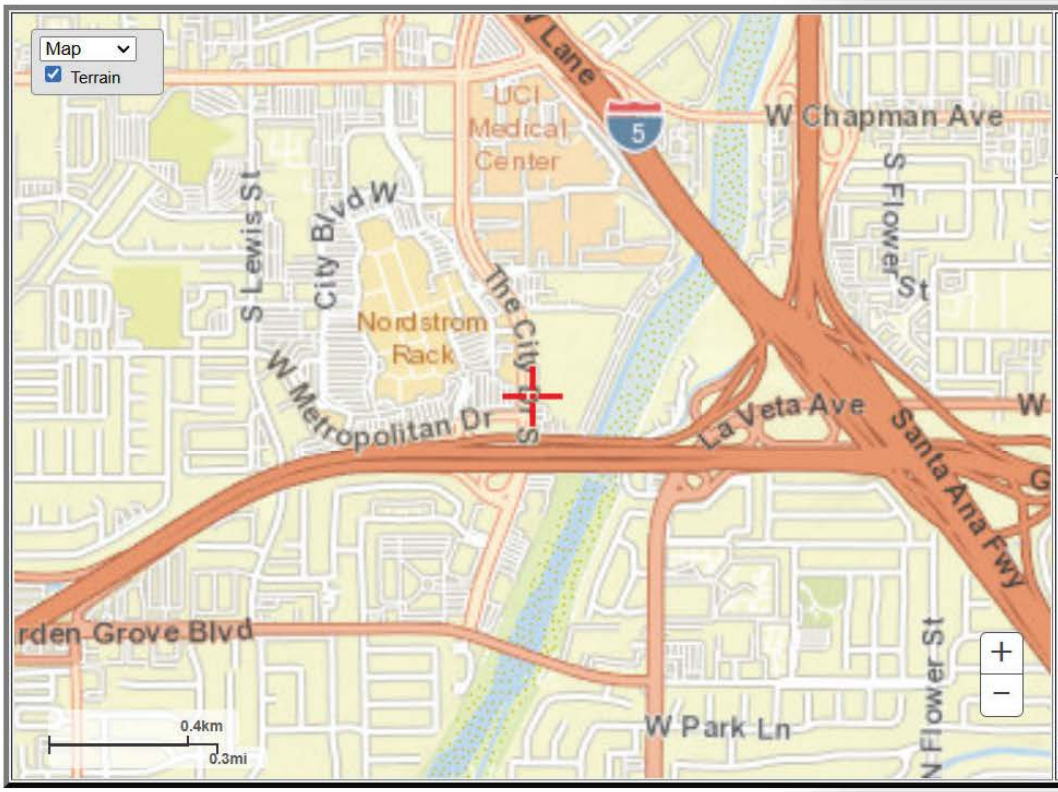
END OF RATIONAL METHOD ANALYSIS

Appendix B

Rainfall Data
Post-Development Unit Hydrograph Analysis
25-Year Storm Event
100-Year Storm Event



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

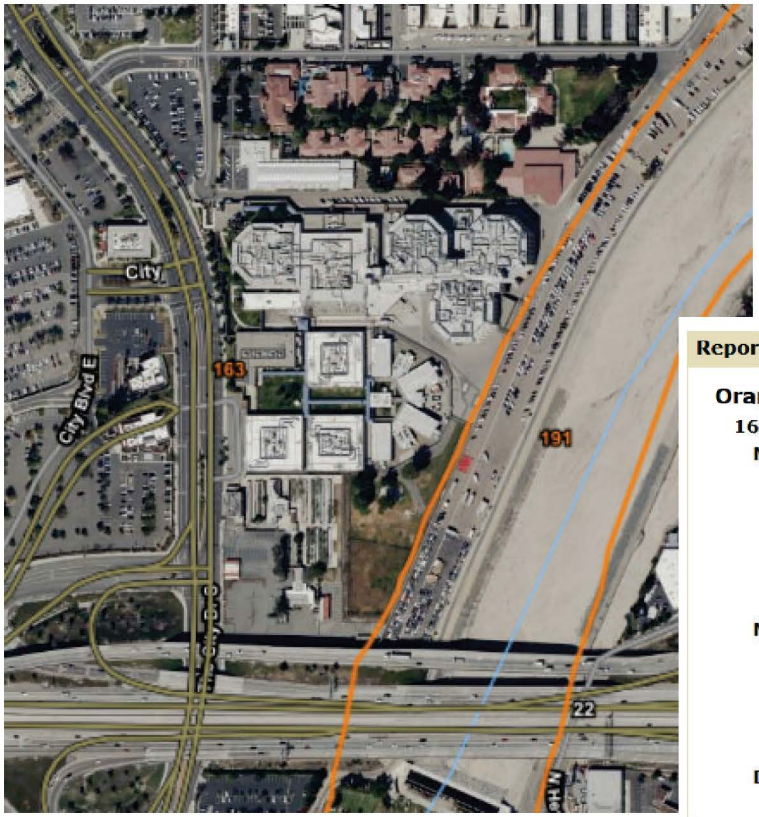
WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 6, Version 2

PF tabular | PF graphical | Supplementary information

Print page

PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.122** (0.102-0.146)	**0.158** (0.132-0.191)	**0.206** (0.172-0.250)	**0.247** (0.204-0.301)	**0.302** (0.241-0.382)	**0.346** (0.270-0.447)	**0.390** (0.297-0.518)	**0.437** (0.323-0.598)	**0.502** (0.355-0.718)	**0.553** (0.377-0.821)
10-min	**0.174** (0.146-0.210)	**0.226** (0.190-0.273)	**0.296** (0.247-0.358)	**0.354** (0.293-0.431)	**0.433** (0.346-0.548)	**0.495** (0.387-0.641)	**0.560** (0.426-0.743)	**0.627** (0.463-0.858)	**0.720** (0.508-1.03)	**0.793** (0.540-1.18)
15-min	**0.211** (0.177-0.254)	**0.274** (0.229-0.330)	**0.358** (0.299-0.433)	**0.428** (0.354-0.522)	**0.524** (0.418-0.663)	**0.599** (0.468-0.775)	**0.677** (0.515-0.899)	**0.758** (0.560-1.04)	**0.870** (0.615-1.24)	**0.959** (0.653-1.42)
30-min	**0.292** (0.245-0.352)	**0.379** (0.318-0.458)	**0.496** (0.414-0.600)	**0.592** (0.490-0.723)	**0.726** (0.580-0.918)	**0.830** (0.648-1.07)	**0.938** (0.714-1.24)	**1.05** (0.776-1.44)	**1.21** (0.852-1.72)	**1.33** (0.905-1.97)
60-min	**0.409** (0.343-0.492)	**0.531** (0.445-0.641)	**0.694** (0.580-0.840)	**0.829** (0.686-1.01)	**1.02** (0.811-1.28)	**1.16** (0.907-1.50)	**1.31** (0.999-1.74)	**1.47** (1.09-2.01)	**1.69** (1.19-2.41)	**1.86** (1.27-2.76)
2-hr	**0.592** (0.497-0.714)	**0.772** (0.647-0.932)	**1.01** (0.842-1.22)	**1.20** (0.996-1.47)	**1.47** (1.17-1.86)	**1.67** (1.31-2.17)	**1.88** (1.43-2.50)	**2.10** (1.55-2.88)	**2.40** (1.70-3.44)	**2.64** (1.80-3.92)
3-hr	**0.737** (0.618-0.887)	**0.960** (0.804-1.16)	**1.25** (1.05-1.52)	**1.49** (1.24-1.82)	**1.82** (1.45-2.30)	**2.07** (1.62-2.68)	**2.33** (1.77-3.10)	**2.60** (1.92-3.56)	**2.97** (2.10-4.25)	**3.26** (2.22-4.84)
6-hr	**1.04** (0.870-1.25)	**1.35** (1.13-1.63)	**1.76** (1.47-2.13)	**2.10** (1.74-2.56)	**2.55** (2.04-3.23)	**2.91** (2.27-3.76)	**3.27** (2.49-4.34)	**3.65** (2.69-4.99)	**4.16** (2.94-5.95)	**4.57** (3.11-6.78)
12-hr	**1.36** (1.14-1.63)	**1.76** (1.48-2.13)	**2.30** (1.92-2.78)	**2.75** (2.27-3.35)	**3.36** (2.68-4.25)	**3.84** (3.00-4.96)	**4.33** (3.29-5.75)	**4.84** (3.58-6.62)	**5.55** (3.92-7.94)	**6.11** (4.16-9.06)
24-hr	**1.80** (1.59-2.08)	**2.35** (2.07-2.71)	**3.08** (2.71-3.57)	**3.69** (3.22-4.31)	**4.54** (3.84-5.48)	**5.21** (4.32-6.42)	**5.91** (4.78-7.45)	**6.64** (5.23-8.60)	**7.66** (5.80-10.3)	**8.48** (6.20-11.8)
2-day	**2.20** (1.95-2.54)	**2.91** (2.57-3.36)	**3.85** (3.39-4.46)	**4.63** (4.04-5.40)	**5.71** (4.83-6.89)	**6.56** (5.44-8.07)	**7.43** (6.02-9.37)	**8.35** (6.58-10.8)	**9.62** (7.28-13.0)	**10.6** (7.78-14.8)
3-day	**2.48**	**3.30**	**4.40**	**5.30**	**6.56**	**7.54**	**8.54**	**9.60**	**11.1**	**12.2**



Report — Map Unit Description

Orange County and Part of Riverside County, California

163—Metz loamy sand

Map Unit Setting

National map unit symbol: hcn8
Elevation: 30 to 2,500 feet
Mean annual precipitation: 20 inches
Mean annual air temperature: 57 to 61 degrees F
Frost-free period: 200 to 340 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Metz and similar soils: 80 percent
Minor components: 20 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Metz

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Side slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from mixed

Typical profile

H1 - 0 to 17 inches: loamy sand
H2 - 17 to 63 inches: stratified sand to fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R019XD035CA - SANDY
Hydric soil rating: No

Minor Components

San emigdio, fine sandy loam

Percent of map unit: 4 percent
Hydric soil rating: No

Hueneme, fine sandy loam

Percent of map unit: 4 percent
Hydric soil rating: No

Corralitos, loamy sand

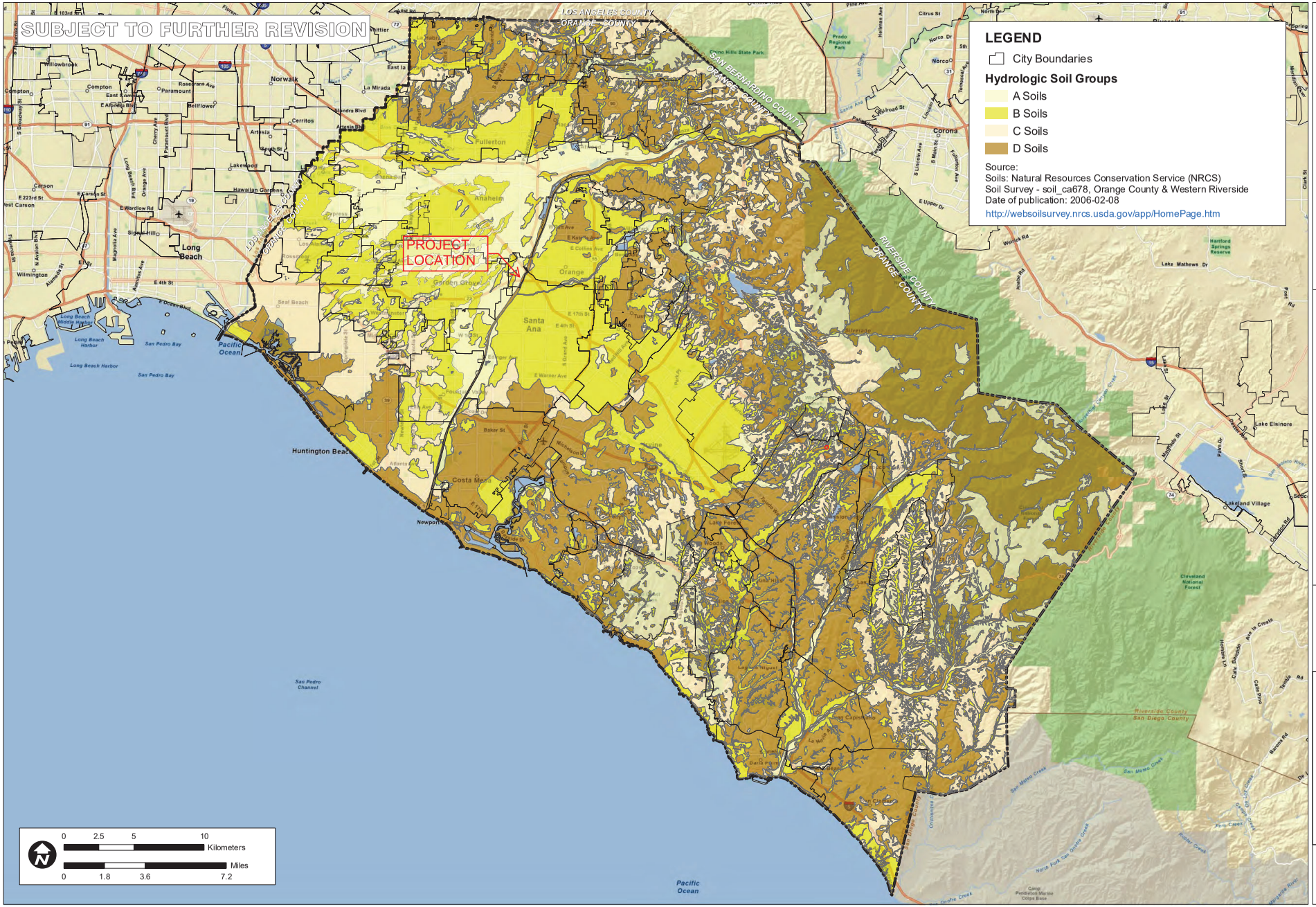
Percent of map unit: 4 percent
Hydric soil rating: No

Metz, mod fine substratum

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 4 percent
Landform: Fans
Hydric soil rating: Yes



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TITLE: NRCS HYDROLOGIC SOILS GROUPS

JOB: ORANGE COUNTY INFILTRATION STUDY — ORANGE CO., CA

SCALE	1" = 1.8 miles
DESIGNED	TH
DRAWING	TH
CHECKED	BMP
DATE	02/09/11
JOB NO.	9526-E

PACE Advanced Water Engineering

FIGURE XVI-2a

Geotechnical Exploration Report
Proposed Workforce Reentry Center
591 The City Drive South
City of Orange, California

Prepared for:

Griffin Structures, Inc.
2 Technology, Suite 150
Irvine, California 92618

Prepared by:

Verdantas Inc.
2600 Michelson Drive, Suite 400
Irvine, California 92612

Project No. 20833

August 7, 2024

content indicate a low potential for corrosion of steel in concrete due to the chloride content of the soil. However, an Exposure Class of C1 may be assumed for concrete in contact with soil exposed to moisture per ACI 318 (ACI, 2014), but not to external sources of chlorides.

2.3.3 Soil Compressibility

Three (3) samples of the onsite soils recovered from the borings were subjected to consolidation testing to evaluate the compressibility of these materials under assumed loads representative of anticipated structural bearing stresses. The results of testing indicate these soils exhibit a low to moderate compressibility potential. The results of testing performed as a part of this study are presented in Appendix C.

2.3.4 Shear Strength

Evaluation of the shear strength characteristics of the onsite soil and bedrock materials included laboratory direct shear testing of four (4) samples recovered from the borings as a part of this study. The results of testing are included in Appendix C.

2.3.5 Excavation Characteristics

Based on our subsurface explorations performed at the site and our experience from grading jobs in the vicinity of the site, we anticipate the onsite artificial fill and alluvial materials can generally be excavated using conventional excavation equipment in good operating condition.

2.4 Groundwater Conditions

Groundwater was encountered at the site in our subsurface investigation at depths ranging between approximately 27.8 feet and 35.9 feet bgs. Review of the *Seismic Hazard Zone Report for the Anaheim and Newport Beach Quadrangles* (CGS, 1997) indicates the historically shallowest depth to groundwater beneath the site is between approximately 25 and 30 feet bgs. Based on groundwater monitoring data available through the State Water Resources Control Board's GeoTracker website for the site associated with a former gas station, groundwater levels were measured at approximately 36 to 41 feet bgs between approximately 1992 and 2002 (TRC, 2003). For the purposes of our study, the design groundwater depth used in our analysis is 25 feet bgs.

Based on these findings, groundwater is not expected to pose a constraint during or after construction. Fluctuations of the groundwater level, localized zones of perched water, and an increase in soil moisture, should be anticipated during and following the rainy seasons or periods of locally intense rainfall or storm water runoff.

2.4.1 Infiltration

Percolation testing was performed within temporary percolation wells installed in borings LP-1 and LP-2 to evaluate the infiltration characteristics of subsurface soils. The percolation tests were conducted in general accordance with the *Orange County Technical Guidance Document (TGD) for the Preparation of Conceptual/Preliminary and/or Project Water Quality Management Programs (WQMPs)* (OCPW, 2013). Results of the percolation testing are presented in Appendix B. The test locations and zones tested are shown on Plate 1.

A boring percolation test is useful for field measurements of the infiltration rate of soils and is suited for testing when the design depth of the infiltration device is deeper than current existing grades, especially in areas where it is difficult to dig test pits, or where the depths of these test pits would be considerably deep. At the subject site, testing consisted of advancing the borings to general depths anticipated for the invert of typical near-surface infiltration devices.

Due to the predominately granular and permeable characteristics of the subsurface soils within the test zone at the percolation test locations, a constant-head test method was employed for testing in both LP-1 and LP-2. The constant-head method records the approximate volume of water delivered to the test zone while maintaining a relatively constant height of water in the well over the testing period. Since the subsurface materials at this location were generally favorable for percolation (sandy soils), a water source was used to deliver water to the well at a relatively constant rate while recording the water height in the well. The measured infiltration rate for the constant-head percolation test was calculated by dividing the total volume of water infiltrated by the total duration of the test and dividing by the percolation surface area.

Detailed results of the field testing data and measured infiltration rate for the test well are presented in Appendix B. The test results are summarized in the table below:

Table 1 – Measured (Unfactored) Infiltration Rate

Test Well Designation	Approximate Depth of Test Zone (feet bgs)	Measured Unfactored Infiltration Rate (inch per hour)
LP-1	5 to 10	60.4
LP-2	5 to 10	76.6

The measured (unfactored) infiltration rate for the two (2) tests performed were performed were 60.4 inch per hour (LP-1) and 76.6 inches per hour (LP-2), respectively. In accordance with the TGD (OCPW, 2013), a minimum factor of safety of 2 or more should be applied to the measured infiltration rates for design of the system.

Due to the variability of test results, the lower infiltration rate measured at test well LP-1 should be considered for design purposes. In addition, based on the variability of the results and unknown location and depth of the planned stormwater infiltration device(s), additional testing may be required.

2.5 Surface Fault Rupture

Our review of available literature indicates that no known active faults have been mapped across the site, and the site is **not** located within a currently established *Alquist-Priolo Earthquake Fault Zone* (CGS, 2018; Bryant and Hart, 2007). Therefore, a surface fault rupture hazard evaluation is not mandated for this site and the potential for surface fault rupture at the site is expected to be low.

The location of the closest active faults to the site was evaluated using the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008). The closest active faults to the site with the potential for surface fault rupture are the

Table 5 – PCC Pavement Sections

Area	Traffic Index	Portland Cement Concrete (inches)	Base Course (inches)
Parking Areas	4	5	4
Light Truck	5	5½	4
Heavy Truck	6	6	4
Main Drives	7	6½	4

The paving should be provided with control joints or expansion joints at regular intervals no more than 15 feet in each direction. Load transfer devices, such as dowels or keys, are recommended at joints in the paving to reduce possible offsets. The paving sections in the above table have been developed based on the strength of unreinforced concrete. Steel reinforcing may be added to the paving to reduce cracking and to prolong the life of the paving.

3.8.3 Base Course

The base course for both asphalt concrete and Portland cement concrete paving should meet the specifications for Class 2 Aggregate Base as defined in Section 26 of the latest edition of the State of California, Department of Transportation, Standard Specifications. Alternatively, the base course could meet the specifications for untreated base as defined in Section 200-2 of the latest edition of the *Standard Specifications for Public Works Construction* (Greenbook), current edition. The base course should be compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM Test Method D 1557.

3.9 Infiltration BMP Design Considerations

It should be noted that the measured infiltration rates presented herein may degrade over time due to complete saturation of underlying soils, and fines build-up and plugging if pretreatment of the storm water is not performed. As such, a reduction of the measured infiltration rates using a factor of safety of at least 2 or more should be considered to establish a conservative infiltration rate for the service life of the system. This factor should not be less than 2, but may be higher at the discretion of the design engineer.

In general, a vast majority of geotechnical distress issues are related to improper drainage. Distress in the form of foundation movement could occur. Direct infiltration to the subsurface is not recommended adjacent to curb and gutter, public pavements or within 10 feet away from the design saturation zone as soil saturation could lead to a loss of soil support, settlement or collapse, and internal erosion (piping). The design saturation zone may be assumed as a 1:1 plane projected downward from the top of an infiltration device's discharge zone. Additionally, infiltration water will migrate along pipe backfill (typically sand or gravel bedding) affecting improvements far from the point of infiltration. Proposed direct open bottom infiltration systems, should be located as far away from existing or proposed foundations, rigid improvements and utilities as is practical in order to reduce the geotechnical distress issues related to water. Where sufficient distance from improvements cannot be achieved, additional recommendations may be warranted and can be provided during plan review.

Prior to construction of any infiltration device intended for the site, the plans should be reviewed by the geotechnical consultant to verify that our geotechnical recommendations have been appropriately incorporated into the plans and not compromised by the addition of an infiltration system to the site. The designer of any infiltration system should contact the geotechnical consultant for geotechnical input during the design process as they feel necessary.

3.10 Temporary Excavations

All temporary excavations, including utility trenches, retaining wall excavations, and foundation excavations should be performed in accordance with project plans, specifications, and all OSHA requirements. Excavations 4 feet or deeper should be laid back or shored in accordance with OSHA requirements before personnel are allowed to enter.

No surcharge loads should be permitted within a horizontal distance equal to the height of cut or 5 feet, whichever is greater from the top of the cut, unless the cut is shored appropriately. Excavations that extend below an imaginary plane inclined at 45 degrees below the edge of any adjacent existing site foundation should be properly shored to maintain support of the adjacent structure.

Temporary excavations should be treated in accordance with the State of California version of OSHA excavation regulations, Construction Safety Orders for Excavation General Requirements, Article 6, Section 1541, effective October 1, 1995. The sides of excavations should be shored or sloped in accordance with OSHA regulations. OSHA allows the sides of unbraced excavations, up to a maximum height of 20 feet, to be cut to a ¾H:1V (horizontal:vertical) slope for Type A soils, 1H:1V for Type B soils, and 1½H:1V for Type C soils. Near-surface onsite soils are to be considered Type C soils.

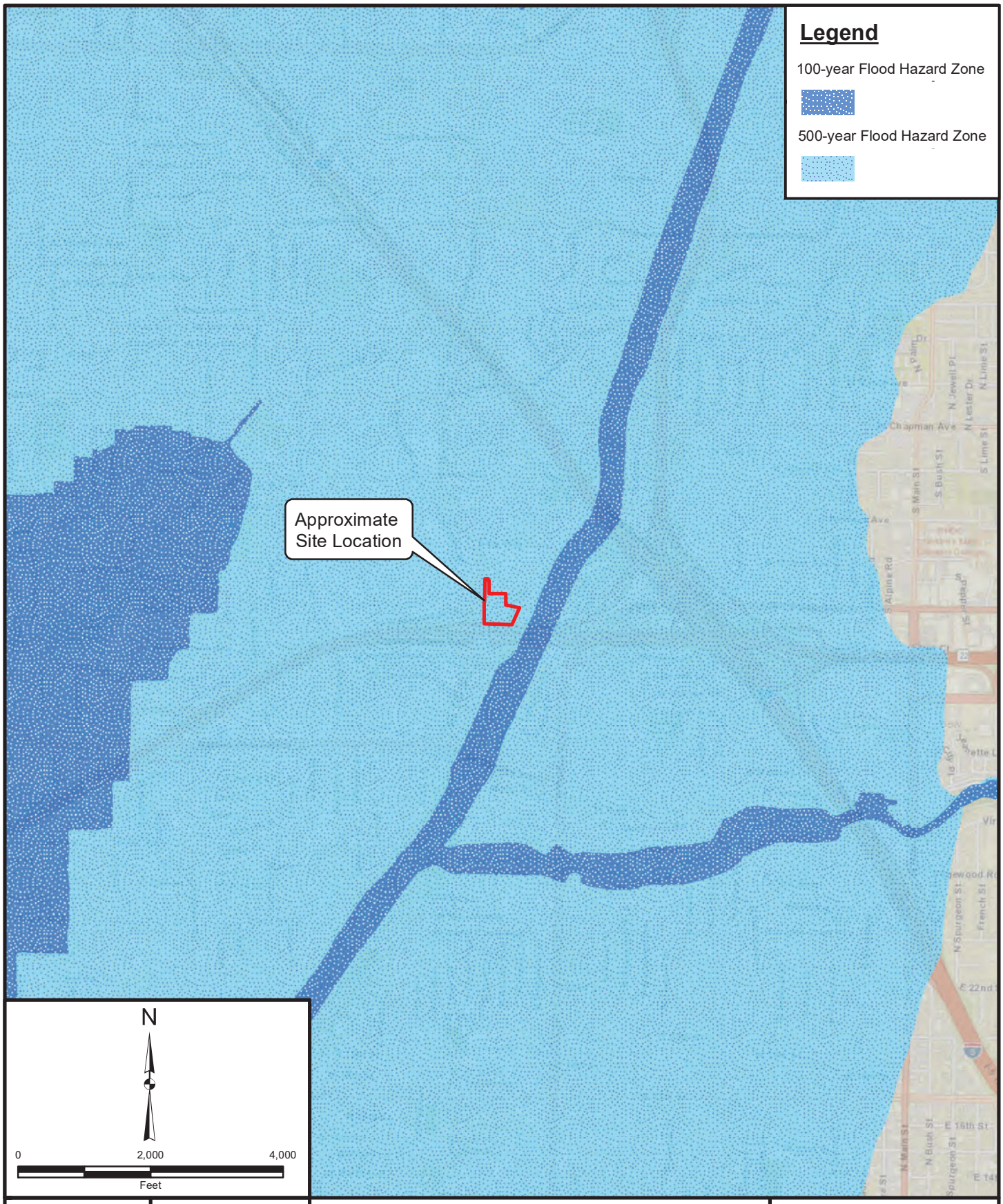
During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor shall be responsible for providing the “competent person” required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and the geotechnical engineer should be maintained to facilitate construction while providing safe excavations.

3.11 Trench Backfill

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1 and 306-6 of the *Standard Specifications for Public Works Construction* (Greenbook), current edition. Utility trenches can be backfilled with onsite sandy material free of rubble, debris, organic and oversized material up to (≤) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

(1) **Sand:** A uniform, sand material that has a Sand Equivalent (SE) greater-than-or-equal-to (≥) 30, passing the No. 4 U.S. Standard Sieve (or as specified by the pipe manufacturer), water densified in place, or

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction,* (Greenbook), current edition. CLSM should not be jetted.



Project: 20833	Eng/Geol: CCK/JMP
Scale: 1 " = 2,000 '	Date: August 2024

Reference: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
FEMA (http://www.fema.gov/index.shtm), DWR (http://www.dwr.ca.gov)

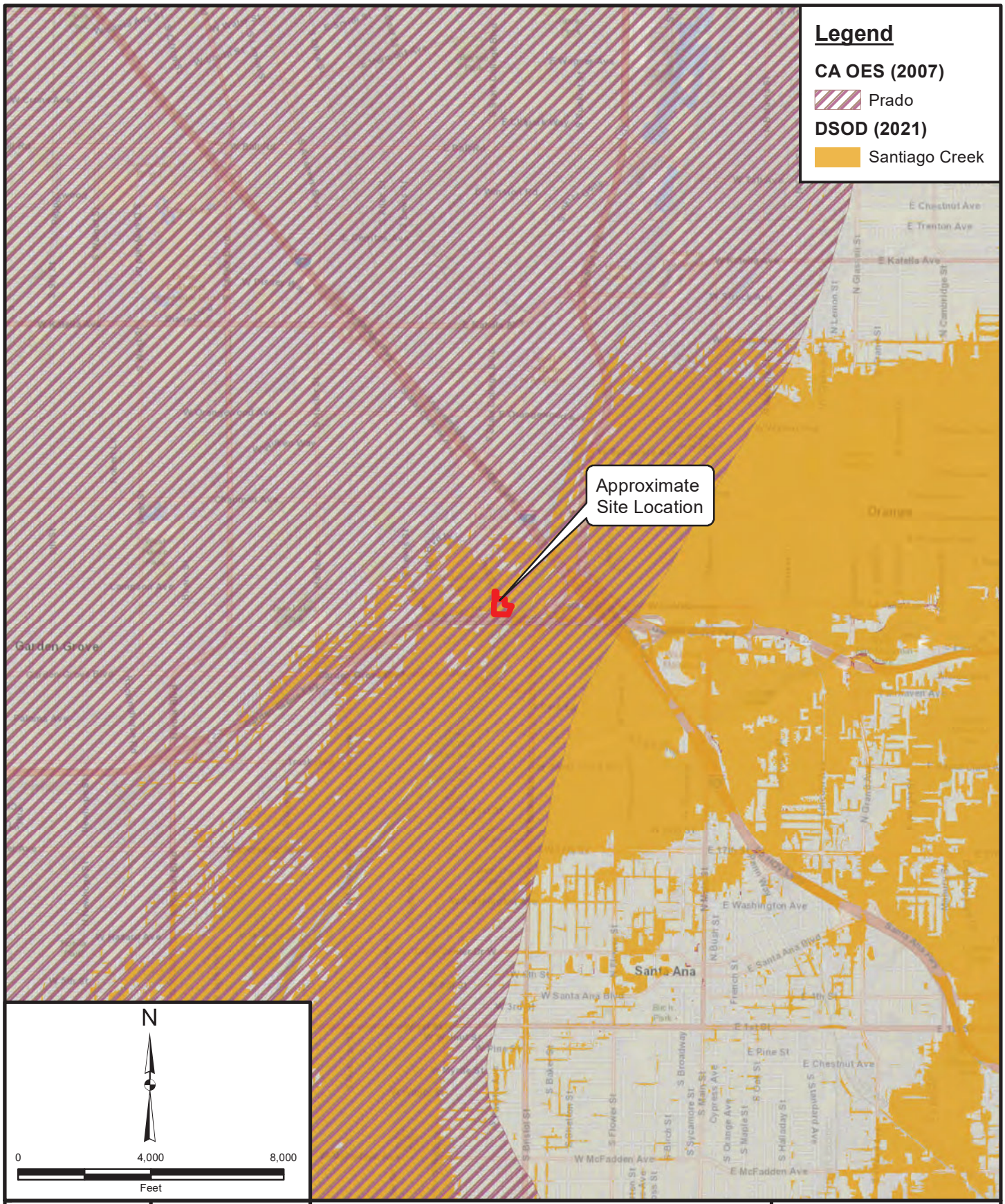
FLOOD HAZARD ZONE MAP

Proposed Workforce Reentry Project
591 The City Drive South
City of Orange, California

FIGURE 5

verdantas

Map Saved as Z:\Project Files\GA-HZ\Griffin\20833 - Griffin OC Workforce Reentry Geo\GIS\Maps\20833_F05_FHM_2024-08-06.mxd on 8/6/2024 1:39:16 PM Author: KVM (btran)



Project: 20833	Eng/Geol: CCK/JMP
Scale: 1 " = 4,000 '	Date: August 2024

Basemap Reference: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China
Reference: Office of Emergency Services (2007),
Dept of Safety of Dams (2021)
National Inventory of Dams, Army Corps of Engrs (2021)

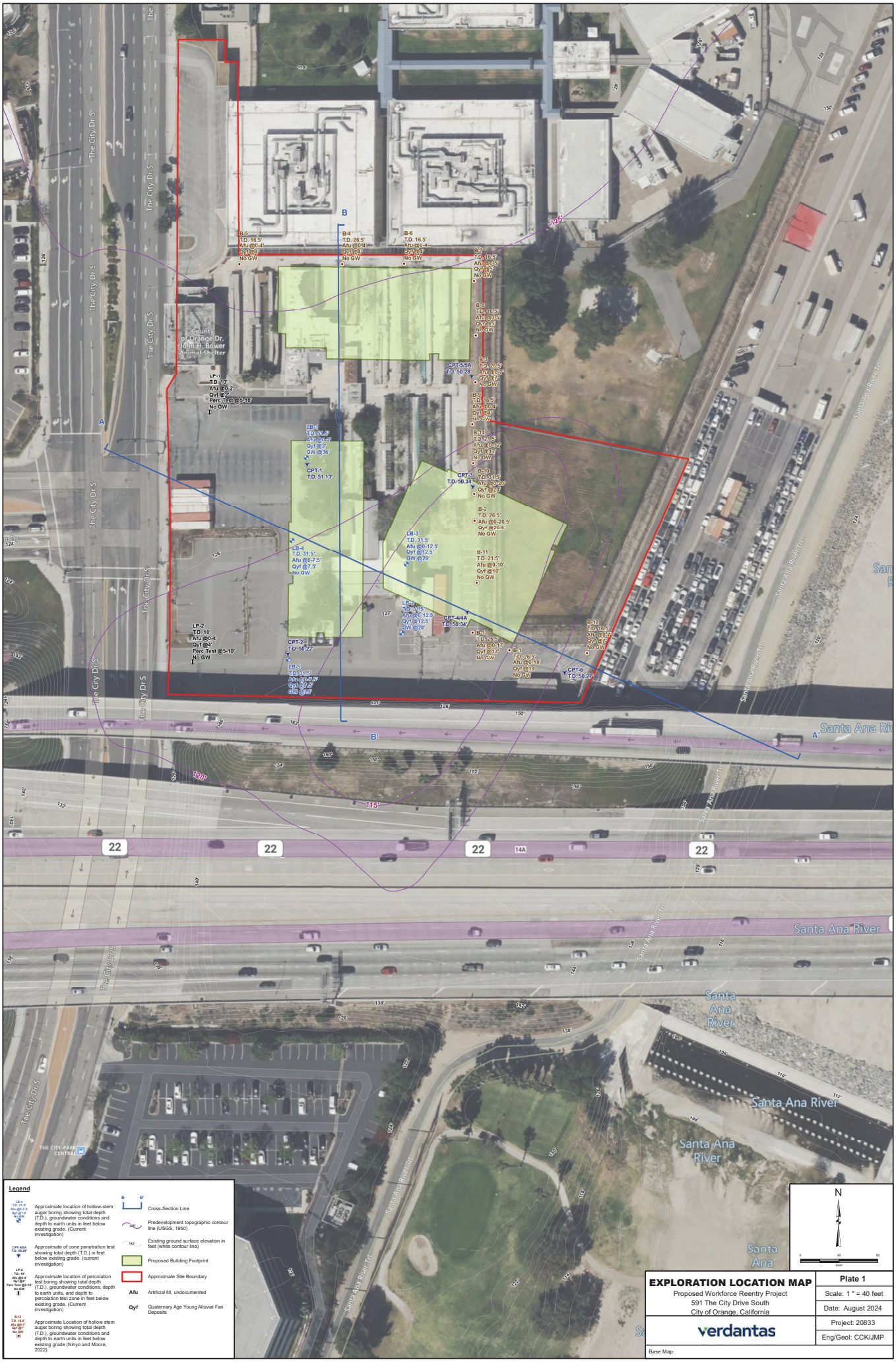
DAM INUNDATION MAP

Proposed Workforce Reentry Project
591 The City Drive South
City of Orange, California

FIGURE 6

verdantas

Map Saved as Z:\Project Files\GA-HZ\Griffin\20833 - Griffin OC Workforce Reentry Geo\GIS\Maps\20833_F06_DIM_2024-08-06.mxd on 7/24/2024 2:37:19 PM Author: KVM (btran)



EXPLORATION LOCATION MAP

Proposed Workforce Reentry Project
591 The City Drive South
City of Orange, California

verdantas

Plate 1	
Scale: 1 " = 40 feet	
Date: August 2024	
Project: 20833	
Eng/Geol: CCK/JMP	

Base Map:

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 4.54 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.82	0.00	98.	0.300	0.948
2	0.11	100.00	75.	0.300	0.459

TOTAL AREA (Acres) = 0.93

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.035

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.110

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.89
    TOTAL CATCHMENT AREA(ACRES) =    0.93
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.035
    LOW LOSS FRACTION = 0.110
    TIME OF CONCENTRATION(MIN.) =  7.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.28
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.07

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.03      0.0000      0.00  Q         .         .         .         .
  0.14      0.0002      0.05  Q         .         .         .         .
  0.26      0.0007      0.05  Q         .         .         .         .
  0.38      0.0012      0.05  Q         .         .         .         .
  0.50      0.0017      0.05  Q         .         .         .         .
  0.62      0.0022      0.05  Q         .         .         .         .
  0.74      0.0027      0.05  Q         .         .         .         .
  0.85      0.0032      0.05  Q         .         .         .         .
  0.97      0.0037      0.05  Q         .         .         .         .
  1.09      0.0043      0.05  Q         .         .         .         .
  1.21      0.0048      0.05  Q         .         .         .         .
  1.33      0.0053      0.05  Q         .         .         .         .
  1.45      0.0058      0.05  Q         .         .         .         .
  1.56      0.0063      0.05  Q         .         .         .         .
  1.68      0.0068      0.05  Q         .         .         .         .
  1.80      0.0074      0.05  Q         .         .         .         .
  1.92      0.0079      0.05  Q         .         .         .         .
  2.04      0.0084      0.05  Q         .         .         .         .
  2.16      0.0090      0.05  Q         .         .         .         .
  2.27      0.0095      0.05  Q         .         .         .         .
  2.39      0.0100      0.06  Q         .         .         .         .
  2.51      0.0106      0.06  Q         .         .         .         .
  2.63      0.0111      0.06  Q         .         .         .         .
  2.75      0.0117      0.06  Q         .         .         .         .
  2.87      0.0122      0.06  Q         .         .         .         .
  2.98      0.0128      0.06  Q         .         .         .         .
  3.10      0.0133      0.06  Q         .         .         .         .
  3.22      0.0139      0.06  Q         .         .         .         .
  3.34      0.0145      0.06  Q         .         .         .         .
  3.46      0.0150      0.06  Q         .         .         .         .
  3.58      0.0156      0.06  Q         .         .         .         .
  3.69      0.0162      0.06  Q         .         .         .         .
  3.81      0.0168      0.06  Q         .         .         .         .
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3.93	0.0173	0.06	Q	.	.	.	.
4.05	0.0179	0.06	Q	.	.	.	.
4.17	0.0185	0.06	Q	.	.	.	.
4.29	0.0191	0.06	Q	.	.	.	.
4.40	0.0197	0.06	Q	.	.	.	.
4.52	0.0203	0.06	Q	.	.	.	.
4.64	0.0209	0.06	Q	.	.	.	.
4.76	0.0215	0.06	Q	.	.	.	.
4.88	0.0221	0.06	Q	.	.	.	.
5.00	0.0227	0.06	Q	.	.	.	.
5.11	0.0234	0.06	Q	.	.	.	.
5.23	0.0240	0.06	Q	.	.	.	.
5.35	0.0246	0.06	Q	.	.	.	.
5.47	0.0252	0.07	Q	.	.	.	.
5.59	0.0259	0.07	Q	.	.	.	.
5.71	0.0265	0.07	Q	.	.	.	.
5.82	0.0272	0.07	Q	.	.	.	.
5.94	0.0278	0.07	Q	.	.	.	.
6.06	0.0285	0.07	Q	.	.	.	.
6.18	0.0291	0.07	Q	.	.	.	.
6.30	0.0298	0.07	Q	.	.	.	.
6.41	0.0305	0.07	Q	.	.	.	.
6.53	0.0312	0.07	Q	.	.	.	.
6.65	0.0318	0.07	Q	.	.	.	.
6.77	0.0325	0.07	Q	.	.	.	.
6.89	0.0332	0.07	Q	.	.	.	.
7.01	0.0339	0.07	Q	.	.	.	.
7.12	0.0346	0.07	Q	.	.	.	.
7.24	0.0353	0.07	Q	.	.	.	.
7.36	0.0361	0.07	Q	.	.	.	.
7.48	0.0368	0.07	Q	.	.	.	.
7.60	0.0375	0.08	Q	.	.	.	.
7.72	0.0382	0.08	Q	.	.	.	.
7.84	0.0390	0.08	Q	.	.	.	.
7.95	0.0397	0.08	Q	.	.	.	.
8.07	0.0405	0.08	Q	.	.	.	.
8.19	0.0413	0.08	Q	.	.	.	.
8.31	0.0420	0.08	Q	.	.	.	.
8.43	0.0428	0.08	Q	.	.	.	.
8.55	0.0436	0.08	Q	.	.	.	.
8.66	0.0444	0.08	Q	.	.	.	.
8.78	0.0452	0.08	Q	.	.	.	.
8.90	0.0460	0.08	Q	.	.	.	.
9.02	0.0468	0.08	Q	.	.	.	.
9.14	0.0477	0.08	Q	.	.	.	.
9.26	0.0485	0.09	Q	.	.	.	.
9.37	0.0493	0.09	Q	.	.	.	.
9.49	0.0502	0.09	Q	.	.	.	.
9.61	0.0511	0.09	Q	.	.	.	.
9.73	0.0519	0.09	Q	.	.	.	.
9.85	0.0528	0.09	Q	.	.	.	.
9.97	0.0537	0.09	Q	.	.	.	.
10.08	0.0546	0.09	Q	.	.	.	.
10.20	0.0555	0.09	Q	.	.	.	.
10.32	0.0565	0.10	Q	.	.	.	.
10.44	0.0574	0.10	Q	.	.	.	.
10.56	0.0584	0.10	Q	.	.	.	.
10.68	0.0593	0.10	Q	.	.	.	.
10.79	0.0603	0.10	Q	.	.	.	.
10.91	0.0613	0.10	Q	.	.	.	.

11.03	0.0623	0.10	Q	.	.	.	.
11.15	0.0634	0.11	Q	.	.	.	.
11.27	0.0644	0.11	Q	.	.	.	.
11.38	0.0655	0.11	Q	.	.	.	.
11.50	0.0665	0.11	Q	.	.	.	.
11.62	0.0676	0.11	Q	.	.	.	.
11.74	0.0687	0.11	Q	.	.	.	.
11.86	0.0699	0.12	Q	.	.	.	.
11.98	0.0710	0.12	Q	.	.	.	.
12.10	0.0723	0.15	Q	.	.	.	.
12.21	0.0738	0.16	Q	.	.	.	.
12.33	0.0755	0.17	Q	.	.	.	.
12.45	0.0771	0.17	Q	.	.	.	.
12.57	0.0787	0.17	Q	.	.	.	.
12.69	0.0804	0.17	Q	.	.	.	.
12.80	0.0821	0.18	Q	.	.	.	.
12.92	0.0839	0.18	Q	.	.	.	.
13.04	0.0857	0.18	Q	.	.	.	.
13.16	0.0875	0.19	Q	.	.	.	.
13.28	0.0894	0.19	Q	.	.	.	.
13.40	0.0913	0.20	Q	.	.	.	.
13.52	0.0932	0.20	Q	.	.	.	.
13.63	0.0952	0.21	Q	.	.	.	.
13.75	0.0972	0.21	Q	.	.	.	.
13.87	0.0993	0.22	Q	.	.	.	.
13.99	0.1015	0.22	Q	.	.	.	.
14.11	0.1037	0.23	Q	.	.	.	.
14.23	0.1060	0.24	Q	.	.	.	.
14.34	0.1083	0.24	Q	.	.	.	.
14.46	0.1107	0.26	.Q	.	.	.	.
14.58	0.1133	0.26	.Q	.	.	.	.
14.70	0.1159	0.28	.Q	.	.	.	.
14.82	0.1187	0.29	.Q	.	.	.	.
14.93	0.1216	0.31	.Q	.	.	.	.
15.05	0.1248	0.33	.Q	.	.	.	.
15.17	0.1281	0.36	.Q	.	.	.	.
15.29	0.1317	0.38	.Q	.	.	.	.
15.41	0.1354	0.39	.Q	.	.	.	.
15.53	0.1392	0.38	.Q	.	.	.	.
15.65	0.1433	0.47	.Q	.	.	.	.
15.76	0.1483	0.54	. Q	.	.	.	.
15.88	0.1549	0.82	. Q	.	.	.	.
16.00	0.1643	1.11	. Q	.	.	.	.
16.12	0.1855	3.22	.	. Q	.	.	.
16.24	0.2046	0.67	. Q	.	.	.	.
16.35	0.2099	0.42	.Q	.	.	.	.
16.47	0.2139	0.40	.Q	.	.	.	.
16.59	0.2175	0.34	.Q	.	.	.	.
16.71	0.2206	0.30	.Q	.	.	.	.
16.83	0.2234	0.27	.Q	.	.	.	.
16.95	0.2259	0.25	Q	.	.	.	.
17.07	0.2283	0.23	Q	.	.	.	.
17.18	0.2305	0.22	Q	.	.	.	.
17.30	0.2326	0.21	Q	.	.	.	.
17.42	0.2346	0.20	Q	.	.	.	.
17.54	0.2365	0.19	Q	.	.	.	.
17.66	0.2383	0.18	Q	.	.	.	.
17.77	0.2400	0.18	Q	.	.	.	.
17.89	0.2417	0.17	Q	.	.	.	.
18.01	0.2434	0.16	Q	.	.	.	.

18.13	0.2447	0.12	Q	.	.	.	.
18.25	0.2459	0.12	Q	.	.	.	.
18.37	0.2470	0.11	Q	.	.	.	.
18.48	0.2481	0.11	Q	.	.	.	.
18.60	0.2491	0.10	Q	.	.	.	.
18.72	0.2501	0.10	Q	.	.	.	.
18.84	0.2511	0.10	Q	.	.	.	.
18.96	0.2521	0.10	Q	.	.	.	.
19.08	0.2530	0.09	Q	.	.	.	.
19.19	0.2539	0.09	Q	.	.	.	.
19.31	0.2548	0.09	Q	.	.	.	.
19.43	0.2557	0.09	Q	.	.	.	.
19.55	0.2565	0.09	Q	.	.	.	.
19.67	0.2573	0.08	Q	.	.	.	.
19.79	0.2582	0.08	Q	.	.	.	.
19.91	0.2589	0.08	Q	.	.	.	.
20.02	0.2597	0.08	Q	.	.	.	.
20.14	0.2605	0.08	Q	.	.	.	.
20.26	0.2612	0.08	Q	.	.	.	.
20.38	0.2620	0.07	Q	.	.	.	.
20.50	0.2627	0.07	Q	.	.	.	.
20.61	0.2634	0.07	Q	.	.	.	.
20.73	0.2641	0.07	Q	.	.	.	.
20.85	0.2648	0.07	Q	.	.	.	.
20.97	0.2655	0.07	Q	.	.	.	.
21.09	0.2661	0.07	Q	.	.	.	.
21.21	0.2668	0.07	Q	.	.	.	.
21.33	0.2674	0.07	Q	.	.	.	.
21.44	0.2681	0.06	Q	.	.	.	.
21.56	0.2687	0.06	Q	.	.	.	.
21.68	0.2693	0.06	Q	.	.	.	.
21.80	0.2699	0.06	Q	.	.	.	.
21.92	0.2706	0.06	Q	.	.	.	.
22.03	0.2711	0.06	Q	.	.	.	.
22.15	0.2717	0.06	Q	.	.	.	.
22.27	0.2723	0.06	Q	.	.	.	.
22.39	0.2729	0.06	Q	.	.	.	.
22.51	0.2735	0.06	Q	.	.	.	.
22.63	0.2740	0.06	Q	.	.	.	.
22.74	0.2746	0.06	Q	.	.	.	.
22.86	0.2751	0.06	Q	.	.	.	.
22.98	0.2757	0.06	Q	.	.	.	.
23.10	0.2762	0.05	Q	.	.	.	.
23.22	0.2767	0.05	Q	.	.	.	.
23.34	0.2773	0.05	Q	.	.	.	.
23.45	0.2778	0.05	Q	.	.	.	.
23.57	0.2783	0.05	Q	.	.	.	.
23.69	0.2788	0.05	Q	.	.	.	.
23.81	0.2793	0.05	Q	.	.	.	.
23.93	0.2798	0.05	Q	.	.	.	.
24.05	0.2803	0.05	Q	.	.	.	.
24.17	0.2805	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)

0%	1441.3
10%	99.4
20%	28.4
30%	14.2
40%	7.1
50%	7.1
60%	7.1
70%	7.1
80%	7.1
90%	7.1

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 25-year storm event

STEP 1
Import results from hydrograph

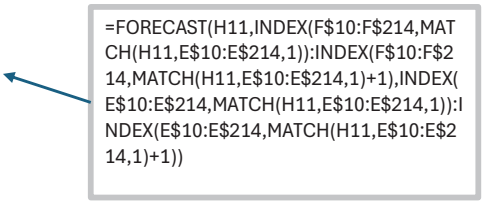
TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.03	0	0
0.14	0.0002	0.05
0.26	0.0007	0.05
0.38	0.0012	0.05
0.5	0.0017	0.05
0.62	0.0022	0.05
0.74	0.0027	0.05
0.85	0.0032	0.05
0.97	0.0037	0.05
1.09	0.0043	0.05
1.21	0.0048	0.05
1.33	0.0053	0.05
1.45	0.0058	0.05
1.56	0.0063	0.05
1.68	0.0068	0.05
1.8	0.0074	0.05
1.92	0.0079	0.05
2.04	0.0084	0.05
2.16	0.009	0.05
2.27	0.0095	0.05
2.39	0.01	0.06
2.51	0.0106	0.06
2.63	0.0111	0.06
2.75	0.0117	0.06
2.87	0.0122	0.06
2.98	0.0128	0.06
3.1	0.0133	0.06
3.22	0.0139	0.06
3.34	0.0145	0.06
3.46	0.015	0.06
3.58	0.0156	0.06
3.69	0.0162	0.06
3.81	0.0168	0.06
3.93	0.0173	0.06
4.05	0.0179	0.06
4.17	0.0185	0.06
4.29	0.0191	0.06
4.4	0.0197	0.06
4.52	0.0203	0.06
4.64	0.0209	0.06
4.76	0.0215	0.06
4.88	0.0221	0.06
5	0.0227	0.06
5.11	0.0234	0.06
5.23	0.024	0.06
5.35	0.0246	0.06
5.47	0.0252	0.07
5.59	0.0259	0.07
5.71	0.0265	0.07
5.82	0.0272	0.07
5.94	0.0278	0.07
6.06	0.0285	0.07

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
1.8	0
8.4	0.05
15.6	0.05
22.8	0.05
30	0.05
37.2	0.05
44.4	0.05
51	0.05
58.2	0.05
65.4	0.05
72.6	0.05
79.8	0.05
87	0.05
93.6	0.05
100.8	0.05
108	0.05
115.2	0.05
122.4	0.05
129.6	0.05
136.2	0.05
143.4	0.06
150.6	0.06
157.8	0.06
165	0.06
172.2	0.06
178.8	0.06
186	0.06
193.2	0.06
200.4	0.06
207.6	0.06
214.8	0.06
221.4	0.06
228.6	0.06
235.8	0.06
243	0.06
250.2	0.06
257.4	0.06
264	0.06
271.2	0.06
278.4	0.06
285.6	0.06
292.8	0.06
300	0.06
306.6	0.06
313.8	0.06
321	0.06
328.2	0.07
335.4	0.07
342.6	0.07
349.2	0.07
356.4	0.07
363.6	0.07

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.05
15	0.05
20	0.05
25	0.05
30	0.05
35	0.05
40	0.05
45	0.05
50	0.05
55	0.05
60	0.05
65	0.05
70	0.05
75	0.05
80	0.05
85	0.05
90	0.05
95	0.05
100	0.05
105	0.05
110	0.05
115	0.05
120	0.05
125	0.05
130	0.05
135	0.05
140	0.055278
145	0.06
150	0.06
155	0.06
160	0.06
165	0.06
170	0.06
175	0.06
180	0.06
185	0.06
190	0.06
195	0.06
200	0.06
205	0.06
210	0.06
215	0.06
220	0.06
225	0.06
230	0.06
235	0.06
240	0.06
245	0.06
250	0.06
255	0.06
260	0.06



STEP 4

The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5

Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

6.18	0.0291	0.07	370.8	0.07	265	0.06
6.3	0.0298	0.07	378	0.07	270	0.06
6.41	0.0305	0.07	384.6	0.07	275	0.06
6.53	0.0312	0.07	391.8	0.07	280	0.06
6.65	0.0318	0.07	399	0.07	285	0.06
6.77	0.0325	0.07	406.2	0.07	290	0.06
6.89	0.0332	0.07	413.4	0.07	295	0.06
7.01	0.0339	0.07	420.6	0.07	300	0.06
7.12	0.0346	0.07	427.2	0.07	305	0.06
7.24	0.0353	0.07	434.4	0.07	310	0.06
7.36	0.0361	0.07	441.6	0.07	315	0.06
7.48	0.0368	0.07	448.8	0.07	320	0.06
7.6	0.0375	0.08	456	0.08	325	0.065556
7.72	0.0382	0.08	463.2	0.08	330	0.07
7.84	0.039	0.08	470.4	0.08	335	0.07
7.95	0.0397	0.08	477	0.08	340	0.07
8.07	0.0405	0.08	484.2	0.08	345	0.07
8.19	0.0413	0.08	491.4	0.08	350	0.07
8.31	0.042	0.08	498.6	0.08	355	0.07
8.43	0.0428	0.08	505.8	0.08	360	0.07
8.55	0.0436	0.08	513	0.08	365	0.07
8.66	0.0444	0.08	519.6	0.08	370	0.07
8.78	0.0452	0.08	526.8	0.08	375	0.07
8.9	0.046	0.08	534	0.08	380	0.07
9.02	0.0468	0.08	541.2	0.08	385	0.07
9.14	0.0477	0.08	548.4	0.08	390	0.07
9.26	0.0485	0.09	555.6	0.09	395	0.07
9.37	0.0493	0.09	562.2	0.09	400	0.07
9.49	0.0502	0.09	569.4	0.09	405	0.07
9.61	0.0511	0.09	576.6	0.09	410	0.07
9.73	0.0519	0.09	583.8	0.09	415	0.07
9.85	0.0528	0.09	591	0.09	420	0.07
9.97	0.0537	0.09	598.2	0.09	425	0.07
10.08	0.0546	0.09	604.8	0.09	430	0.07
10.2	0.0555	0.09	612	0.09	435	0.07
10.32	0.0565	0.1	619.2	0.1	440	0.07
10.44	0.0574	0.1	626.4	0.1	445	0.07
10.56	0.0584	0.1	633.6	0.1	450	0.071667
10.68	0.0593	0.1	640.8	0.1	455	0.078611
10.79	0.0603	0.1	647.4	0.1	460	0.08
10.91	0.0613	0.1	654.6	0.1	465	0.08
11.03	0.0623	0.1	661.8	0.1	470	0.08
11.15	0.0634	0.11	669	0.11	475	0.08
11.27	0.0644	0.11	676.2	0.11	480	0.08
11.38	0.0655	0.11	682.8	0.11	485	0.08
11.5	0.0665	0.11	690	0.11	490	0.08
11.62	0.0676	0.11	697.2	0.11	495	0.08
11.74	0.0687	0.11	704.4	0.11	500	0.08
11.86	0.0699	0.12	711.6	0.12	505	0.08
11.98	0.071	0.12	718.8	0.12	510	0.08
12.1	0.0723	0.15	726	0.15	515	0.08
12.21	0.0738	0.16	732.6	0.16	520	0.08
12.33	0.0755	0.17	739.8	0.17	525	0.08
12.45	0.0771	0.17	747	0.17	530	0.08
12.57	0.0787	0.17	754.2	0.17	535	0.08
12.69	0.0804	0.17	761.4	0.17	540	0.08
12.8	0.0821	0.18	768	0.18	545	0.08
12.92	0.0839	0.18	775.2	0.18	550	0.082222
13.04	0.0857	0.18	782.4	0.18	555	0.089167
13.16	0.0875	0.19	789.6	0.19	560	0.09
13.28	0.0894	0.19	796.8	0.19	565	0.09
13.4	0.0913	0.2	804	0.2	570	0.09

13.52	0.0932	0.2	811.2	0.2	575	0.09
13.63	0.0952	0.21	817.8	0.21	580	0.09
13.75	0.0972	0.21	825	0.21	585	0.09
13.87	0.0993	0.22	832.2	0.22	590	0.09
13.99	0.1015	0.22	839.4	0.22	595	0.09
14.11	0.1037	0.23	846.6	0.23	600	0.09
14.23	0.106	0.24	853.8	0.24	605	0.09
14.34	0.1083	0.24	860.4	0.24	610	0.09
14.46	0.1107	0.26	867.6	0.26	615	0.094167
14.58	0.1133	0.26	874.8	0.26	620	0.1
14.7	0.1159	0.28	882	0.28	625	0.1
14.82	0.1187	0.29	889.2	0.29	630	0.1
14.93	0.1216	0.31	895.8	0.31	635	0.1
15.05	0.1248	0.33	903	0.33	640	0.1
15.17	0.1281	0.36	910.2	0.36	645	0.1
15.29	0.1317	0.38	917.4	0.38	650	0.1
15.41	0.1354	0.39	924.6	0.39	655	0.1
15.53	0.1392	0.38	931.8	0.38	660	0.1
15.65	0.1433	0.47	939	0.47	665	0.104444
15.76	0.1483	0.54	945.6	0.54	670	0.11
15.88	0.1549	0.82	952.8	0.82	675	0.11
16	0.1643	1.11	960	1.11	680	0.11
16.12	0.1855	3.22	967.2	3.22	685	0.11
16.24	0.2046	0.67	974.4	0.67	690	0.11
16.35	0.2099	0.42	981	0.42	695	0.11
16.47	0.2139	0.4	988.2	0.4	700	0.11
16.59	0.2175	0.34	995.4	0.34	705	0.110833
16.71	0.2206	0.3	1002.6	0.3	710	0.117778
16.83	0.2234	0.27	1009.8	0.27	715	0.12
16.95	0.2259	0.25	1017	0.25	720	0.125
17.07	0.2283	0.23	1024.2	0.23	725	0.145833
17.18	0.2305	0.22	1030.8	0.22	730	0.156061
17.3	0.2326	0.21	1038	0.21	735	0.163333
17.42	0.2346	0.2	1045.2	0.2	740	0.17
17.54	0.2365	0.19	1052.4	0.19	745	0.17
17.66	0.2383	0.18	1059.6	0.18	750	0.17
17.77	0.24	0.18	1066.2	0.18	755	0.17
17.89	0.2417	0.17	1073.4	0.17	760	0.17
18.01	0.2434	0.16	1080.6	0.16	765	0.175455
18.13	0.2447	0.12	1087.8	0.12	770	0.18
18.25	0.2459	0.12	1095	0.12	775	0.18
18.37	0.247	0.11	1102.2	0.11	780	0.18
18.48	0.2481	0.11	1108.8	0.11	785	0.183611
18.6	0.2491	0.1	1116	0.1	790	0.19
18.72	0.2501	0.1	1123.2	0.1	795	0.19
18.84	0.2511	0.1	1130.4	0.1	800	0.194444
18.96	0.2521	0.1	1137.6	0.1	805	0.2
19.08	0.253	0.09	1144.8	0.09	810	0.2
19.19	0.2539	0.09	1151.4	0.09	815	0.205758
19.31	0.2548	0.09	1158.6	0.09	820	0.21
19.43	0.2557	0.09	1165.8	0.09	825	0.21
19.55	0.2565	0.09	1173	0.09	830	0.216944
19.67	0.2573	0.08	1180.2	0.08	835	0.22
19.79	0.2582	0.08	1187.4	0.08	840	0.220833
19.91	0.2589	0.08	1194.6	0.08	845	0.227778
20.02	0.2597	0.08	1201.2	0.08	850	0.234722
20.14	0.2605	0.08	1208.4	0.08	855	0.24
20.26	0.2612	0.08	1215.6	0.08	860	0.24
20.38	0.262	0.07	1222.8	0.07	865	0.252778
20.5	0.2627	0.07	1230	0.07	870	0.26
20.61	0.2634	0.07	1236.6	0.07	875	0.260556
20.73	0.2641	0.07	1243.8	0.07	880	0.274444

20.85	0.2648	0.07	1251	0.07	885	0.284167
20.97	0.2655	0.07	1258.2	0.07	890	0.292424
21.09	0.2661	0.07	1265.4	0.07	895	0.307576
21.21	0.2668	0.07	1272.6	0.07	900	0.321667
21.33	0.2674	0.07	1279.8	0.07	905	0.338333
21.44	0.2681	0.06	1286.4	0.06	910	0.359167
21.56	0.2687	0.06	1293.6	0.06	915	0.373333
21.68	0.2693	0.06	1300.8	0.06	920	0.383611
21.8	0.2699	0.06	1308	0.06	925	0.389444
21.92	0.2706	0.06	1315.2	0.06	930	0.3825
22.03	0.2711	0.06	1321.8	0.06	935	0.42
22.15	0.2717	0.06	1329	0.06	940	0.480606
22.27	0.2723	0.06	1336.2	0.06	945	0.533636
22.39	0.2729	0.06	1343.4	0.06	950	0.711111
22.51	0.2735	0.06	1350.6	0.06	955	0.908611
22.63	0.274	0.06	1357.8	0.06	960	1.11
22.74	0.2746	0.06	1364.4	0.06	965	3.22
22.86	0.2751	0.06	1371.6	0.06	970	2.228333
22.98	0.2757	0.06	1378.8	0.06	975	0.647273
23.1	0.2762	0.05	1386	0.05	980	0.457879
23.22	0.2767	0.05	1393.2	0.05	985	0.408889
23.34	0.2773	0.05	1400.4	0.05	990	0.385
23.45	0.2778	0.05	1407	0.05	995	0.343333
23.57	0.2783	0.05	1414.2	0.05	1000	0.314444
23.69	0.2788	0.05	1421.4	0.05	1005	0.29
23.81	0.2793	0.05	1428.6	0.05	1010	0.269444
23.93	0.2798	0.05	1435.8	0.05	1015	0.255556
24.05	0.2803	0.05	1443	0.05	1020	0.241667
24.17	0.2805	0	1450.2	0	1025	0.228788
					1030	0.221212
					1035	0.214167
					1040	0.207222
					1045	0.200278
					1050	0.193333
					1055	0.186389
					1060	0.18
					1065	0.18
					1070	0.174722
					1075	0.167778
					1080	0.160833
					1085	0.135556
					1090	0.12
					1095	0.12
					1100	0.113056
					1105	0.11
					1110	0.108333
					1115	0.101389
					1120	0.1
					1125	0.1
					1130	0.1
					1135	0.1
					1140	0.096667
					1145	0.09
					1150	0.09
					1155	0.09
					1160	0.09
					1165	0.09
					1170	0.09
					1175	0.087222
					1180	0.080278
					1185	0.08
					1190	0.08

1195	0.08
1200	0.08
1205	0.08
1210	0.08
1215	0.08
1220	0.073889
1225	0.07
1230	0.07
1235	0.07
1240	0.07
1245	0.07
1250	0.07
1255	0.07
1260	0.07
1265	0.07
1270	0.07
1275	0.07
1280	0.069697
1285	0.062121
1290	0.06
1295	0.06
1300	0.06
1305	0.06
1310	0.06
1315	0.06
1320	0.06
1325	0.06
1330	0.06
1335	0.06
1340	0.06
1345	0.06
1350	0.06
1355	0.06
1360	0.06
1365	0.06
1370	0.06
1375	0.06
1380	0.058333
1385	0.051389
1390	0.05
1395	0.05
1400	0.05
1405	0.05
1410	0.05
1415	0.05
1420	0.05
1425	0.05
1430	0.05
1435	0.05
1440	0.05
1445	0.036111

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 4.54 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	1.50	0.00	98.	0.300	0.948
2	0.24	100.00	75.	0.300	0.459

TOTAL AREA (Acres) = 1.74

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.041

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.120

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.87
    TOTAL CATCHMENT AREA(ACRES) =    1.74
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.041
    LOW LOSS FRACTION = 0.120
    TIME OF CONCENTRATION(MIN.) =  6.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.51
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.14

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.04      0.0001      0.09  Q         .         .         .         .
  0.14      0.0009      0.09  Q         .         .         .         .
  0.24      0.0017      0.09  Q         .         .         .         .
  0.34      0.0024      0.09  Q         .         .         .         .
  0.45      0.0032      0.09  Q         .         .         .         .
  0.55      0.0040      0.09  Q         .         .         .         .
  0.65      0.0048      0.09  Q         .         .         .         .
  0.75      0.0056      0.09  Q         .         .         .         .
  0.85      0.0063      0.09  Q         .         .         .         .
  0.95      0.0071      0.09  Q         .         .         .         .
  1.06      0.0079      0.09  Q         .         .         .         .
  1.16      0.0087      0.09  Q         .         .         .         .
  1.26      0.0095      0.10  Q         .         .         .         .
  1.36      0.0103      0.10  Q         .         .         .         .
  1.46      0.0111      0.10  Q         .         .         .         .
  1.56      0.0119      0.10  Q         .         .         .         .
  1.67      0.0128      0.10  Q         .         .         .         .
  1.77      0.0136      0.10  Q         .         .         .         .
  1.87      0.0144      0.10  Q         .         .         .         .
  1.97      0.0152      0.10  Q         .         .         .         .
  2.07      0.0160      0.10  Q         .         .         .         .
  2.17      0.0169      0.10  Q         .         .         .         .
  2.28      0.0177      0.10  Q         .         .         .         .
  2.38      0.0186      0.10  Q         .         .         .         .
  2.48      0.0194      0.10  Q         .         .         .         .
  2.58      0.0203      0.10  Q         .         .         .         .
  2.68      0.0211      0.10  Q         .         .         .         .
  2.78      0.0220      0.10  Q         .         .         .         .
  2.88      0.0228      0.10  Q         .         .         .         .
  2.99      0.0237      0.10  Q         .         .         .         .
  3.09      0.0246      0.10  Q         .         .         .         .
  3.19      0.0254      0.10  Q         .         .         .         .
  3.29      0.0263      0.10  Q         .         .         .         .
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3.39	0.0272	0.11	Q	.	.	.	.
3.50	0.0281	0.11	Q	.	.	.	.
3.60	0.0290	0.11	Q	.	.	.	.
3.70	0.0299	0.11	Q	.	.	.	.
3.80	0.0308	0.11	Q	.	.	.	.
3.90	0.0317	0.11	Q	.	.	.	.
4.00	0.0326	0.11	Q	.	.	.	.
4.11	0.0335	0.11	Q	.	.	.	.
4.21	0.0344	0.11	Q	.	.	.	.
4.31	0.0353	0.11	Q	.	.	.	.
4.41	0.0363	0.11	Q	.	.	.	.
4.51	0.0372	0.11	Q	.	.	.	.
4.61	0.0381	0.11	Q	.	.	.	.
4.72	0.0391	0.11	Q	.	.	.	.
4.82	0.0400	0.11	Q	.	.	.	.
4.92	0.0410	0.11	Q	.	.	.	.
5.02	0.0420	0.11	Q	.	.	.	.
5.12	0.0429	0.12	Q	.	.	.	.
5.22	0.0439	0.12	Q	.	.	.	.
5.32	0.0449	0.12	Q	.	.	.	.
5.43	0.0459	0.12	Q	.	.	.	.
5.53	0.0469	0.12	Q	.	.	.	.
5.63	0.0479	0.12	Q	.	.	.	.
5.73	0.0489	0.12	Q	.	.	.	.
5.83	0.0499	0.12	Q	.	.	.	.
5.93	0.0509	0.12	Q	.	.	.	.
6.04	0.0519	0.12	Q	.	.	.	.
6.14	0.0529	0.12	Q	.	.	.	.
6.24	0.0540	0.12	Q	.	.	.	.
6.34	0.0550	0.12	Q	.	.	.	.
6.44	0.0561	0.13	Q	.	.	.	.
6.55	0.0571	0.13	Q	.	.	.	.
6.65	0.0582	0.13	Q	.	.	.	.
6.75	0.0593	0.13	Q	.	.	.	.
6.85	0.0603	0.13	Q	.	.	.	.
6.95	0.0614	0.13	Q	.	.	.	.
7.05	0.0625	0.13	Q	.	.	.	.
7.16	0.0636	0.13	Q	.	.	.	.
7.26	0.0647	0.13	Q	.	.	.	.
7.36	0.0659	0.13	Q	.	.	.	.
7.46	0.0670	0.13	Q	.	.	.	.
7.56	0.0681	0.14	Q	.	.	.	.
7.66	0.0693	0.14	Q	.	.	.	.
7.76	0.0704	0.14	Q	.	.	.	.
7.87	0.0716	0.14	Q	.	.	.	.
7.97	0.0728	0.14	Q	.	.	.	.
8.07	0.0739	0.14	Q	.	.	.	.
8.17	0.0751	0.14	Q	.	.	.	.
8.27	0.0763	0.14	Q	.	.	.	.
8.38	0.0775	0.14	Q	.	.	.	.
8.48	0.0787	0.15	Q	.	.	.	.
8.58	0.0800	0.15	Q	.	.	.	.
8.68	0.0812	0.15	Q	.	.	.	.
8.78	0.0825	0.15	Q	.	.	.	.
8.88	0.0837	0.15	Q	.	.	.	.
8.99	0.0850	0.15	Q	.	.	.	.
9.09	0.0863	0.15	Q	.	.	.	.
9.19	0.0876	0.16	Q	.	.	.	.
9.29	0.0889	0.16	Q	.	.	.	.
9.39	0.0902	0.16	Q	.	.	.	.

9.49	0.0916	0.16	Q	.	.	.	.
9.60	0.0929	0.16	Q	.	.	.	.
9.70	0.0943	0.16	Q	.	.	.	.
9.80	0.0956	0.16	Q	.	.	.	.
9.90	0.0970	0.17	Q	.	.	.	.
10.00	0.0984	0.17	Q	.	.	.	.
10.10	0.0999	0.17	Q	.	.	.	.
10.20	0.1013	0.17	Q	.	.	.	.
10.31	0.1027	0.17	Q	.	.	.	.
10.41	0.1042	0.18	Q	.	.	.	.
10.51	0.1057	0.18	Q	.	.	.	.
10.61	0.1072	0.18	Q	.	.	.	.
10.71	0.1087	0.18	Q	.	.	.	.
10.82	0.1103	0.18	Q	.	.	.	.
10.92	0.1118	0.19	Q	.	.	.	.
11.02	0.1134	0.19	Q	.	.	.	.
11.12	0.1150	0.19	Q	.	.	.	.
11.22	0.1166	0.19	Q	.	.	.	.
11.32	0.1182	0.20	Q	.	.	.	.
11.43	0.1199	0.20	Q	.	.	.	.
11.53	0.1216	0.20	Q	.	.	.	.
11.63	0.1233	0.21	Q	.	.	.	.
11.73	0.1250	0.21	Q	.	.	.	.
11.83	0.1268	0.21	Q	.	.	.	.
11.93	0.1286	0.21	Q	.	.	.	.
12.03	0.1304	0.22	Q	.	.	.	.
12.14	0.1325	0.29	.Q	.	.	.	.
12.24	0.1350	0.30	.Q	.	.	.	.
12.34	0.1375	0.30	.Q	.	.	.	.
12.44	0.1401	0.31	.Q	.	.	.	.
12.54	0.1427	0.31	.Q	.	.	.	.
12.65	0.1453	0.31	.Q	.	.	.	.
12.75	0.1479	0.32	.Q	.	.	.	.
12.85	0.1506	0.33	.Q	.	.	.	.
12.95	0.1534	0.33	.Q	.	.	.	.
13.05	0.1562	0.34	.Q	.	.	.	.
13.15	0.1590	0.34	.Q	.	.	.	.
13.26	0.1619	0.35	.Q	.	.	.	.
13.36	0.1649	0.35	.Q	.	.	.	.
13.46	0.1679	0.36	.Q	.	.	.	.
13.56	0.1709	0.37	.Q	.	.	.	.
13.66	0.1741	0.38	.Q	.	.	.	.
13.76	0.1773	0.38	.Q	.	.	.	.
13.87	0.1805	0.40	.Q	.	.	.	.
13.97	0.1839	0.40	.Q	.	.	.	.
14.07	0.1873	0.41	.Q	.	.	.	.
14.17	0.1908	0.42	.Q	.	.	.	.
14.27	0.1944	0.43	.Q	.	.	.	.
14.37	0.1981	0.44	.Q	.	.	.	.
14.48	0.2019	0.46	.Q	.	.	.	.
14.58	0.2058	0.48	.Q	.	.	.	.
14.68	0.2099	0.50	. Q	.	.	.	.
14.78	0.2142	0.52	. Q	.	.	.	.
14.88	0.2187	0.55	. Q	.	.	.	.
14.98	0.2234	0.57	. Q	.	.	.	.
15.09	0.2284	0.61	. Q	.	.	.	.
15.19	0.2337	0.64	. Q	.	.	.	.
15.29	0.2393	0.70	. Q	.	.	.	.
15.39	0.2454	0.74	. Q	.	.	.	.
15.49	0.2514	0.70	. Q	.	.	.	.

15.59	0.2576	0.76	. Q . . . .
15.70	0.2647	0.93	. Q . . . .
15.80	0.2734	1.14	. Q . . . .
15.90	0.2850	1.63	. Q . . . .
16.00	0.3012	2.22	. Q . . . .
16.10	0.3375	6.44	. . . Q . .
16.20	0.3701	1.33	. Q . . . .
16.31	0.3792	0.84	. Q . . . .
16.41	0.3856	0.68	. Q . . . .
16.51	0.3913	0.67	. Q . . . .
16.61	0.3966	0.59	. Q . . . .
16.71	0.4013	0.53	. Q . . . .
16.81	0.4056	0.49	.Q . . . .
16.92	0.4095	0.45	.Q . . . .
17.02	0.4132	0.43	.Q . . . .
17.12	0.4167	0.41	.Q . . . .
17.22	0.4201	0.39	.Q . . . .
17.32	0.4233	0.37	.Q . . . .
17.42	0.4264	0.36	.Q . . . .
17.52	0.4293	0.34	.Q . . . .
17.63	0.4321	0.33	.Q . . . .
17.73	0.4349	0.32	.Q . . . .
17.83	0.4375	0.31	.Q . . . .
17.93	0.4401	0.30	.Q . . . .
18.03	0.4426	0.29	.Q . . . .
18.14	0.4448	0.22	Q . . . .
18.24	0.4466	0.21	Q . . . .
18.34	0.4483	0.20	Q . . . .
18.44	0.4500	0.20	Q . . . .
18.54	0.4516	0.19	Q . . . .
18.64	0.4532	0.19	Q . . . .
18.74	0.4548	0.18	Q . . . .
18.85	0.4563	0.18	Q . . . .
18.95	0.4578	0.17	Q . . . .
19.05	0.4592	0.17	Q . . . .
19.15	0.4607	0.17	Q . . . .
19.25	0.4620	0.16	Q . . . .
19.36	0.4634	0.16	Q . . . .
19.46	0.4647	0.16	Q . . . .
19.56	0.4661	0.15	Q . . . .
19.66	0.4673	0.15	Q . . . .
19.76	0.4686	0.15	Q . . . .
19.86	0.4698	0.15	Q . . . .
19.97	0.4711	0.14	Q . . . .
20.07	0.4723	0.14	Q . . . .
20.17	0.4734	0.14	Q . . . .
20.27	0.4746	0.14	Q . . . .
20.37	0.4758	0.14	Q . . . .
20.47	0.4769	0.13	Q . . . .
20.58	0.4780	0.13	Q . . . .
20.68	0.4791	0.13	Q . . . .
20.78	0.4802	0.13	Q . . . .
20.88	0.4812	0.13	Q . . . .
20.98	0.4823	0.12	Q . . . .
21.08	0.4833	0.12	Q . . . .
21.18	0.4843	0.12	Q . . . .
21.29	0.4853	0.12	Q . . . .
21.39	0.4863	0.12	Q . . . .
21.49	0.4873	0.12	Q . . . .
21.59	0.4883	0.12	Q . . . .

21.69	0.4893	0.11	Q	.	.	.	.
21.80	0.4902	0.11	Q	.	.	.	.
21.90	0.4912	0.11	Q	.	.	.	.
22.00	0.4921	0.11	Q	.	.	.	.
22.10	0.4930	0.11	Q	.	.	.	.
22.20	0.4939	0.11	Q	.	.	.	.
22.30	0.4948	0.11	Q	.	.	.	.
22.41	0.4957	0.11	Q	.	.	.	.
22.51	0.4966	0.10	Q	.	.	.	.
22.61	0.4975	0.10	Q	.	.	.	.
22.71	0.4983	0.10	Q	.	.	.	.
22.81	0.4992	0.10	Q	.	.	.	.
22.91	0.5000	0.10	Q	.	.	.	.
23.02	0.5009	0.10	Q	.	.	.	.
23.12	0.5017	0.10	Q	.	.	.	.
23.22	0.5025	0.10	Q	.	.	.	.
23.32	0.5034	0.10	Q	.	.	.	.
23.42	0.5042	0.10	Q	.	.	.	.
23.52	0.5050	0.10	Q	.	.	.	.
23.62	0.5058	0.09	Q	.	.	.	.
23.73	0.5066	0.09	Q	.	.	.	.
23.83	0.5073	0.09	Q	.	.	.	.
23.93	0.5081	0.09	Q	.	.	.	.
24.03	0.5089	0.09	Q	.	.	.	.
24.13	0.5093	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.7
10%	79.3
20%	24.4
30%	12.2
40%	6.1
50%	6.1
60%	6.1
70%	6.1
80%	6.1
90%	6.1

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 25-year storm event

STEP 1
Import results from hydrograph

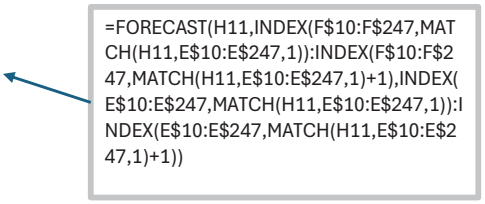
TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.04	0.0001	0.09
0.14	0.0009	0.09
0.24	0.0017	0.09
0.34	0.0024	0.09
0.45	0.0032	0.09
0.55	0.004	0.09
0.65	0.0048	0.09
0.75	0.0056	0.09
0.85	0.0063	0.09
0.95	0.0071	0.09
1.06	0.0079	0.09
1.16	0.0087	0.09
1.26	0.0095	0.1
1.36	0.0103	0.1
1.46	0.0111	0.1
1.56	0.0119	0.1
1.67	0.0128	0.1
1.77	0.0136	0.1
1.87	0.0144	0.1
1.97	0.0152	0.1
2.07	0.016	0.1
2.17	0.0169	0.1
2.28	0.0177	0.1
2.38	0.0186	0.1
2.48	0.0194	0.1
2.58	0.0203	0.1
2.68	0.0211	0.1
2.78	0.022	0.1
2.88	0.0228	0.1
2.99	0.0237	0.1
3.09	0.0246	0.1
3.19	0.0254	0.1
3.29	0.0263	0.1
3.39	0.0272	0.11
3.5	0.0281	0.11
3.6	0.029	0.11
3.7	0.0299	0.11
3.8	0.0308	0.11
3.9	0.0317	0.11
4	0.0326	0.11
4.11	0.0335	0.11
4.21	0.0344	0.11
4.31	0.0353	0.11
4.41	0.0363	0.11
4.51	0.0372	0.11
4.61	0.0381	0.11
4.72	0.0391	0.11
4.82	0.04	0.11
4.92	0.041	0.11
5.02	0.042	0.11
5.12	0.0429	0.12
5.22	0.0439	0.12

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
2.4	0.09
8.4	0.09
14.4	0.09
20.4	0.09
27	0.09
33	0.09
39	0.09
45	0.09
51	0.09
57	0.09
63.6	0.09
69.6	0.09
75.6	0.1
81.6	0.1
87.6	0.1
93.6	0.1
100.2	0.1
106.2	0.1
112.2	0.1
118.2	0.1
124.2	0.1
130.2	0.1
136.8	0.1
142.8	0.1
148.8	0.1
154.8	0.1
160.8	0.1
166.8	0.1
172.8	0.1
179.4	0.1
185.4	0.1
191.4	0.1
197.4	0.1
203.4	0.11
210	0.11
216	0.11
222	0.11
228	0.11
234	0.11
240	0.11
246.6	0.11
252.6	0.11
258.6	0.11
264.6	0.11
270.6	0.11
276.6	0.11
283.2	0.11
289.2	0.11
295.2	0.11
301.2	0.11
307.2	0.12
313.2	0.12

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.09
15	0.09
20	0.09
25	0.09
30	0.09
35	0.09
40	0.09
45	0.09
50	0.09
55	0.09
60	0.09
65	0.09
70	0.090667
75	0.099
80	0.1
85	0.1
90	0.1
95	0.1
100	0.1
105	0.1
110	0.1
115	0.1
120	0.1
125	0.1
130	0.1
135	0.1
140	0.1
145	0.1
150	0.1
155	0.1
160	0.1
165	0.1
170	0.1
175	0.1
180	0.1
185	0.1
190	0.1
195	0.1
200	0.104333
205	0.11
210	0.11
215	0.11
220	0.11
225	0.11
230	0.11
235	0.11
240	0.11
245	0.11
250	0.11
255	0.11
260	0.11



STEP 4
The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5
Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

5.32	0.0449	0.12	319.2	0.12	265	0.11
5.43	0.0459	0.12	325.8	0.12	270	0.11
5.53	0.0469	0.12	331.8	0.12	275	0.11
5.63	0.0479	0.12	337.8	0.12	280	0.11
5.73	0.0489	0.12	343.8	0.12	285	0.11
5.83	0.0499	0.12	349.8	0.12	290	0.11
5.93	0.0509	0.12	355.8	0.12	295	0.11
6.04	0.0519	0.12	362.4	0.12	300	0.11
6.14	0.0529	0.12	368.4	0.12	305	0.116333
6.24	0.054	0.12	374.4	0.12	310	0.12
6.34	0.055	0.12	380.4	0.12	315	0.12
6.44	0.0561	0.13	386.4	0.13	320	0.12
6.55	0.0571	0.13	393	0.13	325	0.12
6.65	0.0582	0.13	399	0.13	330	0.12
6.75	0.0593	0.13	405	0.13	335	0.12
6.85	0.0603	0.13	411	0.13	340	0.12
6.95	0.0614	0.13	417	0.13	345	0.12
7.05	0.0625	0.13	423	0.13	350	0.12
7.16	0.0636	0.13	429.6	0.13	355	0.12
7.26	0.0647	0.13	435.6	0.13	360	0.12
7.36	0.0659	0.13	441.6	0.13	365	0.12
7.46	0.067	0.13	447.6	0.13	370	0.12
7.56	0.0681	0.14	453.6	0.14	375	0.12
7.66	0.0693	0.14	459.6	0.14	380	0.12
7.76	0.0704	0.14	465.6	0.14	385	0.127667
7.87	0.0716	0.14	472.2	0.14	390	0.13
7.97	0.0728	0.14	478.2	0.14	395	0.13
8.07	0.0739	0.14	484.2	0.14	400	0.13
8.17	0.0751	0.14	490.2	0.14	405	0.13
8.27	0.0763	0.14	496.2	0.14	410	0.13
8.38	0.0775	0.14	502.8	0.14	415	0.13
8.48	0.0787	0.15	508.8	0.15	420	0.13
8.58	0.08	0.15	514.8	0.15	425	0.13
8.68	0.0812	0.15	520.8	0.15	430	0.13
8.78	0.0825	0.15	526.8	0.15	435	0.13
8.88	0.0837	0.15	532.8	0.15	440	0.13
8.99	0.085	0.15	539.4	0.15	445	0.13
9.09	0.0863	0.15	545.4	0.15	450	0.134
9.19	0.0876	0.16	551.4	0.16	455	0.14
9.29	0.0889	0.16	557.4	0.16	460	0.14
9.39	0.0902	0.16	563.4	0.16	465	0.14
9.49	0.0916	0.16	569.4	0.16	470	0.14
9.6	0.0929	0.16	576	0.16	475	0.14
9.7	0.0943	0.16	582	0.16	480	0.14
9.8	0.0956	0.16	588	0.16	485	0.14
9.9	0.097	0.17	594	0.17	490	0.14
10	0.0984	0.17	600	0.17	495	0.14
10.1	0.0999	0.17	606	0.17	500	0.14
10.2	0.1013	0.17	612	0.17	505	0.143667
10.31	0.1027	0.17	618.6	0.17	510	0.15
10.41	0.1042	0.18	624.6	0.18	515	0.15
10.51	0.1057	0.18	630.6	0.18	520	0.15
10.61	0.1072	0.18	636.6	0.18	525	0.15
10.71	0.1087	0.18	642.6	0.18	530	0.15
10.82	0.1103	0.18	649.2	0.18	535	0.15
10.92	0.1118	0.19	655.2	0.19	540	0.15
11.02	0.1134	0.19	661.2	0.19	545	0.15
11.12	0.115	0.19	667.2	0.19	550	0.157667
11.22	0.1166	0.19	673.2	0.19	555	0.16
11.32	0.1182	0.2	679.2	0.2	560	0.16
11.43	0.1199	0.2	685.8	0.2	565	0.16
11.53	0.1216	0.2	691.8	0.2	570	0.16

11.63	0.1233	0.21	697.8	0.21	575	0.16
11.73	0.125	0.21	703.8	0.21	580	0.16
11.83	0.1268	0.21	709.8	0.21	585	0.16
11.93	0.1286	0.21	715.8	0.21	590	0.163333
12.03	0.1304	0.22	721.8	0.22	595	0.17
12.14	0.1325	0.29	728.4	0.29	600	0.17
12.24	0.135	0.3	734.4	0.3	605	0.17
12.34	0.1375	0.3	740.4	0.3	610	0.17
12.44	0.1401	0.31	746.4	0.31	615	0.17
12.54	0.1427	0.31	752.4	0.31	620	0.172333
12.65	0.1453	0.31	759	0.31	625	0.18
12.75	0.1479	0.32	765	0.32	630	0.18
12.85	0.1506	0.33	771	0.33	635	0.18
12.95	0.1534	0.33	777	0.33	640	0.18
13.05	0.1562	0.34	783	0.34	645	0.18
13.15	0.159	0.34	789	0.34	650	0.181333
13.26	0.1619	0.35	795.6	0.35	655	0.189667
13.36	0.1649	0.35	801.6	0.35	660	0.19
13.46	0.1679	0.36	807.6	0.36	665	0.19
13.56	0.1709	0.37	813.6	0.37	670	0.19
13.66	0.1741	0.38	819.6	0.38	675	0.193
13.76	0.1773	0.38	825.6	0.38	680	0.2
13.87	0.1805	0.4	832.2	0.4	685	0.2
13.97	0.1839	0.4	838.2	0.4	690	0.2
14.07	0.1873	0.41	844.2	0.41	695	0.205333
14.17	0.1908	0.42	850.2	0.42	700	0.21
14.27	0.1944	0.43	856.2	0.43	705	0.21
14.37	0.1981	0.44	862.2	0.44	710	0.21
14.48	0.2019	0.46	868.8	0.46	715	0.21
14.58	0.2058	0.48	874.8	0.48	720	0.217
14.68	0.2099	0.5	880.8	0.5	725	0.253939
14.78	0.2142	0.52	886.8	0.52	730	0.292667
14.88	0.2187	0.55	892.8	0.55	735	0.3
14.98	0.2234	0.57	898.8	0.57	740	0.3
15.09	0.2284	0.61	905.4	0.61	745	0.307667
15.19	0.2337	0.64	911.4	0.64	750	0.31
15.29	0.2393	0.7	917.4	0.7	755	0.31
15.39	0.2454	0.74	923.4	0.74	760	0.311667
15.49	0.2514	0.7	929.4	0.7	765	0.32
15.59	0.2576	0.76	935.4	0.76	770	0.328333
15.7	0.2647	0.93	942	0.93	775	0.33
15.8	0.2734	1.14	948	1.14	780	0.335
15.9	0.285	1.63	954	1.63	785	0.34
16	0.3012	2.22	960	2.22	790	0.341515
16.1	0.3375	6.44	966	6.44	795	0.349091
16.2	0.3701	1.33	972	1.33	800	0.35
16.31	0.3792	0.84	978.6	0.84	805	0.355667
16.41	0.3856	0.68	984.6	0.68	810	0.364
16.51	0.3913	0.67	990.6	0.67	815	0.372333
16.61	0.3966	0.59	996.6	0.59	820	0.38
16.71	0.4013	0.53	1002.6	0.53	825	0.38
16.81	0.4056	0.49	1008.6	0.49	830	0.393333
16.92	0.4095	0.45	1015.2	0.45	835	0.4
17.02	0.4132	0.43	1021.2	0.43	840	0.403
17.12	0.4167	0.41	1027.2	0.41	845	0.411333
17.22	0.4201	0.39	1033.2	0.39	850	0.419667
17.32	0.4233	0.37	1039.2	0.37	855	0.428
17.42	0.4264	0.36	1045.2	0.36	860	0.436333
17.52	0.4293	0.34	1051.2	0.34	865	0.448485
17.63	0.4321	0.33	1057.8	0.33	870	0.464
17.73	0.4349	0.32	1063.8	0.32	875	0.480667
17.83	0.4375	0.31	1069.8	0.31	880	0.497333

17.93	0.4401	0.3	1075.8	0.3	885	0.514
18.03	0.4426	0.29	1081.8	0.29	890	0.536
18.14	0.4448	0.22	1088.4	0.22	895	0.557333
18.24	0.4466	0.21	1094.4	0.21	900	0.577273
18.34	0.4483	0.2	1100.4	0.2	905	0.607576
18.44	0.45	0.2	1106.4	0.2	910	0.633
18.54	0.4516	0.19	1112.4	0.19	915	0.676
18.64	0.4532	0.19	1118.4	0.19	920	0.717333
18.74	0.4548	0.18	1124.4	0.18	925	0.729333
18.85	0.4563	0.18	1131	0.18	930	0.706
18.95	0.4578	0.17	1137	0.17	935	0.756
19.05	0.4592	0.17	1143	0.17	940	0.878485
19.15	0.4607	0.17	1149	0.17	945	1.035
19.25	0.462	0.16	1155	0.16	950	1.303333
19.36	0.4634	0.16	1161.6	0.16	955	1.728333
19.46	0.4647	0.16	1167.6	0.16	960	2.22
19.56	0.4661	0.15	1173.6	0.15	965	6.44
19.66	0.4673	0.15	1179.6	0.15	970	3.033333
19.76	0.4686	0.15	1185.6	0.15	975	1.107273
19.86	0.4698	0.15	1191.6	0.15	980	0.802667
19.97	0.4711	0.14	1198.2	0.14	985	0.679333
20.07	0.4723	0.14	1204.2	0.14	990	0.671
20.17	0.4734	0.14	1210.2	0.14	995	0.611333
20.27	0.4746	0.14	1216.2	0.14	1000	0.556
20.37	0.4758	0.14	1222.2	0.14	1005	0.514
20.47	0.4769	0.13	1228.2	0.13	1010	0.481515
20.58	0.478	0.13	1234.8	0.13	1015	0.451212
20.68	0.4791	0.13	1240.8	0.13	1020	0.434
20.78	0.4802	0.13	1246.8	0.13	1025	0.417333
20.88	0.4812	0.13	1252.8	0.13	1030	0.400667
20.98	0.4823	0.12	1258.8	0.12	1035	0.384
21.08	0.4833	0.12	1264.8	0.12	1040	0.368667
21.18	0.4843	0.12	1270.8	0.12	1045	0.360333
21.29	0.4853	0.12	1277.4	0.12	1050	0.344
21.39	0.4863	0.12	1283.4	0.12	1055	0.334242
21.49	0.4873	0.12	1289.4	0.12	1060	0.326333
21.59	0.4883	0.12	1295.4	0.12	1065	0.318
21.69	0.4893	0.11	1301.4	0.11	1070	0.309667
21.8	0.4902	0.11	1308	0.11	1075	0.301333
21.9	0.4912	0.11	1314	0.11	1080	0.293
22	0.4921	0.11	1320	0.11	1085	0.256061
22.1	0.493	0.11	1326	0.11	1090	0.217333
22.2	0.4939	0.11	1332	0.11	1095	0.209
22.3	0.4948	0.11	1338	0.11	1100	0.200667
22.41	0.4957	0.11	1344.6	0.11	1105	0.2
22.51	0.4966	0.1	1350.6	0.1	1110	0.194
22.61	0.4975	0.1	1356.6	0.1	1115	0.19
22.71	0.4983	0.1	1362.6	0.1	1120	0.187333
22.81	0.4992	0.1	1368.6	0.1	1125	0.18
22.91	0.5	0.1	1374.6	0.1	1130	0.18
23.02	0.5009	0.1	1381.2	0.1	1135	0.173333
23.12	0.5017	0.1	1387.2	0.1	1140	0.17
23.22	0.5025	0.1	1393.2	0.1	1145	0.17
23.32	0.5034	0.1	1399.2	0.1	1150	0.168333
23.42	0.5042	0.1	1405.2	0.1	1155	0.16
23.52	0.505	0.1	1411.2	0.1	1160	0.16
23.62	0.5058	0.09	1417.2	0.09	1165	0.16
23.73	0.5066	0.09	1423.8	0.09	1170	0.156
23.83	0.5073	0.09	1429.8	0.09	1175	0.15
23.93	0.5081	0.09	1435.8	0.09	1180	0.15
24.03	0.5089	0.09	1441.8	0.09	1185	0.15
24.13	0.5093	0	1447.8	0	1190	0.15

1195	0.144848
1200	0.14
1205	0.14
1210	0.14
1215	0.14
1220	0.14
1225	0.135333
1230	0.13
1235	0.13
1240	0.13
1245	0.13
1250	0.13
1255	0.126333
1260	0.12
1265	0.12
1270	0.12
1275	0.12
1280	0.12
1285	0.12
1290	0.12
1295	0.12
1300	0.112333
1305	0.11
1310	0.11
1315	0.11
1320	0.11
1325	0.11
1330	0.11
1335	0.11
1340	0.11
1345	0.109333
1350	0.101
1355	0.1
1360	0.1
1365	0.1
1370	0.1
1375	0.1
1380	0.1
1385	0.1
1390	0.1
1395	0.1
1400	0.1
1405	0.1
1410	0.1
1415	0.093667
1420	0.09
1425	0.09
1430	0.09
1435	0.09
1440	0.09
1445	0.042

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC II:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 4.54 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	1.34	0.00	98.	0.300	0.948
2	0.28	100.00	75.	0.300	0.459

TOTAL AREA (Acres) = 1.62

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.052

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.137

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.89
    TOTAL CATCHMENT AREA(ACRES) =    1.62
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.052
    LOW LOSS FRACTION = 0.137
    TIME OF CONCENTRATION(MIN.) =  6.80
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    ORANGE COUNTY "VALLEY" RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) =  25
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.40
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.87
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.15
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.94
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.71
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  4.49

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.48
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.13

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.02      0.0000      0.00  Q         .         .         .         .
  0.13      0.0004      0.08  Q         .         .         .         .
  0.25      0.0012      0.09  Q         .         .         .         .
  0.36      0.0020      0.09  Q         .         .         .         .
  0.47      0.0028      0.09  Q         .         .         .         .
  0.59      0.0036      0.09  Q         .         .         .         .
  0.70      0.0044      0.09  Q         .         .         .         .
  0.81      0.0052      0.09  Q         .         .         .         .
  0.93      0.0061      0.09  Q         .         .         .         .
  1.04      0.0069      0.09  Q         .         .         .         .
  1.15      0.0077      0.09  Q         .         .         .         .
  1.27      0.0085      0.09  Q         .         .         .         .
  1.38      0.0094      0.09  Q         .         .         .         .
  1.49      0.0102      0.09  Q         .         .         .         .
  1.61      0.0111      0.09  Q         .         .         .         .
  1.72      0.0119      0.09  Q         .         .         .         .
  1.83      0.0128      0.09  Q         .         .         .         .
  1.95      0.0136      0.09  Q         .         .         .         .
  2.06      0.0145      0.09  Q         .         .         .         .
  2.17      0.0154      0.09  Q         .         .         .         .
  2.29      0.0162      0.09  Q         .         .         .         .
  2.40      0.0171      0.09  Q         .         .         .         .
  2.51      0.0180      0.09  Q         .         .         .         .
  2.63      0.0189      0.09  Q         .         .         .         .
  2.74      0.0198      0.10  Q         .         .         .         .
  2.85      0.0207      0.10  Q         .         .         .         .
  2.97      0.0216      0.10  Q         .         .         .         .
  3.08      0.0225      0.10  Q         .         .         .         .
  3.19      0.0234      0.10  Q         .         .         .         .
  3.31      0.0243      0.10  Q         .         .         .         .
  3.42      0.0252      0.10  Q         .         .         .         .
  3.53      0.0261      0.10  Q         .         .         .         .
  3.65      0.0271      0.10  Q         .         .         .         .
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3.76	0.0280	0.10	Q	.	.	.	.
3.87	0.0289	0.10	Q	.	.	.	.
3.99	0.0299	0.10	Q	.	.	.	.
4.10	0.0308	0.10	Q	.	.	.	.
4.21	0.0318	0.10	Q	.	.	.	.
4.33	0.0327	0.10	Q	.	.	.	.
4.44	0.0337	0.10	Q	.	.	.	.
4.55	0.0347	0.10	Q	.	.	.	.
4.67	0.0357	0.11	Q	.	.	.	.
4.78	0.0367	0.11	Q	.	.	.	.
4.89	0.0377	0.11	Q	.	.	.	.
5.01	0.0387	0.11	Q	.	.	.	.
5.12	0.0397	0.11	Q	.	.	.	.
5.23	0.0407	0.11	Q	.	.	.	.
5.35	0.0417	0.11	Q	.	.	.	.
5.46	0.0427	0.11	Q	.	.	.	.
5.57	0.0438	0.11	Q	.	.	.	.
5.69	0.0448	0.11	Q	.	.	.	.
5.80	0.0458	0.11	Q	.	.	.	.
5.91	0.0469	0.11	Q	.	.	.	.
6.03	0.0480	0.11	Q	.	.	.	.
6.14	0.0490	0.11	Q	.	.	.	.
6.25	0.0501	0.12	Q	.	.	.	.
6.37	0.0512	0.12	Q	.	.	.	.
6.48	0.0523	0.12	Q	.	.	.	.
6.59	0.0534	0.12	Q	.	.	.	.
6.71	0.0545	0.12	Q	.	.	.	.
6.82	0.0556	0.12	Q	.	.	.	.
6.93	0.0568	0.12	Q	.	.	.	.
7.05	0.0579	0.12	Q	.	.	.	.
7.16	0.0590	0.12	Q	.	.	.	.
7.27	0.0602	0.12	Q	.	.	.	.
7.39	0.0614	0.12	Q	.	.	.	.
7.50	0.0625	0.13	Q	.	.	.	.
7.61	0.0637	0.13	Q	.	.	.	.
7.73	0.0649	0.13	Q	.	.	.	.
7.84	0.0661	0.13	Q	.	.	.	.
7.95	0.0673	0.13	Q	.	.	.	.
8.07	0.0686	0.13	Q	.	.	.	.
8.18	0.0698	0.13	Q	.	.	.	.
8.29	0.0711	0.13	Q	.	.	.	.
8.41	0.0723	0.14	Q	.	.	.	.
8.52	0.0736	0.14	Q	.	.	.	.
8.63	0.0749	0.14	Q	.	.	.	.
8.75	0.0762	0.14	Q	.	.	.	.
8.86	0.0775	0.14	Q	.	.	.	.
8.97	0.0788	0.14	Q	.	.	.	.
9.09	0.0802	0.14	Q	.	.	.	.
9.20	0.0815	0.14	Q	.	.	.	.
9.31	0.0829	0.15	Q	.	.	.	.
9.43	0.0842	0.15	Q	.	.	.	.
9.54	0.0856	0.15	Q	.	.	.	.
9.65	0.0871	0.15	Q	.	.	.	.
9.77	0.0885	0.15	Q	.	.	.	.
9.88	0.0899	0.15	Q	.	.	.	.
9.99	0.0914	0.16	Q	.	.	.	.
10.11	0.0929	0.16	Q	.	.	.	.
10.22	0.0943	0.16	Q	.	.	.	.
10.33	0.0959	0.16	Q	.	.	.	.
10.45	0.0974	0.16	Q	.	.	.	.

10.56	0.0989	0.17	Q . . . .
10.67	0.1005	0.17	Q . . . .
10.79	0.1021	0.17	Q . . . .
10.90	0.1037	0.17	Q . . . .
11.01	0.1054	0.18	Q . . . .
11.13	0.1070	0.18	Q . . . .
11.24	0.1087	0.18	Q . . . .
11.35	0.1104	0.18	Q . . . .
11.47	0.1122	0.19	Q . . . .
11.58	0.1139	0.19	Q . . . .
11.69	0.1157	0.19	Q . . . .
11.81	0.1175	0.20	Q . . . .
11.92	0.1194	0.20	Q . . . .
12.03	0.1213	0.20	Q . . . .
12.15	0.1235	0.27	.Q . . . .
12.26	0.1260	0.28	.Q . . . .
12.37	0.1287	0.28	.Q . . . .
12.49	0.1313	0.29	.Q . . . .
12.60	0.1340	0.29	.Q . . . .
12.71	0.1368	0.30	.Q . . . .
12.83	0.1396	0.30	.Q . . . .
12.94	0.1424	0.31	.Q . . . .
13.05	0.1453	0.31	.Q . . . .
13.17	0.1483	0.32	.Q . . . .
13.28	0.1513	0.32	.Q . . . .
13.39	0.1544	0.33	.Q . . . .
13.51	0.1575	0.34	.Q . . . .
13.62	0.1607	0.35	.Q . . . .
13.73	0.1640	0.36	.Q . . . .
13.85	0.1674	0.37	.Q . . . .
13.96	0.1709	0.37	.Q . . . .
14.07	0.1744	0.39	.Q . . . .
14.19	0.1781	0.39	.Q . . . .
14.30	0.1818	0.41	.Q . . . .
14.41	0.1857	0.42	.Q . . . .
14.53	0.1897	0.44	.Q . . . .
14.64	0.1939	0.45	.Q . . . .
14.75	0.1982	0.48	.Q . . . .
14.87	0.2028	0.49	.Q . . . .
14.98	0.2076	0.53	. Q . . . .
15.09	0.2127	0.56	. Q . . . .
15.21	0.2182	0.61	. Q . . . .
15.32	0.2241	0.65	. Q . . . .
15.43	0.2300	0.63	. Q . . . .
15.55	0.2361	0.66	. Q . . . .
15.66	0.2430	0.81	. Q . . . .
15.77	0.2513	0.96	. Q . . . .
15.89	0.2625	1.44	. Q . . . .
16.00	0.2784	1.97	. Q . . . .
16.11	0.3146	5.75	. . . Q . .
16.23	0.3469	1.17	. Q . . . .
16.34	0.3558	0.73	. Q . . . .
16.45	0.3625	0.69	. Q . . . .
16.57	0.3684	0.58	. Q . . . .
16.68	0.3735	0.51	. Q . . . .
16.79	0.3781	0.46	.Q . . . .
16.91	0.3823	0.43	.Q . . . .
17.02	0.3861	0.40	.Q . . . .
17.13	0.3898	0.38	.Q . . . .
17.25	0.3933	0.36	.Q . . . .

17.36	0.3966	0.34	.Q	.	.	.	.
17.47	0.3997	0.33	.Q	.	.	.	.
17.59	0.4027	0.32	.Q	.	.	.	.
17.70	0.4056	0.30	.Q	.	.	.	.
17.81	0.4084	0.29	.Q	.	.	.	.
17.93	0.4111	0.28	.Q	.	.	.	.
18.04	0.4138	0.28	.Q	.	.	.	.
18.15	0.4160	0.20	Q	.	.	.	.
18.27	0.4178	0.19	Q	.	.	.	.
18.38	0.4196	0.19	Q	.	.	.	.
18.49	0.4214	0.18	Q	.	.	.	.
18.61	0.4231	0.18	Q	.	.	.	.
18.72	0.4247	0.17	Q	.	.	.	.
18.83	0.4263	0.17	Q	.	.	.	.
18.95	0.4278	0.16	Q	.	.	.	.
19.06	0.4294	0.16	Q	.	.	.	.
19.17	0.4308	0.16	Q	.	.	.	.
19.29	0.4323	0.15	Q	.	.	.	.
19.40	0.4337	0.15	Q	.	.	.	.
19.51	0.4351	0.15	Q	.	.	.	.
19.63	0.4364	0.14	Q	.	.	.	.
19.74	0.4377	0.14	Q	.	.	.	.
19.85	0.4390	0.14	Q	.	.	.	.
19.97	0.4403	0.13	Q	.	.	.	.
20.08	0.4416	0.13	Q	.	.	.	.
20.19	0.4428	0.13	Q	.	.	.	.
20.31	0.4440	0.13	Q	.	.	.	.
20.42	0.4452	0.13	Q	.	.	.	.
20.53	0.4463	0.12	Q	.	.	.	.
20.65	0.4475	0.12	Q	.	.	.	.
20.76	0.4486	0.12	Q	.	.	.	.
20.87	0.4497	0.12	Q	.	.	.	.
20.99	0.4508	0.12	Q	.	.	.	.
21.10	0.4519	0.11	Q	.	.	.	.
21.21	0.4530	0.11	Q	.	.	.	.
21.33	0.4540	0.11	Q	.	.	.	.
21.44	0.4551	0.11	Q	.	.	.	.
21.55	0.4561	0.11	Q	.	.	.	.
21.67	0.4571	0.11	Q	.	.	.	.
21.78	0.4581	0.11	Q	.	.	.	.
21.89	0.4591	0.10	Q	.	.	.	.
22.01	0.4600	0.10	Q	.	.	.	.
22.12	0.4610	0.10	Q	.	.	.	.
22.23	0.4619	0.10	Q	.	.	.	.
22.35	0.4629	0.10	Q	.	.	.	.
22.46	0.4638	0.10	Q	.	.	.	.
22.57	0.4647	0.10	Q	.	.	.	.
22.69	0.4656	0.10	Q	.	.	.	.
22.80	0.4665	0.09	Q	.	.	.	.
22.91	0.4674	0.09	Q	.	.	.	.
23.03	0.4683	0.09	Q	.	.	.	.
23.14	0.4691	0.09	Q	.	.	.	.
23.25	0.4700	0.09	Q	.	.	.	.
23.37	0.4708	0.09	Q	.	.	.	.
23.48	0.4717	0.09	Q	.	.	.	.
23.59	0.4725	0.09	Q	.	.	.	.
23.71	0.4733	0.09	Q	.	.	.	.
23.82	0.4741	0.09	Q	.	.	.	.
23.93	0.4750	0.09	Q	.	.	.	.
24.05	0.4758	0.09	Q	.	.	.	.

```
 24.16      0.4762      0.00  Q          .          .          .          .
 ------------------------------------------------------------------------------
------------------------------------------------------------------------------
```

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1441.6
10%	88.4
20%	27.2
30%	13.6
40%	6.8
50%	6.8
60%	6.8
70%	6.8
80%	6.8
90%	6.8

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 25-year storm event

STEP 1
Import results from hydrograph

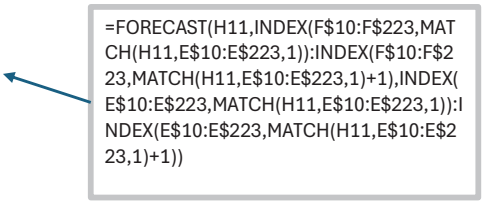
TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.02	0	0
0.13	0.0004	0.08
0.25	0.0012	0.09
0.36	0.002	0.09
0.47	0.0028	0.09
0.59	0.0036	0.09
0.7	0.0044	0.09
0.81	0.0052	0.09
0.93	0.0061	0.09
1.04	0.0069	0.09
1.15	0.0077	0.09
1.27	0.0085	0.09
1.38	0.0094	0.09
1.49	0.0102	0.09
1.61	0.0111	0.09
1.72	0.0119	0.09
1.83	0.0128	0.09
1.95	0.0136	0.09
2.06	0.0145	0.09
2.17	0.0154	0.09
2.29	0.0162	0.09
2.4	0.0171	0.09
2.51	0.018	0.09
2.63	0.0189	0.09
2.74	0.0198	0.1
2.85	0.0207	0.1
2.97	0.0216	0.1
3.08	0.0225	0.1
3.19	0.0234	0.1
3.31	0.0243	0.1
3.42	0.0252	0.1
3.53	0.0261	0.1
3.65	0.0271	0.1
3.76	0.028	0.1
3.87	0.0289	0.1
3.99	0.0299	0.1
4.1	0.0308	0.1
4.21	0.0318	0.1
4.33	0.0327	0.1
4.44	0.0337	0.1
4.55	0.0347	0.1
4.67	0.0357	0.11
4.78	0.0367	0.11
4.89	0.0377	0.11
5.01	0.0387	0.11
5.12	0.0397	0.11
5.23	0.0407	0.11
5.35	0.0417	0.11
5.46	0.0427	0.11
5.57	0.0438	0.11
5.69	0.0448	0.11
5.8	0.0458	0.11

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
1.2	0
7.8	0.08
15	0.09
21.6	0.09
28.2	0.09
35.4	0.09
42	0.09
48.6	0.09
55.8	0.09
62.4	0.09
69	0.09
76.2	0.09
82.8	0.09
89.4	0.09
96.6	0.09
103.2	0.09
109.8	0.09
117	0.09
123.6	0.09
130.2	0.09
137.4	0.09
144	0.09
150.6	0.09
157.8	0.09
164.4	0.1
171	0.1
178.2	0.1
184.8	0.1
191.4	0.1
198.6	0.1
205.2	0.1
211.8	0.1
219	0.1
225.6	0.1
232.2	0.1
239.4	0.1
246	0.1
252.6	0.1
259.8	0.1
266.4	0.1
273	0.1
280.2	0.11
286.8	0.11
293.4	0.11
300.6	0.11
307.2	0.11
313.8	0.11
321	0.11
327.6	0.11
334.2	0.11
341.4	0.11
348	0.11

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.083056
15	0.09
20	0.09
25	0.09
30	0.09
35	0.09
40	0.09
45	0.09
50	0.09
55	0.09
60	0.09
65	0.09
70	0.09
75	0.09
80	0.09
85	0.09
90	0.09
95	0.09
100	0.09
105	0.09
110	0.09
115	0.09
120	0.09
125	0.09
130	0.09
135	0.09
140	0.09
145	0.09
150	0.09
155	0.09
160	0.093333
165	0.1
170	0.1
175	0.1
180	0.1
185	0.1
190	0.1
195	0.1
200	0.1
205	0.1
210	0.1
215	0.1
220	0.1
225	0.1
230	0.1
235	0.1
240	0.1
245	0.1
250	0.1
255	0.1
260	0.1



STEP 4
The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5
Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

5.91	0.0469	0.11	354.6	0.11	265	0.1
6.03	0.048	0.11	361.8	0.11	270	0.1
6.14	0.049	0.11	368.4	0.11	275	0.102778
6.25	0.0501	0.12	375	0.12	280	0.109722
6.37	0.0512	0.12	382.2	0.12	285	0.11
6.48	0.0523	0.12	388.8	0.12	290	0.11
6.59	0.0534	0.12	395.4	0.12	295	0.11
6.71	0.0545	0.12	402.6	0.12	300	0.11
6.82	0.0556	0.12	409.2	0.12	305	0.11
6.93	0.0568	0.12	415.8	0.12	310	0.11
7.05	0.0579	0.12	423	0.12	315	0.11
7.16	0.059	0.12	429.6	0.12	320	0.11
7.27	0.0602	0.12	436.2	0.12	325	0.11
7.39	0.0614	0.12	443.4	0.12	330	0.11
7.5	0.0625	0.13	450	0.13	335	0.11
7.61	0.0637	0.13	456.6	0.13	340	0.11
7.73	0.0649	0.13	463.8	0.13	345	0.11
7.84	0.0661	0.13	470.4	0.13	350	0.11
7.95	0.0673	0.13	477	0.13	355	0.11
8.07	0.0686	0.13	484.2	0.13	360	0.11
8.18	0.0698	0.13	490.8	0.13	365	0.11
8.29	0.0711	0.13	497.4	0.13	370	0.112424
8.41	0.0723	0.14	504.6	0.14	375	0.12
8.52	0.0736	0.14	511.2	0.14	380	0.12
8.63	0.0749	0.14	517.8	0.14	385	0.12
8.75	0.0762	0.14	525	0.14	390	0.12
8.86	0.0775	0.14	531.6	0.14	395	0.12
8.97	0.0788	0.14	538.2	0.14	400	0.12
9.09	0.0802	0.14	545.4	0.14	405	0.12
9.2	0.0815	0.14	552	0.14	410	0.12
9.31	0.0829	0.15	558.6	0.15	415	0.12
9.43	0.0842	0.15	565.8	0.15	420	0.12
9.54	0.0856	0.15	572.4	0.15	425	0.12
9.65	0.0871	0.15	579	0.15	430	0.12
9.77	0.0885	0.15	586.2	0.15	435	0.12
9.88	0.0899	0.15	592.8	0.15	440	0.12
9.99	0.0914	0.16	599.4	0.16	445	0.122424
10.11	0.0929	0.16	606.6	0.16	450	0.13
10.22	0.0943	0.16	613.2	0.16	455	0.13
10.33	0.0959	0.16	619.8	0.16	460	0.13
10.45	0.0974	0.16	627	0.16	465	0.13
10.56	0.0989	0.17	633.6	0.17	470	0.13
10.67	0.1005	0.17	640.2	0.17	475	0.13
10.79	0.1021	0.17	647.4	0.17	480	0.13
10.9	0.1037	0.17	654	0.17	485	0.13
11.01	0.1054	0.18	660.6	0.18	490	0.13
11.13	0.107	0.18	667.8	0.18	495	0.13
11.24	0.1087	0.18	674.4	0.18	500	0.133611
11.35	0.1104	0.18	681	0.18	505	0.14
11.47	0.1122	0.19	688.2	0.19	510	0.14
11.58	0.1139	0.19	694.8	0.19	515	0.14
11.69	0.1157	0.19	701.4	0.19	520	0.14
11.81	0.1175	0.2	708.6	0.2	525	0.14
11.92	0.1194	0.2	715.2	0.2	530	0.14
12.03	0.1213	0.2	721.8	0.2	535	0.14
12.15	0.1235	0.27	729	0.27	540	0.14
12.26	0.126	0.28	735.6	0.28	545	0.14
12.37	0.1287	0.28	742.2	0.28	550	0.14
12.49	0.1313	0.29	749.4	0.29	555	0.144545
12.6	0.134	0.29	756	0.29	560	0.15
12.71	0.1368	0.3	762.6	0.3	565	0.15
12.83	0.1396	0.3	769.8	0.3	570	0.15

12.94	0.1424	0.31	776.4	0.31	575	0.15
13.05	0.1453	0.31	783	0.31	580	0.15
13.17	0.1483	0.32	790.2	0.32	585	0.15
13.28	0.1513	0.32	796.8	0.32	590	0.15
13.39	0.1544	0.33	803.4	0.33	595	0.153333
13.51	0.1575	0.34	810.6	0.34	600	0.16
13.62	0.1607	0.35	817.2	0.35	605	0.16
13.73	0.164	0.36	823.8	0.36	610	0.16
13.85	0.1674	0.37	831	0.37	615	0.16
13.96	0.1709	0.37	837.6	0.37	620	0.16
14.07	0.1744	0.39	844.2	0.39	625	0.16
14.19	0.1781	0.39	851.4	0.39	630	0.164545
14.3	0.1818	0.41	858	0.41	635	0.17
14.41	0.1857	0.42	864.6	0.42	640	0.17
14.53	0.1897	0.44	871.8	0.44	645	0.17
14.64	0.1939	0.45	878.4	0.45	650	0.17
14.75	0.1982	0.48	885	0.48	655	0.171515
14.87	0.2028	0.49	892.2	0.49	660	0.179091
14.98	0.2076	0.53	898.8	0.53	665	0.18
15.09	0.2127	0.56	905.4	0.56	670	0.18
15.21	0.2182	0.61	912.6	0.61	675	0.18
15.32	0.2241	0.65	919.2	0.65	680	0.18
15.43	0.23	0.63	925.8	0.63	685	0.185556
15.55	0.2361	0.66	933	0.66	690	0.19
15.66	0.243	0.81	939.6	0.81	695	0.19
15.77	0.2513	0.96	946.2	0.96	700	0.19
15.89	0.2625	1.44	953.4	1.44	705	0.195
16	0.2784	1.97	960	1.97	710	0.2
16.11	0.3146	5.75	966.6	5.75	715	0.2
16.23	0.3469	1.17	973.8	1.17	720	0.2
16.34	0.3558	0.73	980.4	0.73	725	0.231111
16.45	0.3625	0.69	987	0.69	730	0.271515
16.57	0.3684	0.58	994.2	0.58	735	0.279091
16.68	0.3735	0.51	1000.8	0.51	740	0.28
16.79	0.3781	0.46	1007.4	0.46	745	0.283889
16.91	0.3823	0.43	1014.6	0.43	750	0.29
17.02	0.3861	0.4	1021.2	0.4	755	0.29
17.13	0.3898	0.38	1027.8	0.38	760	0.296061
17.25	0.3933	0.36	1035	0.36	765	0.3
17.36	0.3966	0.34	1041.6	0.34	770	0.300303
17.47	0.3997	0.33	1048.2	0.33	775	0.307879
17.59	0.4027	0.32	1055.4	0.32	780	0.31
17.7	0.4056	0.3	1062	0.3	785	0.312778
17.81	0.4084	0.29	1068.6	0.29	790	0.319722
17.93	0.4111	0.28	1075.8	0.28	795	0.32
18.04	0.4138	0.28	1082.4	0.28	800	0.324848
18.15	0.416	0.2	1089	0.2	805	0.332222
18.27	0.4178	0.19	1096.2	0.19	810	0.339167
18.38	0.4196	0.19	1102.8	0.19	815	0.346667
18.49	0.4214	0.18	1109.4	0.18	820	0.354242
18.61	0.4231	0.18	1116.6	0.18	825	0.361667
18.72	0.4247	0.17	1123.2	0.17	830	0.368611
18.83	0.4263	0.17	1129.8	0.17	835	0.37
18.95	0.4278	0.16	1137	0.16	840	0.377273
19.06	0.4294	0.16	1143.6	0.16	845	0.39
19.17	0.4308	0.16	1150.2	0.16	850	0.39
19.29	0.4323	0.15	1157.4	0.15	855	0.400909
19.4	0.4337	0.15	1164	0.15	860	0.41303
19.51	0.4351	0.15	1170.6	0.15	865	0.421111
19.63	0.4364	0.14	1177.8	0.14	870	0.435
19.74	0.4377	0.14	1184.4	0.14	875	0.444848
19.85	0.439	0.14	1191	0.14	880	0.457273

19.97	0.4403	0.13	1198.2	0.13	885	0.48
20.08	0.4416	0.13	1204.8	0.13	890	0.486944
20.19	0.4428	0.13	1211.4	0.13	895	0.50697
20.31	0.444	0.13	1218.6	0.13	900	0.535455
20.42	0.4452	0.13	1225.2	0.13	905	0.558182
20.53	0.4463	0.12	1231.8	0.12	910	0.591944
20.65	0.4475	0.12	1239	0.12	915	0.624545
20.76	0.4486	0.12	1245.6	0.12	920	0.647576
20.87	0.4497	0.12	1252.2	0.12	925	0.632424
20.99	0.4508	0.12	1259.4	0.12	930	0.6475
21.1	0.4519	0.11	1266	0.11	935	0.705455
21.21	0.453	0.11	1272.6	0.11	940	0.819091
21.33	0.454	0.11	1279.8	0.11	945	0.932727
21.44	0.4551	0.11	1286.4	0.11	950	1.213333
21.55	0.4561	0.11	1293	0.11	955	1.568485
21.67	0.4571	0.11	1300.2	0.11	960	1.97
21.78	0.4581	0.11	1306.8	0.11	965	5.75
21.89	0.4591	0.1	1313.4	0.1	970	3.587222
22.01	0.46	0.1	1320.6	0.1	975	1.09
22.12	0.461	0.1	1327.2	0.1	980	0.756667
22.23	0.4619	0.1	1333.8	0.1	985	0.702121
22.35	0.4629	0.1	1341	0.1	990	0.644167
22.46	0.4638	0.1	1347.6	0.1	995	0.571515
22.57	0.4647	0.1	1354.2	0.1	1000	0.518485
22.69	0.4656	0.1	1361.4	0.1	1005	0.478182
22.8	0.4665	0.09	1368	0.09	1010	0.449167
22.91	0.4674	0.09	1374.6	0.09	1015	0.428182
23.03	0.4683	0.09	1381.8	0.09	1020	0.405455
23.14	0.4691	0.09	1388.4	0.09	1025	0.388485
23.25	0.47	0.09	1395	0.09	1030	0.373889
23.37	0.4708	0.09	1402.2	0.09	1035	0.36
23.48	0.4717	0.09	1408.8	0.09	1040	0.344848
23.59	0.4725	0.09	1415.4	0.09	1045	0.334848
23.71	0.4733	0.09	1422.6	0.09	1050	0.3275
23.82	0.4741	0.09	1429.2	0.09	1055	0.320556
23.93	0.475	0.09	1435.8	0.09	1060	0.306061
24.05	0.4758	0.09	1443	0.09	1065	0.295455
24.16	0.4762	0	1449.6	0	1070	0.288056
					1075	0.281111
					1080	0.28
					1085	0.248485
					1090	0.198611
					1095	0.191667
					1100	0.19
					1105	0.186667
					1110	0.18
					1115	0.18
					1120	0.174848
					1125	0.17
					1130	0.169722
					1135	0.162778
					1140	0.16
					1145	0.16
					1150	0.16
					1155	0.153333
					1160	0.15
					1165	0.15
					1170	0.15
					1175	0.143889
					1180	0.14
					1185	0.14
					1190	0.14

1195	0.134444
1200	0.13
1205	0.13
1210	0.13
1215	0.13
1220	0.13
1225	0.13
1230	0.122727
1235	0.12
1240	0.12
1245	0.12
1250	0.12
1255	0.12
1260	0.119091
1265	0.111515
1270	0.11
1275	0.11
1280	0.11
1285	0.11
1290	0.11
1295	0.11
1300	0.11
1305	0.11
1310	0.105152
1315	0.1
1320	0.1
1325	0.1
1330	0.1
1335	0.1
1340	0.1
1345	0.1
1350	0.1
1355	0.1
1360	0.1
1365	0.094545
1370	0.09
1375	0.09
1380	0.09
1385	0.09
1390	0.09
1395	0.09
1400	0.09
1405	0.09
1410	0.09
1415	0.09
1420	0.09
1425	0.09
1430	0.09
1435	0.09
1440	0.09
1445	0.062727

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 5.91 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	0.82	0.00	98.(AMC II)	0.300	0.960
2	0.11	100.00	75.(AMC II)	0.300	0.824

TOTAL AREA (Acres) = 0.93

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.035

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.056

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--------------------------------------------------------------------------------

    RATIONAL METHOD CALIBRATION COEFFICIENT = 1.15
    TOTAL CATCHMENT AREA(ACRES) =    0.93
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.035
    LOW LOSS FRACTION = 0.056
    TIME OF CONCENTRATION(MIN.) =  7.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.39
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.31
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.33
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.27
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.91

--------------------------------------------------------------------------------

    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.50
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    -0.04

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.03      0.0000      0.00  Q         .         .         .         .
  0.14      0.0005      0.11  Q         .         .         .         .
  0.26      0.0016      0.11  Q         .         .         .         .
  0.38      0.0026      0.11  Q         .         .         .         .
  0.50      0.0036      0.11  Q         .         .         .         .
  0.62      0.0047      0.11  Q         .         .         .         .
  0.74      0.0058      0.11  Q         .         .         .         .
  0.85      0.0068      0.11  Q         .         .         .         .
  0.97      0.0079      0.11  Q         .         .         .         .
  1.09      0.0090      0.11  Q         .         .         .         .
  1.21      0.0100      0.11  Q         .         .         .         .
  1.33      0.0111      0.11  Q         .         .         .         .
  1.45      0.0122      0.11  Q         .         .         .         .
  1.56      0.0133      0.11  Q         .         .         .         .
  1.68      0.0144      0.11  Q         .         .         .         .
  1.80      0.0155      0.11  Q         .         .         .         .
  1.92      0.0166      0.11  Q         .         .         .         .
  2.04      0.0177      0.11  Q         .         .         .         .
  2.16      0.0188      0.11  Q         .         .         .         .
  2.27      0.0200      0.12  Q         .         .         .         .
  2.39      0.0211      0.12  Q         .         .         .         .
  2.51      0.0222      0.12  Q         .         .         .         .
  2.63      0.0234      0.12  Q         .         .         .         .
  2.75      0.0245      0.12  Q         .         .         .         .
  2.87      0.0257      0.12  Q         .         .         .         .
  2.98      0.0268      0.12  Q         .         .         .         .
  3.10      0.0280      0.12  Q         .         .         .         .
  3.22      0.0291      0.12  Q         .         .         .         .
  3.34      0.0303      0.12  Q         .         .         .         .
  3.46      0.0315      0.12  Q         .         .         .         .
  3.58      0.0327      0.12  Q         .         .         .         .
  3.69      0.0339      0.12  Q         .         .         .         .
  3.81      0.0351      0.12  Q         .         .         .         .
```

3.93	0.0363	0.12	Q	.	.	.	.
4.05	0.0375	0.12	Q	.	.	.	.
4.17	0.0387	0.13	Q	.	.	.	.
4.29	0.0400	0.13	Q	.	.	.	.
4.40	0.0412	0.13	Q	.	.	.	.
4.52	0.0424	0.13	Q	.	.	.	.
4.64	0.0437	0.13	Q	.	.	.	.
4.76	0.0449	0.13	Q	.	.	.	.
4.88	0.0462	0.13	Q	.	.	.	.
5.00	0.0475	0.13	Q	.	.	.	.
5.11	0.0488	0.13	Q	.	.	.	.
5.23	0.0500	0.13	Q	.	.	.	.
5.35	0.0513	0.13	Q	.	.	.	.
5.47	0.0526	0.13	Q	.	.	.	.
5.59	0.0540	0.13	Q	.	.	.	.
5.71	0.0553	0.14	Q	.	.	.	.
5.82	0.0566	0.14	Q	.	.	.	.
5.94	0.0580	0.14	Q	.	.	.	.
6.06	0.0593	0.14	Q	.	.	.	.
6.18	0.0607	0.14	Q	.	.	.	.
6.30	0.0620	0.14	Q	.	.	.	.
6.41	0.0634	0.14	Q	.	.	.	.
6.53	0.0648	0.14	Q	.	.	.	.
6.65	0.0662	0.14	Q	.	.	.	.
6.77	0.0676	0.14	Q	.	.	.	.
6.89	0.0690	0.15	Q	.	.	.	.
7.01	0.0704	0.15	Q	.	.	.	.
7.12	0.0719	0.15	Q	.	.	.	.
7.24	0.0733	0.15	Q	.	.	.	.
7.36	0.0748	0.15	Q	.	.	.	.
7.48	0.0762	0.15	Q	.	.	.	.
7.60	0.0777	0.15	Q	.	.	.	.
7.72	0.0792	0.15	Q	.	.	.	.
7.84	0.0807	0.15	Q	.	.	.	.
7.95	0.0822	0.16	Q	.	.	.	.
8.07	0.0838	0.16	Q	.	.	.	.
8.19	0.0853	0.16	Q	.	.	.	.
8.31	0.0869	0.16	Q	.	.	.	.
8.43	0.0884	0.16	Q	.	.	.	.
8.55	0.0900	0.16	Q	.	.	.	.
8.66	0.0916	0.16	Q	.	.	.	.
8.78	0.0932	0.17	Q	.	.	.	.
8.90	0.0949	0.17	Q	.	.	.	.
9.02	0.0965	0.17	Q	.	.	.	.
9.14	0.0982	0.17	Q	.	.	.	.
9.26	0.0998	0.17	Q	.	.	.	.
9.37	0.1015	0.17	Q	.	.	.	.
9.49	0.1033	0.18	Q	.	.	.	.
9.61	0.1050	0.18	Q	.	.	.	.
9.73	0.1067	0.18	Q	.	.	.	.
9.85	0.1085	0.18	Q	.	.	.	.
9.97	0.1103	0.18	Q	.	.	.	.
10.08	0.1121	0.19	Q	.	.	.	.
10.20	0.1139	0.19	Q	.	.	.	.
10.32	0.1157	0.19	Q	.	.	.	.
10.44	0.1176	0.19	Q	.	.	.	.
10.56	0.1195	0.19	Q	.	.	.	.
10.68	0.1214	0.20	Q	.	.	.	.
10.79	0.1234	0.20	Q	.	.	.	.
10.91	0.1253	0.20	Q	.	.	.	.

11.03	0.1273	0.20	Q . . . .
11.15	0.1293	0.21	Q . . . .
11.27	0.1314	0.21	Q . . . .
11.38	0.1334	0.21	Q . . . .
11.50	0.1355	0.22	Q . . . .
11.62	0.1377	0.22	Q . . . .
11.74	0.1398	0.22	Q . . . .
11.86	0.1420	0.23	Q . . . .
11.98	0.1443	0.23	Q . . . .
12.10	0.1466	0.26	.Q . . . .
12.21	0.1492	0.27	.Q . . . .
12.33	0.1519	0.28	.Q . . . .
12.45	0.1547	0.28	.Q . . . .
12.57	0.1574	0.29	.Q . . . .
12.69	0.1603	0.29	.Q . . . .
12.80	0.1631	0.30	.Q . . . .
12.92	0.1660	0.30	.Q . . . .
13.04	0.1690	0.31	.Q . . . .
13.16	0.1721	0.31	.Q . . . .
13.28	0.1752	0.32	.Q . . . .
13.40	0.1783	0.33	.Q . . . .
13.52	0.1816	0.34	.Q . . . .
13.63	0.1849	0.34	.Q . . . .
13.75	0.1883	0.35	.Q . . . .
13.87	0.1918	0.36	.Q . . . .
13.99	0.1954	0.37	.Q . . . .
14.11	0.1991	0.39	.Q . . . .
14.23	0.2031	0.43	.Q . . . .
14.34	0.2073	0.43	.Q . . . .
14.46	0.2117	0.45	.Q . . . .
14.58	0.2162	0.46	.Q . . . .
14.70	0.2208	0.49	.Q . . . .
14.82	0.2257	0.50	. Q . . . .
14.93	0.2307	0.53	. Q . . . .
15.05	0.2361	0.55	. Q . . . .
15.17	0.2417	0.60	. Q . . . .
15.29	0.2477	0.62	. Q . . . .
15.41	0.2540	0.67	. Q . . . .
15.53	0.2606	0.68	. Q . . . .
15.65	0.2678	0.80	. Q . . . .
15.76	0.2762	0.90	. Q . . . .
15.88	0.2867	1.25	. Q . . . .
16.00	0.3009	1.65	. Q . . . .
16.12	0.3292	4.14	. . Q . . .
16.24	0.3545	1.04	. Q . . . .
16.35	0.3632	0.73	. Q . . . .
16.47	0.3700	0.66	. Q . . . .
16.59	0.3760	0.57	. Q . . . .
16.71	0.3814	0.52	. Q . . . .
16.83	0.3862	0.48	.Q . . . .
16.95	0.3907	0.44	.Q . . . .
17.07	0.3949	0.42	.Q . . . .
17.18	0.3987	0.37	.Q . . . .
17.30	0.4022	0.35	.Q . . . .
17.42	0.4056	0.33	.Q . . . .
17.54	0.4087	0.32	.Q . . . .
17.66	0.4118	0.30	.Q . . . .
17.77	0.4147	0.29	.Q . . . .
17.89	0.4175	0.28	.Q . . . .
18.01	0.4203	0.27	.Q . . . .

18.13	0.4227	0.23	Q	.	.	.	.
18.25	0.4250	0.22	Q	.	.	.	.
18.37	0.4271	0.22	Q	.	.	.	.
18.48	0.4292	0.21	Q	.	.	.	.
18.60	0.4313	0.21	Q	.	.	.	.
18.72	0.4333	0.20	Q	.	.	.	.
18.84	0.4352	0.20	Q	.	.	.	.
18.96	0.4371	0.19	Q	.	.	.	.
19.08	0.4389	0.19	Q	.	.	.	.
19.19	0.4407	0.18	Q	.	.	.	.
19.31	0.4425	0.18	Q	.	.	.	.
19.43	0.4442	0.17	Q	.	.	.	.
19.55	0.4459	0.17	Q	.	.	.	.
19.67	0.4476	0.17	Q	.	.	.	.
19.79	0.4492	0.16	Q	.	.	.	.
19.91	0.4508	0.16	Q	.	.	.	.
20.02	0.4524	0.16	Q	.	.	.	.
20.14	0.4539	0.16	Q	.	.	.	.
20.26	0.4555	0.15	Q	.	.	.	.
20.38	0.4569	0.15	Q	.	.	.	.
20.50	0.4584	0.15	Q	.	.	.	.
20.61	0.4599	0.15	Q	.	.	.	.
20.73	0.4613	0.14	Q	.	.	.	.
20.85	0.4627	0.14	Q	.	.	.	.
20.97	0.4641	0.14	Q	.	.	.	.
21.09	0.4654	0.14	Q	.	.	.	.
21.21	0.4668	0.14	Q	.	.	.	.
21.33	0.4681	0.14	Q	.	.	.	.
21.44	0.4694	0.13	Q	.	.	.	.
21.56	0.4707	0.13	Q	.	.	.	.
21.68	0.4720	0.13	Q	.	.	.	.
21.80	0.4733	0.13	Q	.	.	.	.
21.92	0.4745	0.13	Q	.	.	.	.
22.03	0.4758	0.13	Q	.	.	.	.
22.15	0.4770	0.12	Q	.	.	.	.
22.27	0.4782	0.12	Q	.	.	.	.
22.39	0.4794	0.12	Q	.	.	.	.
22.51	0.4806	0.12	Q	.	.	.	.
22.63	0.4817	0.12	Q	.	.	.	.
22.74	0.4829	0.12	Q	.	.	.	.
22.86	0.4840	0.12	Q	.	.	.	.
22.98	0.4852	0.12	Q	.	.	.	.
23.10	0.4863	0.11	Q	.	.	.	.
23.22	0.4874	0.11	Q	.	.	.	.
23.34	0.4885	0.11	Q	.	.	.	.
23.45	0.4896	0.11	Q	.	.	.	.
23.57	0.4907	0.11	Q	.	.	.	.
23.69	0.4918	0.11	Q	.	.	.	.
23.81	0.4928	0.11	Q	.	.	.	.
23.93	0.4939	0.11	Q	.	.	.	.
24.05	0.4949	0.11	Q	.	.	.	.
24.17	0.4954	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)

0%	1441.3
10%	177.5
20%	35.5
30%	21.3
40%	7.1
50%	7.1
60%	7.1
70%	7.1
80%	7.1
90%	7.1

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 100-year storm event

STEP 1
Import results from hydrograph

TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.03	0	0
0.14	0.0005	0.11
0.26	0.0016	0.11
0.38	0.0026	0.11
0.5	0.0036	0.11
0.62	0.0047	0.11
0.74	0.0058	0.11
0.85	0.0068	0.11
0.97	0.0079	0.11
1.09	0.009	0.11
1.21	0.01	0.11
1.33	0.0111	0.11
1.45	0.0122	0.11
1.56	0.0133	0.11
1.68	0.0144	0.11
1.8	0.0155	0.11
1.92	0.0166	0.11
2.04	0.0177	0.11
2.16	0.0188	0.11
2.27	0.02	0.12
2.39	0.0211	0.12
2.51	0.0222	0.12
2.63	0.0234	0.12
2.75	0.0245	0.12
2.87	0.0257	0.12
2.98	0.0268	0.12
3.1	0.028	0.12
3.22	0.0291	0.12
3.34	0.0303	0.12
3.46	0.0315	0.12
3.58	0.0327	0.12
3.69	0.0339	0.12
3.81	0.0351	0.12
3.93	0.0363	0.12
4.05	0.0375	0.12
4.17	0.0387	0.13
4.29	0.04	0.13
4.4	0.0412	0.13
4.52	0.0424	0.13
4.64	0.0437	0.13
4.76	0.0449	0.13
4.88	0.0462	0.13
5	0.0475	0.13
5.11	0.0488	0.13
5.23	0.05	0.13
5.35	0.0513	0.13
5.47	0.0526	0.13
5.59	0.054	0.13
5.71	0.0553	0.14
5.82	0.0566	0.14
5.94	0.058	0.14
6.06	0.0593	0.14

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
1.8	0
8.4	0.11
15.6	0.11
22.8	0.11
30	0.11
37.2	0.11
44.4	0.11
51	0.11
58.2	0.11
65.4	0.11
72.6	0.11
79.8	0.11
87	0.11
93.6	0.11
100.8	0.11
108	0.11
115.2	0.11
122.4	0.11
129.6	0.11
136.2	0.12
143.4	0.12
150.6	0.12
157.8	0.12
165	0.12
172.2	0.12
178.8	0.12
186	0.12
193.2	0.12
200.4	0.12
207.6	0.12
214.8	0.12
221.4	0.12
228.6	0.12
235.8	0.12
243	0.12
250.2	0.13
257.4	0.13
264	0.13
271.2	0.13
278.4	0.13
285.6	0.13
292.8	0.13
300	0.13
306.6	0.13
313.8	0.13
321	0.13
328.2	0.13
335.4	0.13
342.6	0.14
349.2	0.14
356.4	0.14
363.6	0.14

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.11
15	0.11
20	0.11
25	0.11
30	0.11
35	0.11
40	0.11
45	0.11
50	0.11
55	0.11
60	0.11
65	0.11
70	0.11
75	0.11
80	0.11
85	0.11
90	0.11
95	0.11
100	0.11
105	0.11
110	0.11
115	0.11
120	0.11
125	0.11
130	0.110606
135	0.118182
140	0.12
145	0.12
150	0.12
155	0.12
160	0.12
165	0.12
170	0.12
175	0.12
180	0.12
185	0.12
190	0.12
195	0.12
200	0.12
205	0.12
210	0.12
215	0.12
220	0.12
225	0.12
230	0.12
235	0.12
240	0.12
245	0.122778
250	0.129722
255	0.13
260	0.13

```
=FORECAST(H11,INDEX(F$10:F$214,MATCH(H11,E$10:E$214,1)):INDEX(F$10:F$214,MATCH(H11,E$10:E$214,1)+1),INDEX(E$10:E$214,MATCH(H11,E$10:E$214,1)):INDEX(E$10:E$214,MATCH(H11,E$10:E$214,1)+1))
```

STEP 4

The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5

Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

6.18	0.0607	0.14	370.8	0.14	265	0.13
6.3	0.062	0.14	378	0.14	270	0.13
6.41	0.0634	0.14	384.6	0.14	275	0.13
6.53	0.0648	0.14	391.8	0.14	280	0.13
6.65	0.0662	0.14	399	0.14	285	0.13
6.77	0.0676	0.14	406.2	0.14	290	0.13
6.89	0.069	0.15	413.4	0.15	295	0.13
7.01	0.0704	0.15	420.6	0.15	300	0.13
7.12	0.0719	0.15	427.2	0.15	305	0.13
7.24	0.0733	0.15	434.4	0.15	310	0.13
7.36	0.0748	0.15	441.6	0.15	315	0.13
7.48	0.0762	0.15	448.8	0.15	320	0.13
7.6	0.0777	0.15	456	0.15	325	0.13
7.72	0.0792	0.15	463.2	0.15	330	0.13
7.84	0.0807	0.15	470.4	0.15	335	0.13
7.95	0.0822	0.16	477	0.16	340	0.136389
8.07	0.0838	0.16	484.2	0.16	345	0.14
8.19	0.0853	0.16	491.4	0.16	350	0.14
8.31	0.0869	0.16	498.6	0.16	355	0.14
8.43	0.0884	0.16	505.8	0.16	360	0.14
8.55	0.09	0.16	513	0.16	365	0.14
8.66	0.0916	0.16	519.6	0.16	370	0.14
8.78	0.0932	0.17	526.8	0.17	375	0.14
8.9	0.0949	0.17	534	0.17	380	0.14
9.02	0.0965	0.17	541.2	0.17	385	0.14
9.14	0.0982	0.17	548.4	0.17	390	0.14
9.26	0.0998	0.17	555.6	0.17	395	0.14
9.37	0.1015	0.17	562.2	0.17	400	0.14
9.49	0.1033	0.18	569.4	0.18	405	0.14
9.61	0.105	0.18	576.6	0.18	410	0.145278
9.73	0.1067	0.18	583.8	0.18	415	0.15
9.85	0.1085	0.18	591	0.18	420	0.15
9.97	0.1103	0.18	598.2	0.18	425	0.15
10.08	0.1121	0.19	604.8	0.19	430	0.15
10.2	0.1139	0.19	612	0.19	435	0.15
10.32	0.1157	0.19	619.2	0.19	440	0.15
10.44	0.1176	0.19	626.4	0.19	445	0.15
10.56	0.1195	0.19	633.6	0.19	450	0.15
10.68	0.1214	0.2	640.8	0.2	455	0.15
10.79	0.1234	0.2	647.4	0.2	460	0.15
10.91	0.1253	0.2	654.6	0.2	465	0.15
11.03	0.1273	0.2	661.8	0.2	470	0.15
11.15	0.1293	0.21	669	0.21	475	0.15697
11.27	0.1314	0.21	676.2	0.21	480	0.16
11.38	0.1334	0.21	682.8	0.21	485	0.16
11.5	0.1355	0.22	690	0.22	490	0.16
11.62	0.1377	0.22	697.2	0.22	495	0.16
11.74	0.1398	0.22	704.4	0.22	500	0.16
11.86	0.142	0.23	711.6	0.23	505	0.16
11.98	0.1443	0.23	718.8	0.23	510	0.16
12.1	0.1466	0.26	726	0.26	515	0.16
12.21	0.1492	0.27	732.6	0.27	520	0.160556
12.33	0.1519	0.28	739.8	0.28	525	0.1675
12.45	0.1547	0.28	747	0.28	530	0.17
12.57	0.1574	0.29	754.2	0.29	535	0.17
12.69	0.1603	0.29	761.4	0.29	540	0.17
12.8	0.1631	0.3	768	0.3	545	0.17
12.92	0.166	0.3	775.2	0.3	550	0.17
13.04	0.169	0.31	782.4	0.31	555	0.17
13.16	0.1721	0.31	789.6	0.31	560	0.17
13.28	0.1752	0.32	796.8	0.32	565	0.173889
13.4	0.1783	0.33	804	0.33	570	0.18

13.52	0.1816	0.34	811.2	0.34	575	0.18
13.63	0.1849	0.34	817.8	0.34	580	0.18
13.75	0.1883	0.35	825	0.35	585	0.18
13.87	0.1918	0.36	832.2	0.36	590	0.18
13.99	0.1954	0.37	839.4	0.37	595	0.18
14.11	0.1991	0.39	846.6	0.39	600	0.182727
14.23	0.2031	0.43	853.8	0.43	605	0.19
14.34	0.2073	0.43	860.4	0.43	610	0.19
14.46	0.2117	0.45	867.6	0.45	615	0.19
14.58	0.2162	0.46	874.8	0.46	620	0.19
14.7	0.2208	0.49	882	0.49	625	0.19
14.82	0.2257	0.5	889.2	0.5	630	0.19
14.93	0.2307	0.53	895.8	0.53	635	0.191944
15.05	0.2361	0.55	903	0.55	640	0.198889
15.17	0.2417	0.6	910.2	0.6	645	0.2
15.29	0.2477	0.62	917.4	0.62	650	0.2
15.41	0.254	0.67	924.6	0.67	655	0.2
15.53	0.2606	0.68	931.8	0.68	660	0.2
15.65	0.2678	0.8	939	0.8	665	0.204444
15.76	0.2762	0.9	945.6	0.9	670	0.21
15.88	0.2867	1.25	952.8	1.25	675	0.21
16	0.3009	1.65	960	1.65	680	0.21
16.12	0.3292	4.14	967.2	4.14	685	0.213056
16.24	0.3545	1.04	974.4	1.04	690	0.22
16.35	0.3632	0.73	981	0.73	695	0.22
16.47	0.37	0.66	988.2	0.66	700	0.22
16.59	0.376	0.57	995.4	0.57	705	0.220833
16.71	0.3814	0.52	1002.6	0.52	710	0.227778
16.83	0.3862	0.48	1009.8	0.48	715	0.23
16.95	0.3907	0.44	1017	0.44	720	0.235
17.07	0.3949	0.42	1024.2	0.42	725	0.255833
17.18	0.3987	0.37	1030.8	0.37	730	0.266061
17.3	0.4022	0.35	1038	0.35	735	0.273333
17.42	0.4056	0.33	1045.2	0.33	740	0.28
17.54	0.4087	0.32	1052.4	0.32	745	0.28
17.66	0.4118	0.3	1059.6	0.3	750	0.284167
17.77	0.4147	0.29	1066.2	0.29	755	0.29
17.89	0.4175	0.28	1073.4	0.28	760	0.29
18.01	0.4203	0.27	1080.6	0.27	765	0.295455
18.13	0.4227	0.23	1087.8	0.23	770	0.3
18.25	0.425	0.22	1095	0.22	775	0.3
18.37	0.4271	0.22	1102.2	0.22	780	0.306667
18.48	0.4292	0.21	1108.8	0.21	785	0.31
18.6	0.4313	0.21	1116	0.21	790	0.310556
18.72	0.4333	0.2	1123.2	0.2	795	0.3175
18.84	0.4352	0.2	1130.4	0.2	800	0.324444
18.96	0.4371	0.19	1137.6	0.19	805	0.331389
19.08	0.4389	0.19	1144.8	0.19	810	0.338333
19.19	0.4407	0.18	1151.4	0.18	815	0.34
19.31	0.4425	0.18	1158.6	0.18	820	0.343056
19.43	0.4442	0.17	1165.8	0.17	825	0.35
19.55	0.4459	0.17	1173	0.17	830	0.356944
19.67	0.4476	0.17	1180.2	0.17	835	0.363889
19.79	0.4492	0.16	1187.4	0.16	840	0.371667
19.91	0.4508	0.16	1194.6	0.16	845	0.385556
20.02	0.4524	0.16	1201.2	0.16	850	0.408889
20.14	0.4539	0.16	1208.4	0.16	855	0.43
20.26	0.4555	0.15	1215.6	0.15	860	0.43
20.38	0.4569	0.15	1222.8	0.15	865	0.442778
20.5	0.4584	0.15	1230	0.15	870	0.453333
20.61	0.4599	0.15	1236.6	0.15	875	0.460833
20.73	0.4613	0.14	1243.8	0.14	880	0.481667

20.85	0.4627	0.14	1251	0.14	885	0.494167
20.97	0.4641	0.14	1258.2	0.14	890	0.503636
21.09	0.4654	0.14	1265.4	0.14	895	0.526364
21.21	0.4668	0.14	1272.6	0.14	900	0.541667
21.33	0.4681	0.14	1279.8	0.14	905	0.563889
21.44	0.4694	0.13	1286.4	0.13	910	0.598611
21.56	0.4707	0.13	1293.6	0.13	915	0.613333
21.68	0.472	0.13	1300.8	0.13	920	0.638056
21.8	0.4733	0.13	1308	0.13	925	0.670556
21.92	0.4745	0.13	1315.2	0.13	930	0.6775
22.03	0.4758	0.13	1321.8	0.13	935	0.733333
22.15	0.477	0.12	1329	0.12	940	0.815152
22.27	0.4782	0.12	1336.2	0.12	945	0.890909
22.39	0.4794	0.12	1343.4	0.12	950	1.113889
22.51	0.4806	0.12	1350.6	0.12	955	1.372222
22.63	0.4817	0.12	1357.8	0.12	960	1.65
22.74	0.4829	0.12	1364.4	0.12	965	4.14
22.86	0.484	0.12	1371.6	0.12	970	2.934444
22.98	0.4852	0.12	1378.8	0.12	975	1.011818
23.1	0.4863	0.11	1386	0.11	980	0.77697
23.22	0.4874	0.11	1393.2	0.11	985	0.691111
23.34	0.4885	0.11	1400.4	0.11	990	0.6375
23.45	0.4896	0.11	1407	0.11	995	0.575
23.57	0.4907	0.11	1414.2	0.11	1000	0.538056
23.69	0.4918	0.11	1421.4	0.11	1005	0.506667
23.81	0.4928	0.11	1428.6	0.11	1010	0.478889
23.93	0.4939	0.11	1435.8	0.11	1015	0.451111
24.05	0.4949	0.11	1443	0.11	1020	0.431667
24.17	0.4954	0	1450.2	0	1025	0.413939
					1030	0.376061
					1035	0.358333
					1040	0.344444
					1045	0.330556
					1050	0.323333
					1055	0.312778
					1060	0.299394
					1065	0.291818
					1070	0.284722
					1075	0.277778
					1080	0.270833
					1085	0.245556
					1090	0.226944
					1095	0.22
					1100	0.22
					1105	0.215758
					1110	0.21
					1115	0.21
					1120	0.204444
					1125	0.2
					1130	0.2
					1135	0.193611
					1140	0.19
					1145	0.189697
					1150	0.182121
					1155	0.18
					1160	0.178056
					1165	0.171111
					1170	0.17
					1175	0.17
					1180	0.17
					1185	0.163333
					1190	0.16

1195	0.16
1200	0.16
1205	0.16
1210	0.157778
1215	0.150833
1220	0.15
1225	0.15
1230	0.15
1235	0.15
1240	0.145278
1245	0.14
1250	0.14
1255	0.14
1260	0.14
1265	0.14
1270	0.14
1275	0.14
1280	0.139697
1285	0.132121
1290	0.13
1295	0.13
1300	0.13
1305	0.13
1310	0.13
1315	0.13
1320	0.13
1325	0.125556
1330	0.12
1335	0.12
1340	0.12
1345	0.12
1350	0.12
1355	0.12
1360	0.12
1365	0.12
1370	0.12
1375	0.12
1380	0.118333
1385	0.111389
1390	0.11
1395	0.11
1400	0.11
1405	0.11
1410	0.11
1415	0.11
1420	0.11
1425	0.11
1430	0.11
1435	0.11
1440	0.11
1445	0.079444

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 5.91 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	1.50	0.00	98.(AMC II)	0.300	0.960
2	0.24	100.00	75.(AMC II)	0.300	0.824

TOTAL AREA (Acres) = 1.74

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.041

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.059

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 1.14
    TOTAL CATCHMENT AREA(ACRES) =    1.74
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.041
    LOW LOSS FRACTION = 0.059
    TIME OF CONCENTRATION(MIN.) =  6.10
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.39
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.31
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.33
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.27
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.91

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.92
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    -0.06

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.04      0.0003      0.20  Q         .         .         .         .
  0.14      0.0020      0.20  Q         .         .         .         .
  0.24      0.0036      0.20  Q         .         .         .         .
  0.34      0.0053      0.20  Q         .         .         .         .
  0.45      0.0069      0.20  Q         .         .         .         .
  0.55      0.0086      0.20  Q         .         .         .         .
  0.65      0.0103      0.20  Q         .         .         .         .
  0.75      0.0120      0.20  Q         .         .         .         .
  0.85      0.0136      0.20  Q         .         .         .         .
  0.95      0.0153      0.20  Q         .         .         .         .
  1.06      0.0170      0.20  Q         .         .         .         .
  1.16      0.0187      0.20  Q         .         .         .         .
  1.26      0.0205      0.20  Q         .         .         .         .
  1.36      0.0222      0.21  Q         .         .         .         .
  1.46      0.0239      0.21  Q         .         .         .         .
  1.56      0.0256      0.21  Q         .         .         .         .
  1.67      0.0274      0.21  Q         .         .         .         .
  1.77      0.0291      0.21  Q         .         .         .         .
  1.87      0.0309      0.21  Q         .         .         .         .
  1.97      0.0327      0.21  Q         .         .         .         .
  2.07      0.0344      0.21  Q         .         .         .         .
  2.17      0.0362      0.21  Q         .         .         .         .
  2.28      0.0380      0.21  Q         .         .         .         .
  2.38      0.0398      0.21  Q         .         .         .         .
  2.48      0.0416      0.21  Q         .         .         .         .
  2.58      0.0434      0.22  Q         .         .         .         .
  2.68      0.0452      0.22  Q         .         .         .         .
  2.78      0.0470      0.22  Q         .         .         .         .
  2.88      0.0489      0.22  Q         .         .         .         .
  2.99      0.0507      0.22  Q         .         .         .         .
  3.09      0.0526      0.22  Q         .         .         .         .
  3.19      0.0544      0.22  Q         .         .         .         .
  3.29      0.0563      0.22  Q         .         .         .         .
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3.39	0.0581	0.22	Q	.	.	.	.
3.50	0.0600	0.22	Q	.	.	.	.
3.60	0.0619	0.23	Q	.	.	.	.
3.70	0.0638	0.23	Q	.	.	.	.
3.80	0.0657	0.23	Q	.	.	.	.
3.90	0.0676	0.23	Q	.	.	.	.
4.00	0.0696	0.23	Q	.	.	.	.
4.11	0.0715	0.23	Q	.	.	.	.
4.21	0.0735	0.23	Q	.	.	.	.
4.31	0.0754	0.23	Q	.	.	.	.
4.41	0.0774	0.23	Q	.	.	.	.
4.51	0.0794	0.24	Q	.	.	.	.
4.61	0.0813	0.24	Q	.	.	.	.
4.72	0.0833	0.24	Q	.	.	.	.
4.82	0.0853	0.24	Q	.	.	.	.
4.92	0.0874	0.24	Q	.	.	.	.
5.02	0.0894	0.24	Q	.	.	.	.
5.12	0.0914	0.24	Q	.	.	.	.
5.22	0.0935	0.24	Q	.	.	.	.
5.32	0.0955	0.25	Q	.	.	.	.
5.43	0.0976	0.25	Q	.	.	.	.
5.53	0.0997	0.25	Q	.	.	.	.
5.63	0.1018	0.25	Q	.	.	.	.
5.73	0.1039	0.25	.Q	.	.	.	.
5.83	0.1060	0.25	.Q	.	.	.	.
5.93	0.1081	0.25	.Q	.	.	.	.
6.04	0.1103	0.26	.Q	.	.	.	.
6.14	0.1124	0.26	.Q	.	.	.	.
6.24	0.1146	0.26	.Q	.	.	.	.
6.34	0.1168	0.26	.Q	.	.	.	.
6.44	0.1189	0.26	.Q	.	.	.	.
6.55	0.1212	0.26	.Q	.	.	.	.
6.65	0.1234	0.26	.Q	.	.	.	.
6.75	0.1256	0.27	.Q	.	.	.	.
6.85	0.1278	0.27	.Q	.	.	.	.
6.95	0.1301	0.27	.Q	.	.	.	.
7.05	0.1324	0.27	.Q	.	.	.	.
7.16	0.1347	0.27	.Q	.	.	.	.
7.26	0.1370	0.27	.Q	.	.	.	.
7.36	0.1393	0.28	.Q	.	.	.	.
7.46	0.1416	0.28	.Q	.	.	.	.
7.56	0.1440	0.28	.Q	.	.	.	.
7.66	0.1464	0.28	.Q	.	.	.	.
7.76	0.1487	0.29	.Q	.	.	.	.
7.87	0.1511	0.29	.Q	.	.	.	.
7.97	0.1536	0.29	.Q	.	.	.	.
8.07	0.1560	0.29	.Q	.	.	.	.
8.17	0.1584	0.29	.Q	.	.	.	.
8.27	0.1609	0.29	.Q	.	.	.	.
8.38	0.1634	0.30	.Q	.	.	.	.
8.48	0.1659	0.30	.Q	.	.	.	.
8.58	0.1684	0.30	.Q	.	.	.	.
8.68	0.1710	0.30	.Q	.	.	.	.
8.78	0.1736	0.31	.Q	.	.	.	.
8.88	0.1761	0.31	.Q	.	.	.	.
8.99	0.1788	0.31	.Q	.	.	.	.
9.09	0.1814	0.31	.Q	.	.	.	.
9.19	0.1840	0.32	.Q	.	.	.	.
9.29	0.1867	0.32	.Q	.	.	.	.
9.39	0.1894	0.32	.Q	.	.	.	.

9.49	0.1921	0.32	.Q . . . .
9.60	0.1949	0.33	.Q . . . .
9.70	0.1976	0.33	.Q . . . .
9.80	0.2004	0.33	.Q . . . .
9.90	0.2033	0.34	.Q . . . .
10.00	0.2061	0.34	.Q . . . .
10.10	0.2090	0.34	.Q . . . .
10.20	0.2119	0.35	.Q . . . .
10.31	0.2148	0.35	.Q . . . .
10.41	0.2178	0.36	.Q . . . .
10.51	0.2208	0.36	.Q . . . .
10.61	0.2238	0.36	.Q . . . .
10.71	0.2269	0.37	.Q . . . .
10.82	0.2300	0.37	.Q . . . .
10.92	0.2331	0.37	.Q . . . .
11.02	0.2362	0.38	.Q . . . .
11.12	0.2394	0.38	.Q . . . .
11.22	0.2427	0.39	.Q . . . .
11.32	0.2459	0.39	.Q . . . .
11.43	0.2493	0.40	.Q . . . .
11.53	0.2526	0.40	.Q . . . .
11.63	0.2560	0.41	.Q . . . .
11.73	0.2595	0.41	.Q . . . .
11.83	0.2630	0.42	.Q . . . .
11.93	0.2665	0.42	.Q . . . .
12.03	0.2701	0.43	.Q . . . .
12.14	0.2740	0.50	.Q . . . .
12.24	0.2782	0.51	. Q . . . .
12.34	0.2825	0.51	. Q . . . .
12.44	0.2868	0.52	. Q . . . .
12.54	0.2912	0.53	. Q . . . .
12.65	0.2957	0.54	. Q . . . .
12.75	0.3003	0.54	. Q . . . .
12.85	0.3049	0.55	. Q . . . .
12.95	0.3095	0.56	. Q . . . .
13.05	0.3143	0.57	. Q . . . .
13.15	0.3191	0.58	. Q . . . .
13.26	0.3241	0.59	. Q . . . .
13.36	0.3291	0.60	. Q . . . .
13.46	0.3342	0.62	. Q . . . .
13.56	0.3394	0.63	. Q . . . .
13.66	0.3448	0.64	. Q . . . .
13.76	0.3502	0.65	. Q . . . .
13.87	0.3558	0.67	. Q . . . .
13.97	0.3615	0.68	. Q . . . .
14.07	0.3674	0.73	. Q . . . .
14.17	0.3738	0.77	. Q . . . .
14.27	0.3803	0.80	. Q . . . .
14.37	0.3871	0.81	. Q . . . .
14.48	0.3941	0.84	. Q . . . .
14.58	0.4012	0.86	. Q . . . .
14.68	0.4086	0.90	. Q . . . .
14.78	0.4163	0.92	. Q . . . .
14.88	0.4243	0.97	. Q . . . .
14.98	0.4326	1.00	. Q . . . .
15.09	0.4412	1.06	. Q . . . .
15.19	0.4503	1.10	. Q . . . .
15.29	0.4599	1.19	. Q . . . .
15.39	0.4701	1.24	. Q . . . .
15.49	0.4806	1.27	. Q . . . .

15.59	0.4917	1.36	. Q . . . .
15.70	0.5041	1.61	. Q . . . .
15.80	0.5185	1.82	. Q . . . .
15.90	0.5367	2.50	. Q. . . .
16.00	0.5611	3.30	. . Q . . .
16.10	0.6097	8.28	. . . . Q .
16.20	0.6533	2.09	. Q . . . .
16.31	0.6682	1.47	. Q . . . .
16.41	0.6795	1.21	. Q . . . .
16.51	0.6894	1.14	. Q . . . .
16.61	0.6985	1.03	. Q . . . .
16.71	0.7068	0.95	. Q . . . .
16.81	0.7145	0.88	. Q . . . .
16.92	0.7217	0.83	. Q . . . .
17.02	0.7284	0.78	. Q . . . .
17.12	0.7347	0.70	. Q . . . .
17.22	0.7404	0.66	. Q . . . .
17.32	0.7458	0.63	. Q . . . .
17.42	0.7510	0.61	. Q . . . .
17.52	0.7561	0.59	. Q . . . .
17.63	0.7609	0.57	. Q . . . .
17.73	0.7656	0.55	. Q . . . .
17.83	0.7701	0.53	. Q . . . .
17.93	0.7745	0.52	. Q . . . .
18.03	0.7788	0.50	. Q . . . .
18.14	0.7827	0.43	.Q . . . .
18.24	0.7863	0.42	.Q . . . .
18.34	0.7897	0.40	.Q . . . .
18.44	0.7931	0.39	.Q . . . .
18.54	0.7963	0.38	.Q . . . .
18.64	0.7995	0.38	.Q . . . .
18.74	0.8027	0.37	.Q . . . .
18.85	0.8057	0.36	.Q . . . .
18.95	0.8087	0.35	.Q . . . .
19.05	0.8116	0.35	.Q . . . .
19.15	0.8145	0.34	.Q . . . .
19.25	0.8173	0.33	.Q . . . .
19.36	0.8201	0.33	.Q . . . .
19.46	0.8228	0.32	.Q . . . .
19.56	0.8255	0.32	.Q . . . .
19.66	0.8281	0.31	.Q . . . .
19.76	0.8307	0.31	.Q . . . .
19.86	0.8333	0.30	.Q . . . .
19.97	0.8358	0.30	.Q . . . .
20.07	0.8383	0.29	.Q . . . .
20.17	0.8407	0.29	.Q . . . .
20.27	0.8431	0.28	.Q . . . .
20.37	0.8455	0.28	.Q . . . .
20.47	0.8478	0.28	.Q . . . .
20.58	0.8501	0.27	.Q . . . .
20.68	0.8524	0.27	.Q . . . .
20.78	0.8546	0.27	.Q . . . .
20.88	0.8568	0.26	.Q . . . .
20.98	0.8590	0.26	.Q . . . .
21.08	0.8612	0.26	.Q . . . .
21.18	0.8633	0.25	.Q . . . .
21.29	0.8655	0.25	.Q . . . .
21.39	0.8675	0.25	Q . . . .
21.49	0.8696	0.25	Q . . . .
21.59	0.8717	0.24	Q . . . .

21.69	0.8737	0.24	Q	.	.	.	.
21.80	0.8757	0.24	Q	.	.	.	.
21.90	0.8777	0.24	Q	.	.	.	.
22.00	0.8796	0.23	Q	.	.	.	.
22.10	0.8816	0.23	Q	.	.	.	.
22.20	0.8835	0.23	Q	.	.	.	.
22.30	0.8854	0.23	Q	.	.	.	.
22.41	0.8873	0.22	Q	.	.	.	.
22.51	0.8892	0.22	Q	.	.	.	.
22.61	0.8911	0.22	Q	.	.	.	.
22.71	0.8929	0.22	Q	.	.	.	.
22.81	0.8947	0.22	Q	.	.	.	.
22.91	0.8965	0.21	Q	.	.	.	.
23.02	0.8983	0.21	Q	.	.	.	.
23.12	0.9001	0.21	Q	.	.	.	.
23.22	0.9019	0.21	Q	.	.	.	.
23.32	0.9036	0.21	Q	.	.	.	.
23.42	0.9053	0.21	Q	.	.	.	.
23.52	0.9071	0.20	Q	.	.	.	.
23.62	0.9088	0.20	Q	.	.	.	.
23.73	0.9105	0.20	Q	.	.	.	.
23.83	0.9121	0.20	Q	.	.	.	.
23.93	0.9138	0.20	Q	.	.	.	.
24.03	0.9155	0.20	Q	.	.	.	.
24.13	0.9163	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1445.7
10%	146.4
20%	30.5
30%	18.3
40%	6.1
50%	6.1
60%	6.1
70%	6.1
80%	6.1
90%	6.1

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 100-year storm event

STEP 1
Import results from hydrograph

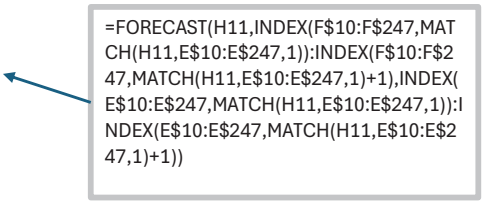
TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.04	0.0003	0.2
0.14	0.002	0.2
0.24	0.0036	0.2
0.34	0.0053	0.2
0.45	0.0069	0.2
0.55	0.0086	0.2
0.65	0.0103	0.2
0.75	0.012	0.2
0.85	0.0136	0.2
0.95	0.0153	0.2
1.06	0.017	0.2
1.16	0.0187	0.2
1.26	0.0205	0.2
1.36	0.0222	0.21
1.46	0.0239	0.21
1.56	0.0256	0.21
1.67	0.0274	0.21
1.77	0.0291	0.21
1.87	0.0309	0.21
1.97	0.0327	0.21
2.07	0.0344	0.21
2.17	0.0362	0.21
2.28	0.038	0.21
2.38	0.0398	0.21
2.48	0.0416	0.21
2.58	0.0434	0.22
2.68	0.0452	0.22
2.78	0.047	0.22
2.88	0.0489	0.22
2.99	0.0507	0.22
3.09	0.0526	0.22
3.19	0.0544	0.22
3.29	0.0563	0.22
3.39	0.0581	0.22
3.5	0.06	0.22
3.6	0.0619	0.23
3.7	0.0638	0.23
3.8	0.0657	0.23
3.9	0.0676	0.23
4	0.0696	0.23
4.11	0.0715	0.23
4.21	0.0735	0.23
4.31	0.0754	0.23
4.41	0.0774	0.23
4.51	0.0794	0.24
4.61	0.0813	0.24
4.72	0.0833	0.24
4.82	0.0853	0.24
4.92	0.0874	0.24
5.02	0.0894	0.24
5.12	0.0914	0.24
5.22	0.0935	0.24

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
2.4	0.2
8.4	0.2
14.4	0.2
20.4	0.2
27	0.2
33	0.2
39	0.2
45	0.2
51	0.2
57	0.2
63.6	0.2
69.6	0.2
75.6	0.2
81.6	0.21
87.6	0.21
93.6	0.21
100.2	0.21
106.2	0.21
112.2	0.21
118.2	0.21
124.2	0.21
130.2	0.21
136.8	0.21
142.8	0.21
148.8	0.21
154.8	0.22
160.8	0.22
166.8	0.22
172.8	0.22
179.4	0.22
185.4	0.22
191.4	0.22
197.4	0.22
203.4	0.22
210	0.22
216	0.23
222	0.23
228	0.23
234	0.23
240	0.23
246.6	0.23
252.6	0.23
258.6	0.23
264.6	0.23
270.6	0.24
276.6	0.24
283.2	0.24
289.2	0.24
295.2	0.24
301.2	0.24
307.2	0.24
313.2	0.24

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.2
15	0.2
20	0.2
25	0.2
30	0.2
35	0.2
40	0.2
45	0.2
50	0.2
55	0.2
60	0.2
65	0.2
70	0.2
75	0.2
80	0.207333
85	0.21
90	0.21
95	0.21
100	0.21
105	0.21
110	0.21
115	0.21
120	0.21
125	0.21
130	0.21
135	0.21
140	0.21
145	0.21
150	0.212
155	0.22
160	0.22
165	0.22
170	0.22
175	0.22
180	0.22
185	0.22
190	0.22
195	0.22
200	0.22
205	0.22
210	0.22
215	0.228333
220	0.23
225	0.23
230	0.23
235	0.23
240	0.23
245	0.23
250	0.23
255	0.23
260	0.23



STEP 4
The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5
Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

5.32	0.0955	0.25	319.2	0.25	265	0.230667
5.43	0.0976	0.25	325.8	0.25	270	0.239
5.53	0.0997	0.25	331.8	0.25	275	0.24
5.63	0.1018	0.25	337.8	0.25	280	0.24
5.73	0.1039	0.25	343.8	0.25	285	0.24
5.83	0.106	0.25	349.8	0.25	290	0.24
5.93	0.1081	0.25	355.8	0.25	295	0.24
6.04	0.1103	0.26	362.4	0.26	300	0.24
6.14	0.1124	0.26	368.4	0.26	305	0.24
6.24	0.1146	0.26	374.4	0.26	310	0.24
6.34	0.1168	0.26	380.4	0.26	315	0.243
6.44	0.1189	0.26	386.4	0.26	320	0.25
6.55	0.1212	0.26	393	0.26	325	0.25
6.65	0.1234	0.26	399	0.26	330	0.25
6.75	0.1256	0.27	405	0.27	335	0.25
6.85	0.1278	0.27	411	0.27	340	0.25
6.95	0.1301	0.27	417	0.27	345	0.25
7.05	0.1324	0.27	423	0.27	350	0.25
7.16	0.1347	0.27	429.6	0.27	355	0.25
7.26	0.137	0.27	435.6	0.27	360	0.256364
7.36	0.1393	0.28	441.6	0.28	365	0.26
7.46	0.1416	0.28	447.6	0.28	370	0.26
7.56	0.144	0.28	453.6	0.28	375	0.26
7.66	0.1464	0.28	459.6	0.28	380	0.26
7.76	0.1487	0.29	465.6	0.29	385	0.26
7.87	0.1511	0.29	472.2	0.29	390	0.26
7.97	0.1536	0.29	478.2	0.29	395	0.26
8.07	0.156	0.29	484.2	0.29	400	0.261667
8.17	0.1584	0.29	490.2	0.29	405	0.27
8.27	0.1609	0.29	496.2	0.29	410	0.27
8.38	0.1634	0.3	502.8	0.3	415	0.27
8.48	0.1659	0.3	508.8	0.3	420	0.27
8.58	0.1684	0.3	514.8	0.3	425	0.27
8.68	0.171	0.3	520.8	0.3	430	0.27
8.78	0.1736	0.31	526.8	0.31	435	0.27
8.88	0.1761	0.31	532.8	0.31	440	0.277333
8.99	0.1788	0.31	539.4	0.31	445	0.28
9.09	0.1814	0.31	545.4	0.31	450	0.28
9.19	0.184	0.32	551.4	0.32	455	0.28
9.29	0.1867	0.32	557.4	0.32	460	0.280667
9.39	0.1894	0.32	563.4	0.32	465	0.289
9.49	0.1921	0.32	569.4	0.32	470	0.29
9.6	0.1949	0.33	576	0.33	475	0.29
9.7	0.1976	0.33	582	0.33	480	0.29
9.8	0.2004	0.33	588	0.33	485	0.29
9.9	0.2033	0.34	594	0.34	490	0.29
10	0.2061	0.34	600	0.34	495	0.29
10.1	0.209	0.34	606	0.34	500	0.295758
10.2	0.2119	0.35	612	0.35	505	0.3
10.31	0.2148	0.35	618.6	0.35	510	0.3
10.41	0.2178	0.36	624.6	0.36	515	0.3
10.51	0.2208	0.36	630.6	0.36	520	0.3
10.61	0.2238	0.36	636.6	0.36	525	0.307
10.71	0.2269	0.37	642.6	0.37	530	0.31
10.82	0.23	0.37	649.2	0.37	535	0.31
10.92	0.2331	0.37	655.2	0.37	540	0.31
11.02	0.2362	0.38	661.2	0.38	545	0.31
11.12	0.2394	0.38	667.2	0.38	550	0.317667
11.22	0.2427	0.39	673.2	0.39	555	0.32
11.32	0.2459	0.39	679.2	0.39	560	0.32
11.43	0.2493	0.4	685.8	0.4	565	0.32
11.53	0.2526	0.4	691.8	0.4	570	0.320909

11.63	0.256	0.41	697.8	0.41	575	0.328485
11.73	0.2595	0.41	703.8	0.41	580	0.33
11.83	0.263	0.42	709.8	0.42	585	0.33
11.93	0.2665	0.42	715.8	0.42	590	0.333333
12.03	0.2701	0.43	721.8	0.43	595	0.34
12.14	0.274	0.5	728.4	0.5	600	0.34
12.24	0.2782	0.51	734.4	0.51	605	0.34
12.34	0.2825	0.51	740.4	0.51	610	0.346667
12.44	0.2868	0.52	746.4	0.52	615	0.35
12.54	0.2912	0.53	752.4	0.53	620	0.352333
12.65	0.2957	0.54	759	0.54	625	0.36
12.75	0.3003	0.54	765	0.54	630	0.36
12.85	0.3049	0.55	771	0.55	635	0.36
12.95	0.3095	0.56	777	0.56	640	0.365667
13.05	0.3143	0.57	783	0.57	645	0.37
13.15	0.3191	0.58	789	0.58	650	0.37
13.26	0.3241	0.59	795.6	0.59	655	0.37
13.36	0.3291	0.6	801.6	0.6	660	0.378
13.46	0.3342	0.62	807.6	0.62	665	0.38
13.56	0.3394	0.63	813.6	0.63	670	0.384667
13.66	0.3448	0.64	819.6	0.64	675	0.39
13.76	0.3502	0.65	825.6	0.65	680	0.391212
13.87	0.3558	0.67	832.2	0.67	685	0.398788
13.97	0.3615	0.68	838.2	0.68	690	0.4
14.07	0.3674	0.73	844.2	0.73	695	0.405333
14.17	0.3738	0.77	850.2	0.77	700	0.41
14.27	0.3803	0.8	856.2	0.8	705	0.412
14.37	0.3871	0.81	862.2	0.81	710	0.42
14.48	0.3941	0.84	868.8	0.84	715	0.42
14.58	0.4012	0.86	874.8	0.86	720	0.427
14.68	0.4086	0.9	880.8	0.9	725	0.463939
14.78	0.4163	0.92	886.8	0.92	730	0.502667
14.88	0.4243	0.97	892.8	0.97	735	0.51
14.98	0.4326	1	898.8	1	740	0.51
15.09	0.4412	1.06	905.4	1.06	745	0.517667
15.19	0.4503	1.1	911.4	1.1	750	0.526
15.29	0.4599	1.19	917.4	1.19	755	0.533939
15.39	0.4701	1.24	923.4	1.24	760	0.54
15.49	0.4806	1.27	929.4	1.27	765	0.54
15.59	0.4917	1.36	935.4	1.36	770	0.548333
15.7	0.5041	1.61	942	1.61	775	0.556667
15.8	0.5185	1.82	948	1.82	780	0.565
15.9	0.5367	2.5	954	2.5	785	0.573333
16	0.5611	3.3	960	3.3	790	0.581515
16.1	0.6097	8.28	966	8.28	795	0.589091
16.2	0.6533	2.09	972	2.09	800	0.597333
16.31	0.6682	1.47	978.6	1.47	805	0.611333
16.41	0.6795	1.21	984.6	1.21	810	0.624
16.51	0.6894	1.14	990.6	1.14	815	0.632333
16.61	0.6985	1.03	996.6	1.03	820	0.640667
16.71	0.7068	0.95	1002.6	0.95	825	0.649
16.81	0.7145	0.88	1008.6	0.88	830	0.663333
16.92	0.7217	0.83	1015.2	0.83	835	0.674667
17.02	0.7284	0.78	1021.2	0.78	840	0.695
17.12	0.7347	0.7	1027.2	0.7	845	0.735333
17.22	0.7404	0.66	1033.2	0.66	850	0.768667
17.32	0.7458	0.63	1039.2	0.63	855	0.794
17.42	0.751	0.61	1045.2	0.61	860	0.806333
17.52	0.7561	0.59	1051.2	0.59	865	0.822727
17.63	0.7609	0.57	1057.8	0.57	870	0.844
17.73	0.7656	0.55	1063.8	0.55	875	0.861333
17.83	0.7701	0.53	1069.8	0.53	880	0.894667

17.93	0.7745	0.52	1075.8	0.52	885	0.914
18.03	0.7788	0.5	1081.8	0.5	890	0.946667
18.14	0.7827	0.43	1088.4	0.43	895	0.981
18.24	0.7863	0.42	1094.4	0.42	900	1.010909
18.34	0.7897	0.4	1100.4	0.4	905	1.056364
18.44	0.7931	0.39	1106.4	0.39	910	1.090667
18.54	0.7963	0.38	1112.4	0.38	915	1.154
18.64	0.7995	0.38	1118.4	0.38	920	1.211667
18.74	0.8027	0.37	1124.4	0.37	925	1.248
18.85	0.8057	0.36	1131	0.36	930	1.279
18.95	0.8087	0.35	1137	0.35	935	1.354
19.05	0.8116	0.35	1143	0.35	940	1.534242
19.15	0.8145	0.34	1149	0.34	945	1.715
19.25	0.8173	0.33	1155	0.33	950	2.046667
19.36	0.8201	0.33	1161.6	0.33	955	2.633333
19.46	0.8228	0.32	1167.6	0.32	960	3.3
19.56	0.8255	0.32	1173.6	0.32	965	8.28
19.66	0.8281	0.31	1179.6	0.31	970	4.153333
19.76	0.8307	0.31	1185.6	0.31	975	1.808182
19.86	0.8333	0.3	1191.6	0.3	980	1.409333
19.97	0.8358	0.3	1198.2	0.3	985	1.205333
20.07	0.8383	0.29	1204.2	0.29	990	1.147
20.17	0.8407	0.29	1210.2	0.29	995	1.059333
20.27	0.8431	0.28	1216.2	0.28	1000	0.984667
20.37	0.8455	0.28	1222.2	0.28	1005	0.922
20.47	0.8478	0.28	1228.2	0.28	1010	0.869394
20.58	0.8501	0.27	1234.8	0.27	1015	0.831515
20.68	0.8524	0.27	1240.8	0.27	1020	0.79
20.78	0.8546	0.27	1246.8	0.27	1025	0.729333
20.88	0.8568	0.26	1252.8	0.26	1030	0.681333
20.98	0.859	0.26	1258.8	0.26	1035	0.651
21.08	0.8612	0.26	1264.8	0.26	1040	0.627333
21.18	0.8633	0.25	1270.8	0.25	1045	0.610667
21.29	0.8655	0.25	1277.4	0.25	1050	0.594
21.39	0.8675	0.25	1283.4	0.25	1055	0.578485
21.49	0.8696	0.25	1289.4	0.25	1060	0.562667
21.59	0.8717	0.24	1295.4	0.24	1065	0.546
21.69	0.8737	0.24	1301.4	0.24	1070	0.529667
21.8	0.8757	0.24	1308	0.24	1075	0.521333
21.9	0.8777	0.24	1314	0.24	1080	0.506
22	0.8796	0.23	1320	0.23	1085	0.466061
22.1	0.8816	0.23	1326	0.23	1090	0.427333
22.2	0.8835	0.23	1332	0.23	1095	0.418
22.3	0.8854	0.23	1338	0.23	1100	0.401333
22.41	0.8873	0.22	1344.6	0.22	1105	0.392333
22.51	0.8892	0.22	1350.6	0.22	1110	0.384
22.61	0.8911	0.22	1356.6	0.22	1115	0.38
22.71	0.8929	0.22	1362.6	0.22	1120	0.377333
22.81	0.8947	0.22	1368.6	0.22	1125	0.369091
22.91	0.8965	0.21	1374.6	0.21	1130	0.361515
23.02	0.8983	0.21	1381.2	0.21	1135	0.353333
23.12	0.9001	0.21	1387.2	0.21	1140	0.35
23.22	0.9019	0.21	1393.2	0.21	1145	0.346667
23.32	0.9036	0.21	1399.2	0.21	1150	0.338333
23.42	0.9053	0.21	1405.2	0.21	1155	0.33
23.52	0.9071	0.2	1411.2	0.2	1160	0.33
23.62	0.9088	0.2	1417.2	0.2	1165	0.324333
23.73	0.9105	0.2	1423.8	0.2	1170	0.32
23.83	0.9121	0.2	1429.8	0.2	1175	0.317667
23.93	0.9138	0.2	1435.8	0.2	1180	0.31
24.03	0.9155	0.2	1441.8	0.2	1185	0.31
24.13	0.9163	0	1447.8	0	1190	0.302667

1195	0.3
1200	0.297
1205	0.29
1210	0.29
1215	0.282
1220	0.28
1225	0.28
1230	0.277273
1235	0.27
1240	0.27
1245	0.27
1250	0.264667
1255	0.26
1260	0.26
1265	0.259667
1270	0.251333
1275	0.25
1280	0.25
1285	0.25
1290	0.249
1295	0.240667
1300	0.24
1305	0.24
1310	0.24
1315	0.238333
1320	0.23
1325	0.23
1330	0.23
1335	0.23
1340	0.22697
1345	0.22
1350	0.22
1355	0.22
1360	0.22
1365	0.22
1370	0.217667
1375	0.21
1380	0.21
1385	0.21
1390	0.21
1395	0.21
1400	0.21
1405	0.21
1410	0.202
1415	0.2
1420	0.2
1425	0.2
1430	0.2
1435	0.2
1440	0.2
1445	0.093333

*** NON-HOMOGENEOUS WATERSHED AREA-AVERAGED LOSS RATE (Fm)
AND LOW LOSS FRACTION ESTIMATIONS FOR AMC III:

TOTAL 24-HOUR DURATION RAINFALL DEPTH = 5.91 (inches)

SOIL-COVER TYPE	AREA (Acres)	PERCENT OF PERVIOUS AREA	SCS CURVE NUMBER	LOSS RATE Fp(in./hr.)	YIELD
1	1.34	0.00	98.(AMC II)	0.300	0.960
2	0.28	100.00	75.(AMC II)	0.300	0.824

TOTAL AREA (Acres) = 1.62

AREA-AVERAGED LOSS RATE, $\overline{Fm}$ (in./hr.) = 0.052

AREA-AVERAGED LOW LOSS FRACTION, $\overline{Y}$ = 0.064

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    RATIONAL METHOD CALIBRATION COEFFICIENT = 1.15
    TOTAL CATCHMENT AREA(ACRES) =    1.62
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.052
    LOW LOSS FRACTION = 0.064
    TIME OF CONCENTRATION(MIN.) =  6.70
    SMALL AREA PEAK Q COMPUTED USING PEAK FLOW RATE FORMULA
    USER SPECIFIED RAINFALL VALUES ARE USED
    RETURN FREQUENCY(YEARS) = 100
       5-MINUTE POINT RAINFALL VALUE(INCHES) =  0.39
      30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.94
       1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.31
       3-HOUR   POINT RAINFALL VALUE(INCHES) =  2.33
       6-HOUR   POINT RAINFALL VALUE(INCHES) =  3.27
      24-HOUR   POINT RAINFALL VALUE(INCHES) =  5.91

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.85
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =    -0.06

********************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
--------------------------------------------------------------------------------
  0.03      0.0000      0.00  Q         .         .         .         .
  0.14      0.0008      0.18  Q         .         .         .         .
  0.26      0.0025      0.18  Q         .         .         .         .
  0.37      0.0042      0.18  Q         .         .         .         .
  0.48      0.0059      0.19  Q         .         .         .         .
  0.59      0.0077      0.19  Q         .         .         .         .
  0.70      0.0094      0.19  Q         .         .         .         .
  0.81      0.0111      0.19  Q         .         .         .         .
  0.93      0.0128      0.19  Q         .         .         .         .
  1.04      0.0146      0.19  Q         .         .         .         .
  1.15      0.0163      0.19  Q         .         .         .         .
  1.26      0.0181      0.19  Q         .         .         .         .
  1.37      0.0199      0.19  Q         .         .         .         .
  1.48      0.0216      0.19  Q         .         .         .         .
  1.60      0.0234      0.19  Q         .         .         .         .
  1.71      0.0252      0.19  Q         .         .         .         .
  1.82      0.0270      0.20  Q         .         .         .         .
  1.93      0.0288      0.20  Q         .         .         .         .
  2.04      0.0306      0.20  Q         .         .         .         .
  2.15      0.0325      0.20  Q         .         .         .         .
  2.27      0.0343      0.20  Q         .         .         .         .
  2.38      0.0361      0.20  Q         .         .         .         .
  2.49      0.0380      0.20  Q         .         .         .         .
  2.60      0.0398      0.20  Q         .         .         .         .
  2.71      0.0417      0.20  Q         .         .         .         .
  2.82      0.0436      0.20  Q         .         .         .         .
  2.94      0.0454      0.20  Q         .         .         .         .
  3.05      0.0473      0.21  Q         .         .         .         .
  3.16      0.0492      0.21  Q         .         .         .         .
  3.27      0.0512      0.21  Q         .         .         .         .
  3.38      0.0531      0.21  Q         .         .         .         .
  3.49      0.0550      0.21  Q         .         .         .         .
  3.61      0.0569      0.21  Q         .         .         .         .
```

3.72	0.0589	0.21	Q	.	.	.	.
3.83	0.0609	0.21	Q	.	.	.	.
3.94	0.0628	0.21	Q	.	.	.	.
4.05	0.0648	0.22	Q	.	.	.	.
4.16	0.0668	0.22	Q	.	.	.	.
4.28	0.0688	0.22	Q	.	.	.	.
4.39	0.0708	0.22	Q	.	.	.	.
4.50	0.0728	0.22	Q	.	.	.	.
4.61	0.0749	0.22	Q	.	.	.	.
4.72	0.0769	0.22	Q	.	.	.	.
4.83	0.0790	0.22	Q	.	.	.	.
4.95	0.0810	0.23	Q	.	.	.	.
5.06	0.0831	0.23	Q	.	.	.	.
5.17	0.0852	0.23	Q	.	.	.	.
5.28	0.0873	0.23	Q	.	.	.	.
5.39	0.0894	0.23	Q	.	.	.	.
5.50	0.0916	0.23	Q	.	.	.	.
5.62	0.0937	0.23	Q	.	.	.	.
5.73	0.0959	0.23	Q	.	.	.	.
5.84	0.0980	0.24	Q	.	.	.	.
5.95	0.1002	0.24	Q	.	.	.	.
6.06	0.1024	0.24	Q	.	.	.	.
6.17	0.1046	0.24	Q	.	.	.	.
6.29	0.1069	0.24	Q	.	.	.	.
6.40	0.1091	0.24	Q	.	.	.	.
6.51	0.1114	0.25	Q	.	.	.	.
6.62	0.1136	0.25	Q	.	.	.	.
6.73	0.1159	0.25	Q	.	.	.	.
6.84	0.1182	0.25	.Q	.	.	.	.
6.96	0.1205	0.25	.Q	.	.	.	.
7.07	0.1229	0.25	.Q	.	.	.	.
7.18	0.1252	0.26	.Q	.	.	.	.
7.29	0.1276	0.26	.Q	.	.	.	.
7.40	0.1300	0.26	.Q	.	.	.	.
7.51	0.1324	0.26	.Q	.	.	.	.
7.62	0.1348	0.26	.Q	.	.	.	.
7.74	0.1372	0.26	.Q	.	.	.	.
7.85	0.1397	0.27	.Q	.	.	.	.
7.96	0.1422	0.27	.Q	.	.	.	.
8.07	0.1447	0.27	.Q	.	.	.	.
8.18	0.1472	0.27	.Q	.	.	.	.
8.30	0.1497	0.28	.Q	.	.	.	.
8.41	0.1523	0.28	.Q	.	.	.	.
8.52	0.1549	0.28	.Q	.	.	.	.
8.63	0.1575	0.28	.Q	.	.	.	.
8.74	0.1601	0.29	.Q	.	.	.	.
8.85	0.1627	0.29	.Q	.	.	.	.
8.97	0.1654	0.29	.Q	.	.	.	.
9.08	0.1681	0.29	.Q	.	.	.	.
9.19	0.1708	0.30	.Q	.	.	.	.
9.30	0.1736	0.30	.Q	.	.	.	.
9.41	0.1763	0.30	.Q	.	.	.	.
9.52	0.1791	0.30	.Q	.	.	.	.
9.64	0.1820	0.31	.Q	.	.	.	.
9.75	0.1848	0.31	.Q	.	.	.	.
9.86	0.1877	0.31	.Q	.	.	.	.
9.97	0.1906	0.32	.Q	.	.	.	.
10.08	0.1935	0.32	.Q	.	.	.	.
10.19	0.1965	0.32	.Q	.	.	.	.
10.30	0.1995	0.33	.Q	.	.	.	.

10.42	0.2026	0.33	.Q . . . .
10.53	0.2056	0.34	.Q . . . .
10.64	0.2087	0.34	.Q . . . .
10.75	0.2119	0.34	.Q . . . .
10.86	0.2151	0.35	.Q . . . .
10.98	0.2183	0.35	.Q . . . .
11.09	0.2216	0.36	.Q . . . .
11.20	0.2249	0.36	.Q . . . .
11.31	0.2282	0.36	.Q . . . .
11.42	0.2316	0.37	.Q . . . .
11.53	0.2350	0.37	.Q . . . .
11.65	0.2385	0.38	.Q . . . .
11.76	0.2421	0.39	.Q . . . .
11.87	0.2457	0.39	.Q . . . .
11.98	0.2493	0.40	.Q . . . .
12.09	0.2532	0.45	.Q . . . .
12.20	0.2575	0.47	.Q . . . .
12.32	0.2618	0.48	.Q . . . .
12.43	0.2663	0.48	.Q . . . .
12.54	0.2708	0.49	.Q . . . .
12.65	0.2754	0.50	.Q . . . .
12.76	0.2800	0.51	. Q . . . .
12.87	0.2847	0.52	. Q . . . .
12.98	0.2896	0.53	. Q . . . .
13.10	0.2945	0.54	. Q . . . .
13.21	0.2995	0.55	. Q . . . .
13.32	0.3046	0.56	. Q . . . .
13.43	0.3098	0.57	. Q . . . .
13.54	0.3151	0.58	. Q . . . .
13.65	0.3206	0.60	. Q . . . .
13.77	0.3262	0.61	. Q . . . .
13.88	0.3319	0.63	. Q . . . .
13.99	0.3377	0.64	. Q . . . .
14.10	0.3439	0.71	. Q . . . .
14.21	0.3506	0.73	. Q . . . .
14.32	0.3574	0.75	. Q . . . .
14.44	0.3644	0.77	. Q . . . .
14.55	0.3717	0.81	. Q . . . .
14.66	0.3792	0.82	. Q . . . .
14.77	0.3870	0.87	. Q . . . .
14.88	0.3952	0.89	. Q . . . .
14.99	0.4037	0.95	. Q . . . .
15.11	0.4126	0.98	. Q . . . .
15.22	0.4220	1.06	. Q . . . .
15.33	0.4320	1.11	. Q . . . .
15.44	0.4423	1.13	. Q . . . .
15.55	0.4531	1.20	. Q . . . .
15.66	0.4652	1.42	. Q . . . .
15.78	0.4791	1.59	. Q . . . .
15.89	0.4967	2.21	. Q . . . .
16.00	0.5204	2.93	. Q . . . .
16.11	0.5681	7.39	. . . Q. .
16.22	0.6107	1.84	. Q . . . .
16.33	0.6252	1.30	. Q . . . .
16.45	0.6365	1.16	. Q . . . .
16.56	0.6466	1.02	. Q . . . .
16.67	0.6555	0.92	. Q . . . .
16.78	0.6637	0.85	. Q . . . .
16.89	0.6712	0.79	. Q . . . .
17.00	0.6783	0.74	. Q . . . .

17.12	0.6847	0.65	. Q	.	.	.	.
17.23	0.6906	0.62	. Q	.	.	.	.
17.34	0.6961	0.59	. Q	.	.	.	.
17.45	0.7015	0.56	. Q	.	.	.	.
17.56	0.7066	0.54	. Q	.	.	.	.
17.67	0.7115	0.52	. Q	.	.	.	.
17.79	0.7162	0.50	. Q	.	.	.	.
17.90	0.7208	0.49	.Q	.	.	.	.
18.01	0.7253	0.47	.Q	.	.	.	.
18.12	0.7293	0.40	.Q	.	.	.	.
18.23	0.7329	0.39	.Q	.	.	.	.
18.34	0.7365	0.38	.Q	.	.	.	.
18.46	0.7399	0.37	.Q	.	.	.	.
18.57	0.7433	0.36	.Q	.	.	.	.
18.68	0.7465	0.35	.Q	.	.	.	.
18.79	0.7497	0.34	.Q	.	.	.	.
18.90	0.7528	0.33	.Q	.	.	.	.
19.02	0.7559	0.33	.Q	.	.	.	.
19.13	0.7588	0.32	.Q	.	.	.	.
19.24	0.7618	0.31	.Q	.	.	.	.
19.35	0.7646	0.31	.Q	.	.	.	.
19.46	0.7674	0.30	.Q	.	.	.	.
19.57	0.7701	0.29	.Q	.	.	.	.
19.68	0.7728	0.29	.Q	.	.	.	.
19.80	0.7755	0.28	.Q	.	.	.	.
19.91	0.7781	0.28	.Q	.	.	.	.
20.02	0.7806	0.27	.Q	.	.	.	.
20.13	0.7832	0.27	.Q	.	.	.	.
20.24	0.7856	0.27	.Q	.	.	.	.
20.36	0.7881	0.26	.Q	.	.	.	.
20.47	0.7905	0.26	.Q	.	.	.	.
20.58	0.7929	0.25	.Q	.	.	.	.
20.69	0.7952	0.25	.Q	.	.	.	.
20.80	0.7975	0.25	Q	.	.	.	.
20.91	0.7998	0.24	Q	.	.	.	.
21.02	0.8020	0.24	Q	.	.	.	.
21.14	0.8042	0.24	Q	.	.	.	.
21.25	0.8064	0.24	Q	.	.	.	.
21.36	0.8086	0.23	Q	.	.	.	.
21.47	0.8107	0.23	Q	.	.	.	.
21.58	0.8128	0.23	Q	.	.	.	.
21.69	0.8149	0.22	Q	.	.	.	.
21.81	0.8169	0.22	Q	.	.	.	.
21.92	0.8190	0.22	Q	.	.	.	.
22.03	0.8210	0.22	Q	.	.	.	.
22.14	0.8230	0.21	Q	.	.	.	.
22.25	0.8249	0.21	Q	.	.	.	.
22.36	0.8269	0.21	Q	.	.	.	.
22.48	0.8288	0.21	Q	.	.	.	.
22.59	0.8307	0.21	Q	.	.	.	.
22.70	0.8326	0.20	Q	.	.	.	.
22.81	0.8345	0.20	Q	.	.	.	.
22.92	0.8364	0.20	Q	.	.	.	.
23.03	0.8382	0.20	Q	.	.	.	.
23.15	0.8400	0.20	Q	.	.	.	.
23.26	0.8418	0.19	Q	.	.	.	.
23.37	0.8436	0.19	Q	.	.	.	.
23.48	0.8454	0.19	Q	.	.	.	.
23.59	0.8471	0.19	Q	.	.	.	.
23.70	0.8489	0.19	Q	.	.	.	.

23.82	0.8506	0.19	Q	.	.	.	.
23.93	0.8523	0.19	Q	.	.	.	.
24.04	0.8540	0.18	Q	.	.	.	.
24.15	0.8549	0.00	Q	.	.	.	.

TIME DURATION(minutes) OF PERCENTILES OF ESTIMATED PEAK FLOW RATE:
(Note: 100% of Peak Flow Rate estimate assumed to have
an instantaneous time duration)

Percentile of Estimated Peak Flow Rate	Duration (minutes)
0%	1440.5
10%	167.5
20%	33.5
30%	13.4
40%	6.7
50%	6.7
60%	6.7
70%	6.7
80%	6.7
90%	6.7

Steps for converting AES hydrograph output into 5-minute intervals for import into Hydraflow/Hydrographs in Civil3d

Post-development condition 100-year storm event

STEP 1
Import results from hydrograph

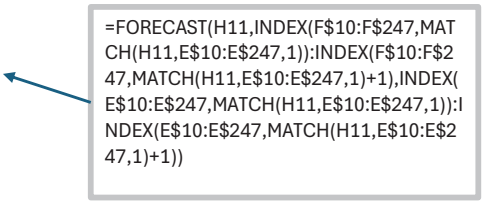
TIME (HOURS)	VOLUME (AF)	Q (CFS)
0.03	0	0
0.14	0.0008	0.18
0.26	0.0025	0.18
0.37	0.0042	0.18
0.48	0.0059	0.19
0.59	0.0077	0.19
0.7	0.0094	0.19
0.81	0.0111	0.19
0.93	0.0128	0.19
1.04	0.0146	0.19
1.15	0.0163	0.19
1.26	0.0181	0.19
1.37	0.0199	0.19
1.48	0.0216	0.19
1.6	0.0234	0.19
1.71	0.0252	0.19
1.82	0.027	0.2
1.93	0.0288	0.2
2.04	0.0306	0.2
2.15	0.0325	0.2
2.27	0.0343	0.2
2.38	0.0361	0.2
2.49	0.038	0.2
2.6	0.0398	0.2
2.71	0.0417	0.2
2.82	0.0436	0.2
2.94	0.0454	0.2
3.05	0.0473	0.21
3.16	0.0492	0.21
3.27	0.0512	0.21
3.38	0.0531	0.21
3.49	0.055	0.21
3.61	0.0569	0.21
3.72	0.0589	0.21
3.83	0.0609	0.21
3.94	0.0628	0.21
4.05	0.0648	0.22
4.16	0.0668	0.22
4.28	0.0688	0.22
4.39	0.0708	0.22
4.5	0.0728	0.22
4.61	0.0749	0.22
4.72	0.0769	0.22
4.83	0.079	0.22
4.95	0.081	0.23
5.06	0.0831	0.23
5.17	0.0852	0.23
5.28	0.0873	0.23
5.39	0.0894	0.23
5.5	0.0916	0.23
5.62	0.0937	0.23
5.73	0.0959	0.23

STEP 2
Convert time to minutes

TIME (MIN)	Q (CFS)
1.8	0
8.4	0.18
15.6	0.18
22.2	0.18
28.8	0.19
35.4	0.19
42	0.19
48.6	0.19
55.8	0.19
62.4	0.19
69	0.19
75.6	0.19
82.2	0.19
88.8	0.19
96	0.19
102.6	0.19
109.2	0.2
115.8	0.2
122.4	0.2
129	0.2
136.2	0.2
142.8	0.2
149.4	0.2
156	0.2
162.6	0.2
169.2	0.2
176.4	0.2
183	0.21
189.6	0.21
196.2	0.21
202.8	0.21
209.4	0.21
216.6	0.21
223.2	0.21
229.8	0.21
236.4	0.21
243	0.22
249.6	0.22
256.8	0.22
263.4	0.22
270	0.22
276.6	0.22
283.2	0.22
289.8	0.22
297	0.23
303.6	0.23
310.2	0.23
316.8	0.23
323.4	0.23
330	0.23
337.2	0.23
343.8	0.23

STEP 3
Convert to 5-min time interval

TIME (MIN)	Q (CFS)
5	0
10	0.18
15	0.18
20	0.18
25	0.184242
30	0.19
35	0.19
40	0.19
45	0.19
50	0.19
55	0.19
60	0.19
65	0.19
70	0.19
75	0.19
80	0.19
85	0.19
90	0.19
95	0.19
100	0.19
105	0.193636
110	0.2
115	0.2
120	0.2
125	0.2
130	0.2
135	0.2
140	0.2
145	0.2
150	0.2
155	0.2
160	0.2
165	0.2
170	0.2
175	0.2
180	0.205455
185	0.21
190	0.21
195	0.21
200	0.21
205	0.21
210	0.21
215	0.21
220	0.21
225	0.21
230	0.21
235	0.21
240	0.215455
245	0.22
250	0.22
255	0.22
260	0.22



STEP 4
The interpolated peak flow will be less than the peak flow from the original hydrograph. To correct this, manually change the interpolated peak flow in the final column to match the peak flow from the output. Doing so maintains the original peak flow intent and provides more conservative results.

STEP 5
Export the final two columns into a text file, in a format that is ready to import into Hydraflow/Hydrographs in Civil3d for basin routing.

5.84	0.098	0.24	350.4	0.24	265	0.22
5.95	0.1002	0.24	357	0.24	270	0.22
6.06	0.1024	0.24	363.6	0.24	275	0.22
6.17	0.1046	0.24	370.2	0.24	280	0.22
6.29	0.1069	0.24	377.4	0.24	285	0.22
6.4	0.1091	0.24	384	0.24	290	0.220278
6.51	0.1114	0.25	390.6	0.25	295	0.227222
6.62	0.1136	0.25	397.2	0.25	300	0.23
6.73	0.1159	0.25	403.8	0.25	305	0.23
6.84	0.1182	0.25	410.4	0.25	310	0.23
6.96	0.1205	0.25	417.6	0.25	315	0.23
7.07	0.1229	0.25	424.2	0.25	320	0.23
7.18	0.1252	0.26	430.8	0.26	325	0.23
7.29	0.1276	0.26	437.4	0.26	330	0.23
7.4	0.13	0.26	444	0.26	335	0.23
7.51	0.1324	0.26	450.6	0.26	340	0.23
7.62	0.1348	0.26	457.2	0.26	345	0.231818
7.74	0.1372	0.26	464.4	0.26	350	0.239394
7.85	0.1397	0.27	471	0.27	355	0.24
7.96	0.1422	0.27	477.6	0.27	360	0.24
8.07	0.1447	0.27	484.2	0.27	365	0.24
8.18	0.1472	0.27	490.8	0.27	370	0.24
8.3	0.1497	0.28	498	0.28	375	0.24
8.41	0.1523	0.28	504.6	0.28	380	0.24
8.52	0.1549	0.28	511.2	0.28	385	0.241515
8.63	0.1575	0.28	517.8	0.28	390	0.249091
8.74	0.1601	0.29	524.4	0.29	395	0.25
8.85	0.1627	0.29	531	0.29	400	0.25
8.97	0.1654	0.29	538.2	0.29	405	0.25
9.08	0.1681	0.29	544.8	0.29	410	0.25
9.19	0.1708	0.3	551.4	0.3	415	0.25
9.3	0.1736	0.3	558	0.3	420	0.25
9.41	0.1763	0.3	564.6	0.3	425	0.251212
9.52	0.1791	0.3	571.2	0.3	430	0.258788
9.64	0.182	0.31	578.4	0.31	435	0.26
9.75	0.1848	0.31	585	0.31	440	0.26
9.86	0.1877	0.31	591.6	0.31	445	0.26
9.97	0.1906	0.32	598.2	0.32	450	0.26
10.08	0.1935	0.32	604.8	0.32	455	0.26
10.19	0.1965	0.32	611.4	0.32	460	0.26
10.3	0.1995	0.33	618	0.33	465	0.260909
10.42	0.2026	0.33	625.2	0.33	470	0.268485
10.53	0.2056	0.34	631.8	0.34	475	0.27
10.64	0.2087	0.34	638.4	0.34	480	0.27
10.75	0.2119	0.34	645	0.34	485	0.27
10.86	0.2151	0.35	651.6	0.35	490	0.27
10.98	0.2183	0.35	658.8	0.35	495	0.275833
11.09	0.2216	0.36	665.4	0.36	500	0.28
11.2	0.2249	0.36	672	0.36	505	0.28
11.31	0.2282	0.36	678.6	0.36	510	0.28
11.42	0.2316	0.37	685.2	0.37	515	0.28
11.53	0.235	0.37	691.8	0.37	520	0.283333
11.65	0.2385	0.38	699	0.38	525	0.29
11.76	0.2421	0.39	705.6	0.39	530	0.29
11.87	0.2457	0.39	712.2	0.39	535	0.29
11.98	0.2493	0.4	718.8	0.4	540	0.29
12.09	0.2532	0.45	725.4	0.45	545	0.290303
12.2	0.2575	0.47	732	0.47	550	0.297879
12.32	0.2618	0.48	739.2	0.48	555	0.3
12.43	0.2663	0.48	745.8	0.48	560	0.3
12.54	0.2708	0.49	752.4	0.49	565	0.3
12.65	0.2754	0.5	759	0.5	570	0.3

12.76	0.28	0.51	765.6	0.51	575	0.305278
12.87	0.2847	0.52	772.2	0.52	580	0.31
12.98	0.2896	0.53	778.8	0.53	585	0.31
13.1	0.2945	0.54	786	0.54	590	0.31
13.21	0.2995	0.55	792.6	0.55	595	0.315152
13.32	0.3046	0.56	799.2	0.56	600	0.32
13.43	0.3098	0.57	805.8	0.57	605	0.32
13.54	0.3151	0.58	812.4	0.58	610	0.32
13.65	0.3206	0.6	819	0.6	615	0.325455
13.77	0.3262	0.61	826.2	0.61	620	0.33
13.88	0.3319	0.63	832.8	0.63	625	0.33
13.99	0.3377	0.64	839.4	0.64	630	0.337273
14.1	0.3439	0.71	846	0.71	635	0.34
14.21	0.3506	0.73	852.6	0.73	640	0.34
14.32	0.3574	0.75	859.2	0.75	645	0.34
14.44	0.3644	0.77	866.4	0.77	650	0.347576
14.55	0.3717	0.81	873	0.81	655	0.35
14.66	0.3792	0.82	879.6	0.82	660	0.351818
14.77	0.387	0.87	886.2	0.87	665	0.359394
14.88	0.3952	0.89	892.8	0.89	670	0.36
14.99	0.4037	0.95	899.4	0.95	675	0.36
15.11	0.4126	0.98	906.6	0.98	680	0.362121
15.22	0.422	1.06	913.2	1.06	685	0.369697
15.33	0.432	1.11	919.8	1.11	690	0.37
15.44	0.4423	1.13	926.4	1.13	695	0.374444
15.55	0.4531	1.2	933	1.2	700	0.381515
15.66	0.4652	1.42	939.6	1.42	705	0.389091
15.78	0.4791	1.59	946.8	1.59	710	0.39
15.89	0.4967	2.21	953.4	2.21	715	0.394242
16	0.5204	2.93	960	2.93	720	0.409091
16.11	0.5681	7.39	966.6	7.39	725	0.44697
16.22	0.6107	1.84	973.2	1.84	730	0.463939
16.33	0.6252	1.3	979.8	1.3	735	0.474167
16.45	0.6365	1.16	987	1.16	740	0.48
16.56	0.6466	1.02	993.6	1.02	745	0.48
16.67	0.6555	0.92	1000.2	0.92	750	0.486364
16.78	0.6637	0.85	1006.8	0.85	755	0.493939
16.89	0.6712	0.79	1013.4	0.79	760	0.501515
17	0.6783	0.74	1020	0.74	765	0.509091
17.12	0.6847	0.65	1027.2	0.65	770	0.516667
17.23	0.6906	0.62	1033.8	0.62	775	0.524242
17.34	0.6961	0.59	1040.4	0.59	780	0.531667
17.45	0.7015	0.56	1047	0.56	785	0.538611
17.56	0.7066	0.54	1053.6	0.54	790	0.546061
17.67	0.7115	0.52	1060.2	0.52	795	0.553636
17.79	0.7162	0.5	1067.4	0.5	800	0.561212
17.9	0.7208	0.49	1074	0.49	805	0.568788
18.01	0.7253	0.47	1080.6	0.47	810	0.576364
18.12	0.7293	0.4	1087.2	0.4	815	0.587879
18.23	0.7329	0.39	1093.8	0.39	820	0.601389
18.34	0.7365	0.38	1100.4	0.38	825	0.608333
18.46	0.7399	0.37	1107.6	0.37	830	0.621515
18.57	0.7433	0.36	1114.2	0.36	835	0.633333
18.68	0.7465	0.35	1120.8	0.35	840	0.646364
18.79	0.7497	0.34	1127.4	0.34	845	0.699394
18.9	0.7528	0.33	1134	0.33	850	0.722121
19.02	0.7559	0.33	1141.2	0.33	855	0.737273
19.13	0.7588	0.32	1147.8	0.32	860	0.752222
19.24	0.7618	0.31	1154.4	0.31	865	0.766111
19.35	0.7646	0.31	1161	0.31	870	0.791818
19.46	0.7674	0.3	1167.6	0.3	875	0.81303
19.57	0.7701	0.29	1174.2	0.29	880	0.82303

19.68	0.7728	0.29	1180.8	0.29	885	0.860909
19.8	0.7755	0.28	1188	0.28	890	0.881515
19.91	0.7781	0.28	1194.6	0.28	895	0.91
20.02	0.7806	0.27	1201.2	0.27	900	0.9525
20.13	0.7832	0.27	1207.8	0.27	905	0.973333
20.24	0.7856	0.27	1214.4	0.27	910	1.021212
20.36	0.7881	0.26	1221.6	0.26	915	1.073636
20.47	0.7905	0.26	1228.2	0.26	920	1.110606
20.58	0.7929	0.25	1234.8	0.25	925	1.125758
20.69	0.7952	0.25	1241.4	0.25	930	1.168182
20.8	0.7975	0.25	1248	0.25	935	1.266667
20.91	0.7998	0.24	1254.6	0.24	940	1.429444
21.02	0.802	0.24	1261.2	0.24	945	1.5475
21.14	0.8042	0.24	1268.4	0.24	950	1.890606
21.25	0.8064	0.24	1275	0.24	955	2.384545
21.36	0.8086	0.23	1281.6	0.23	960	2.93
21.47	0.8107	0.23	1288.2	0.23	965	7.39
21.58	0.8128	0.23	1294.8	0.23	970	4.530909
21.69	0.8149	0.22	1301.4	0.22	975	1.692727
21.81	0.8169	0.22	1308.6	0.22	980	1.296111
21.92	0.819	0.22	1315.2	0.22	985	1.198889
22.03	0.821	0.22	1321.8	0.22	990	1.096364
22.14	0.823	0.21	1328.4	0.21	995	0.998788
22.25	0.8249	0.21	1335	0.21	1000	0.92303
22.36	0.8269	0.21	1341.6	0.21	1005	0.869091
22.48	0.8288	0.21	1348.8	0.21	1010	0.820909
22.59	0.8307	0.21	1355.4	0.21	1015	0.777879
22.7	0.8326	0.2	1362	0.2	1020	0.74
22.81	0.8345	0.2	1368.6	0.2	1025	0.6775
22.92	0.8364	0.2	1375.2	0.2	1030	0.637273
23.03	0.8382	0.2	1381.8	0.2	1035	0.614545
23.15	0.84	0.2	1389	0.2	1040	0.591818
23.26	0.8418	0.19	1395.6	0.19	1045	0.569091
23.37	0.8436	0.19	1402.2	0.19	1050	0.550909
23.48	0.8454	0.19	1408.8	0.19	1055	0.535758
23.59	0.8471	0.19	1415.4	0.19	1060	0.520606
23.7	0.8489	0.19	1422	0.19	1065	0.506667
23.82	0.8506	0.19	1429.2	0.19	1070	0.496061
23.93	0.8523	0.19	1435.8	0.19	1075	0.48697
24.04	0.854	0.18	1442.4	0.18	1080	0.471818
24.15	0.8549	0	1449	0	1085	0.423333
					1090	0.395758
					1095	0.388182
					1100	0.380606
					1105	0.373611
					1110	0.366364
					1115	0.358788
					1120	0.351212
					1125	0.343636
					1130	0.336061
					1135	0.33
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					1145	0.324242
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					1175	0.29
					1180	0.29
					1185	0.284167
					1190	0.28

1195	0.279394
1200	0.271818
1205	0.27
1210	0.27
1215	0.269167
1220	0.262222
1225	0.26
1230	0.257273
1235	0.25
1240	0.25
1245	0.25
1250	0.24697
1255	0.24
1260	0.24
1265	0.24
1270	0.24
1275	0.24
1280	0.232424
1285	0.23
1290	0.23
1295	0.229697
1300	0.222121
1305	0.22
1310	0.22
1315	0.22
1320	0.22
1325	0.215152
1330	0.21
1335	0.21
1340	0.21
1345	0.21
1350	0.21
1355	0.21
1360	0.20303
1365	0.2
1370	0.2
1375	0.2
1380	0.2
1385	0.2
1390	0.198485
1395	0.190909
1400	0.19
1405	0.19
1410	0.19
1415	0.19
1420	0.19
1425	0.19
1430	0.19
1435	0.19
1440	0.183636
1445	0.109091

Appendix C

Hydraulics Calculations

15" PVC

Project Description

Friction Method	Manning Formula
Solve For	Full Flow Capacity

Input Data

Roughness Coefficient	0.011	
Channel Slope	0.05000	ft/ft
Normal Depth	1.25	ft
Diameter	1.25	ft
Discharge	17.07	ft^3/s

Results

Discharge	17.07	ft^3/s
Normal Depth	1.25	ft
Flow Area	1.23	ft^2
Wetted Perimeter	3.93	ft
Hydraulic Radius	0.31	ft
Top Width	0.00	ft
Critical Depth	1.24	ft
Percent Full	100.0	%
Critical Slope	0.04670	ft/ft
Velocity	13.91	ft/s
Velocity Head	3.01	ft
Specific Energy	4.26	ft
Froude Number	0.00	
Maximum Discharge	18.36	ft^3/s
Discharge Full	17.07	ft^3/s
Slope Full	0.05000	ft/ft
Flow Type	SubCritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Average End Depth Over Rise	0.00	%
Normal Depth Over Rise	100.00	%
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.25	ft

15" PVC

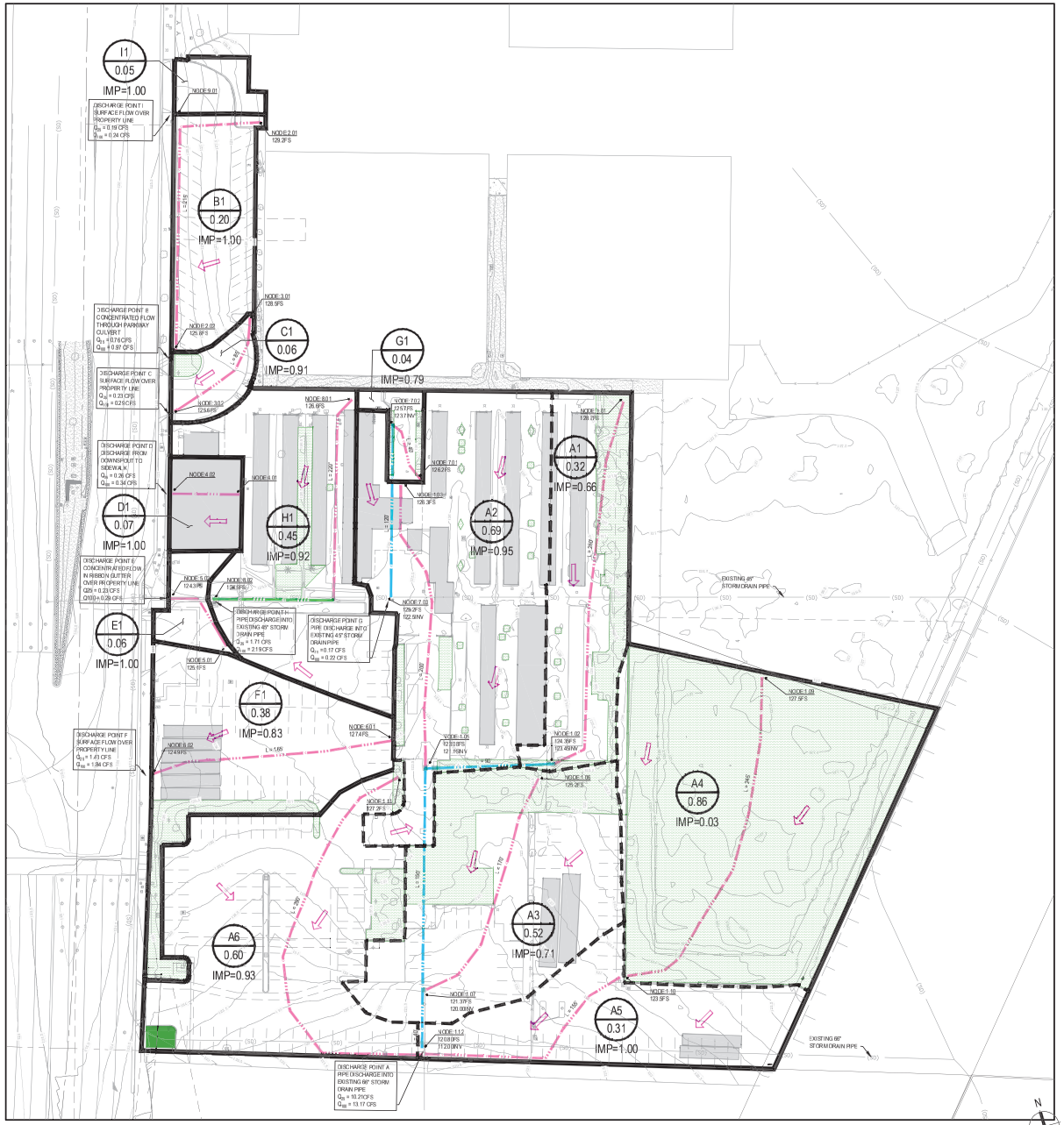
GVF Output Data

Critical Depth	1.24	ft
Channel Slope	0.05000	ft/ft
Critical Slope	0.04670	ft/ft

Appendix D

Exhibits

Pre-Development Hydrology Exhibit
Post-Development Hydrology Exhibit



COUNTY APPROVAL STAMP

LEGEND

- EXISTING BUILDING
- EXISTING PERVIOUS AREA
- SURFACE FLOW DIRECTION
- SURFACE FLOW
- PIPE FLOW
- V-GUTTER FLOW
- RD ROOF DRAIN POINT OF CONNECTION
- DELINEATION BETWEEN DRAINAGE AREAS
- DELINEATION BETWEEN DRAINAGE SUBAREAS
- NAME / X.XX DRAINAGE SUBAREA / AREA (ACRES)
- IMP=0.XX IMPERVIOUS RATIO

County of Orange
OC PUBLIC WORKS
OC Facilities Design & Construction

Revisions

Sym.	Descrip.	Date	By

Consultants

Drawn	Chkd.	Date

A-E Seal

A-E

LPA Changing Lives by Design

Design	AT	Chkd.	KS	Date 11/15/2024

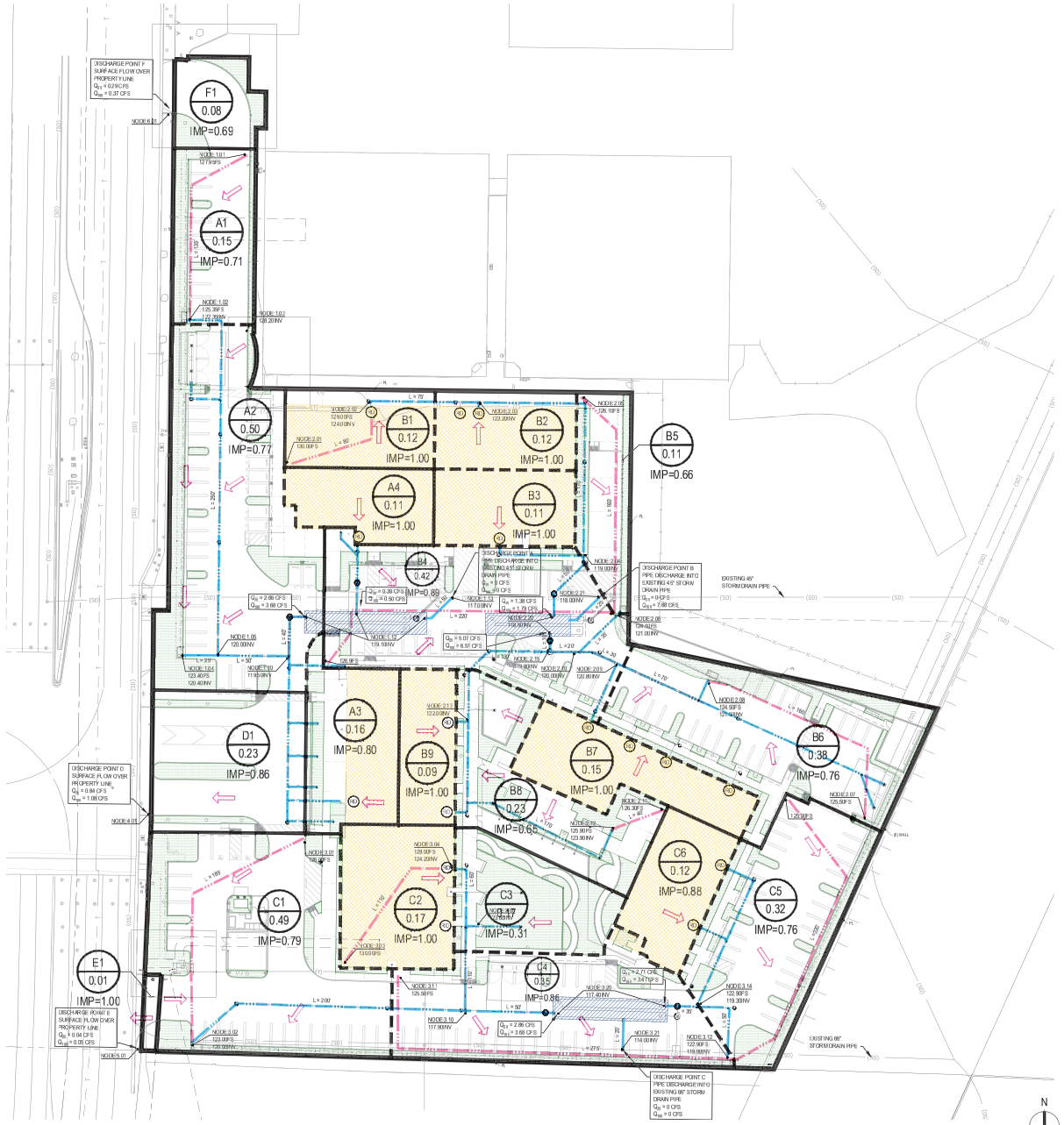
Sht Title
Project
County of Orange
Workforce Reentry Center
561 The City Drive South
Orange, CA 92868

PROJ. NO. 31327

Plan Check No.
GRD XX-XXXX

Sheet
of 18

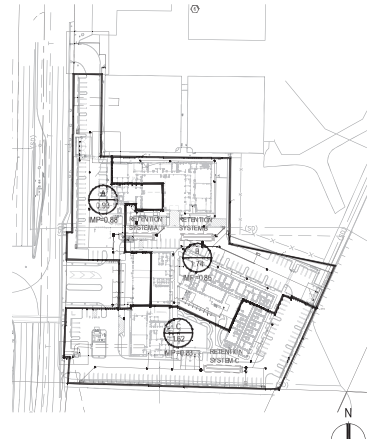
COUNTY APPROVAL STAMP



POST-DEVELOPMENT HYDROLOGY EXHIBIT 1" = 30' 01

LEGEND

- PROPOSED BUILDING
- PROPOSED RETENTION SYSTEM
- PROPOSED PERVIOUS AREA
- SURFACE FLOW DIRECTION
- SURFACE FLOW
- PIPE FLOW
- V-GUTTER FLOW
- RD ROOF DRAIN POINT OF CONNECTION
- DELINEATION BETWEEN DRAINAGE AREAS
- DELINEATION BETWEEN DRAINAGE SUBAREAS
- NAME / X.XX DRAINAGE SUBAREA AREA (ACRES)
- IMP=0.XX IMPERVIOUS RATIO



POST-DEVELOPMENT RETENTION SYSTEMS EXHIBIT 1" = 100' 01

County of Orange
OC PUBLIC WORKS
OC Facilities Design & Construction

Revisions

Sym.	Descrip.	Date	By

Consultants

Drawn	Chkd.	Date

A-E Seal

A-E
LPA Changing Lives by Design
Design AT Chkd. KS Date 11/15/2024

Sht Title
Project
County of Orange
Workforce Reentry Center
561 The City Drive South
Orange, CA 92868
PROJ. NO. 31327

Plan Check No.
GRD XX-XXXX

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of 18

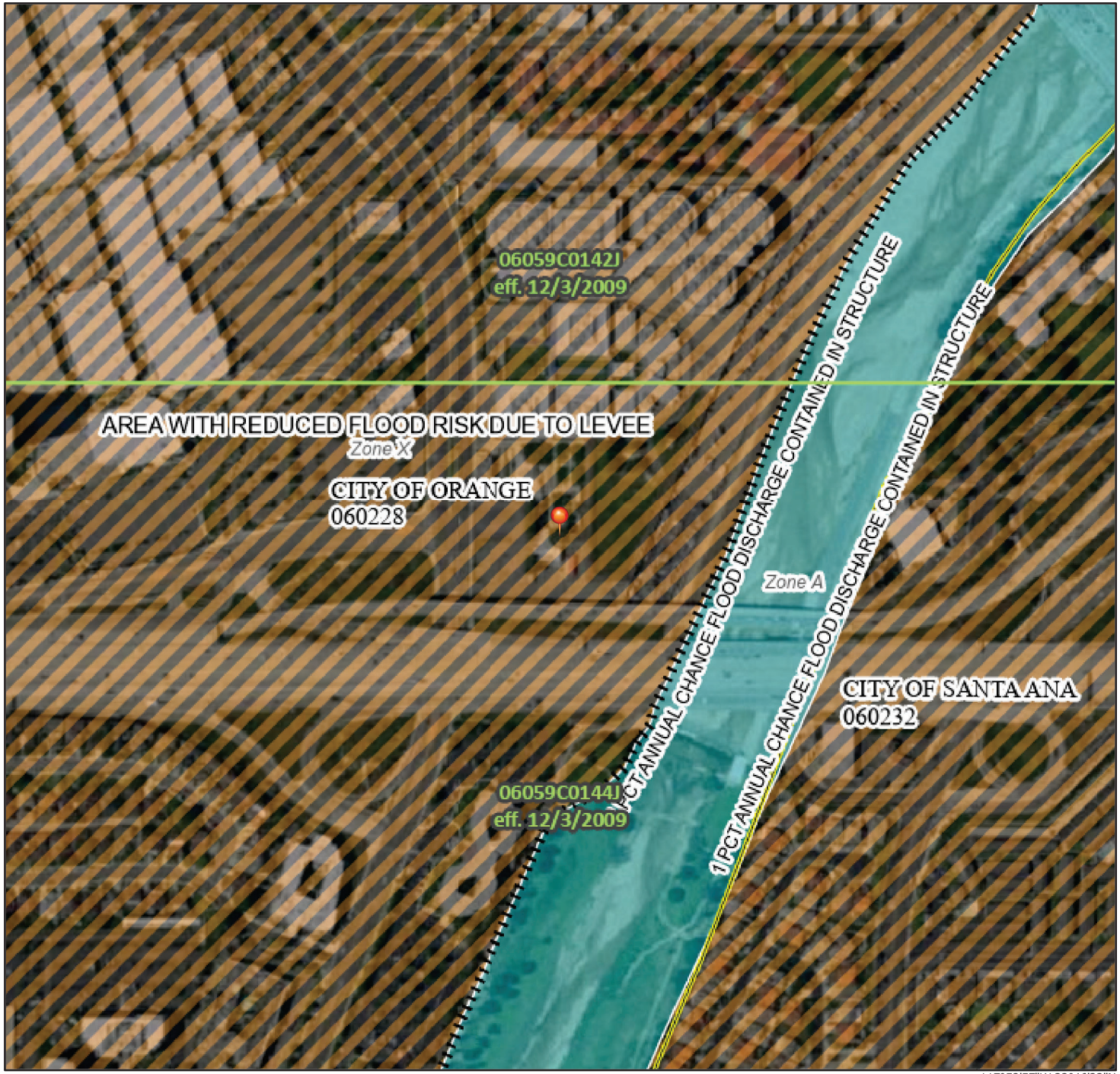
Appendix E

Reference Drawings

Precise Grading Plans
FEMA National Flood Hazard Layer FIRMette

National Flood Hazard Layer FIRMette

FEMA



0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

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