EXHIBIT E
HYDROLOGY REPORT

SITE PLAN NO. PLAN 19-00029

November 2019

Reinforced Earth Company
Concrete Panel Yard
APN 0472-131-03, 04, 08, 10, 13, 16,17 & 0472-141-16
Victorville, CA 92394

Hydrology Report

Prepared for:
Reinforced Earth Company

Prepared By:
JE Miller & Associates
17995 Outer Highway 18, Suite 1
Apple Valley, CA 92307

Original: May 28, 2019
Revised: August 27, 2019
Revised: October 24, 2019

Prepared under the supervision of:

_____

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Discussion

INTRODUCTION – Site Discussion

The Reinforced Earth Company New Construction Project is a proposed industrial development on the southwest side of National Trails Highway. The project proposes to grade 13.46 acres. Project improvements include an office building, parking lot, ac driveway and concrete casting beds with gravel road access (see site map in Hydrology Exhibits). 3 stormwater basins are proposed to retain and infiltrate stormwater runoff from proposed improvements. The drainage area associated with the proposed improvements spans 28.2 acres of undeveloped desert land, but this project will be limited to a graded area of 13.46 acres within the 28.2-acre watershed. This 28.3-acre watershed will be the primary focus of this report.

Proposed grading will include cut and fill slopes and create an upper and lower pad. The upper pad will be graded at an elevation of 2770 ft and include the concrete casting beds. The lower pad will be graded at an elevation of 2750 ft that will transition to lower elevations where the building pad is proposed at an elevation of 2745 ft. Drainage improvements will include construction of v swales, storm drain inlets, storm drainpipe and three infiltration basins. Drainage will be managed as to ensure flows from proposed impervious surfaces will be drained to the basins for retention and infiltration. Surface flows at the perimeter of the proposed improvements that do not include impervious improvements will be conveyed directly to National Trails Highway. An 18-inch storm drain is proposed to connect infiltration basin 1 to infiltration basin 2. Onsite flows will be collected on the surface and conveyed to the onsite infiltration basins. Infiltration basins will be sized to reduce 100 year proposed peak flow discharges to less than the existing peak. This project is a priority development project, which requires the development of a WQMP to complete the plan check process.

The site is located on the southwest side of National Trails Highway immediately southwest of the Mojave River in the City of Victorville. The site consists of sparse desert brush covering approximately 15% of the site. The site slopes to the north east at slopes of 1-8 %. Onsite runoff discharges east to the National Trails Highway and ultimately the Mojave River. Surface flow drains southwest to northeast. Surface flow concentrates and discharges in 3 main locations (Node 1, 4 an 8 See Existing Hydrology Exhibit). According to San Bernardino County hydrology Manual Hydrologic Soil Class C can be found throughout the area. FEMA Flood Insurance Rate Map 06071C5805H indicates the site is located in Zone X which is determined to be outside the 0.2% flood plain.

RAINFALL DATA

Rainfall data was acquired from NOAA Atlas 14. The 1-hour rainfall rates were used rational method analysis. Hydrographs were developed for the 24-hour storm and used, 5-minute, 30-minute, 1 hour, 3-hour, 6 hour and 24 hour.

Table 1. Rainfall Data Summary (inches)

Duration	100 Year
5 Minute	0.413
30 Minute	0.951
1 Hour	1.08
3 Hour	1.57
6 Hour	2.02
24 Hour	3.28

PURPOSE

The purpose of this report is to discuss the hydrologic characteristics of the site, demonstrate the proposed drainage improvements are adequately sized to convey the 100-year peak flow and that runoff increases as a result of development will be mitigated through the use of 3 infiltration basins.

CRITERIA

The criteria utilized in this report are set forth by the San Bernardino County Hydrology Manual. AES software was used to perform computations. Rational Methods were applied to determine peak flow rates and times of concentration while unit hydrographs were applied to determine flow volumes. Hydrographs were routed thru proposed infiltration basins to estimate flow discharge.

RESULTS

The proposed drainage improvements will include 5 storm drain lines (Line A, B, C, D&E) The storm drain sizes are shown on the site plan. Size will vary from 6 inches to 18 inches. Hydraulic calculations indicate pipe sizes are adequate to convey flows in a non-pressure flow condition. Two V Swales (B=1, Z=2, H=1) are proposed and are adequately sized to convey the 100-year peak flow rate. Three infiltration basins (Infiltration Basin1,2,3) are proposed that have been sized to reduce the propose 100-year peak flow to less than existing. Results indicate that proposed drainage infrastructure including storm drains, v swales and the proposed infiltration basins are adequately sized. Infiltration basin 1 was sized to be 0.53 ac/ft or 23,143 ft3. Infiltration basin 2 was sized to be 0.07 ac/ft or 3,119 ft3 and infiltration basin 3 was sized to be 0.17 ac/ft 7,416.5 ft3. The proposed spillway for infiltration basins 1,2 and 3 was sized to be 10 ft wide with a maximum depth of 1 ft. ¼ ton Rip Rap will be provided at the spillways and was sized based on the LA County Hydraulic Manual (included in reference material). The seven proposed 2 ft x2 ft Storm drain inlets have been sized to intercept the 100 year peak flow rate with 50% clogging.

Hydrology analysis was applied to the 28.2 acres indicates proposed infiltration basins are adequately sized to reduce proposed peak flows to less than existing and provide a net benefit.

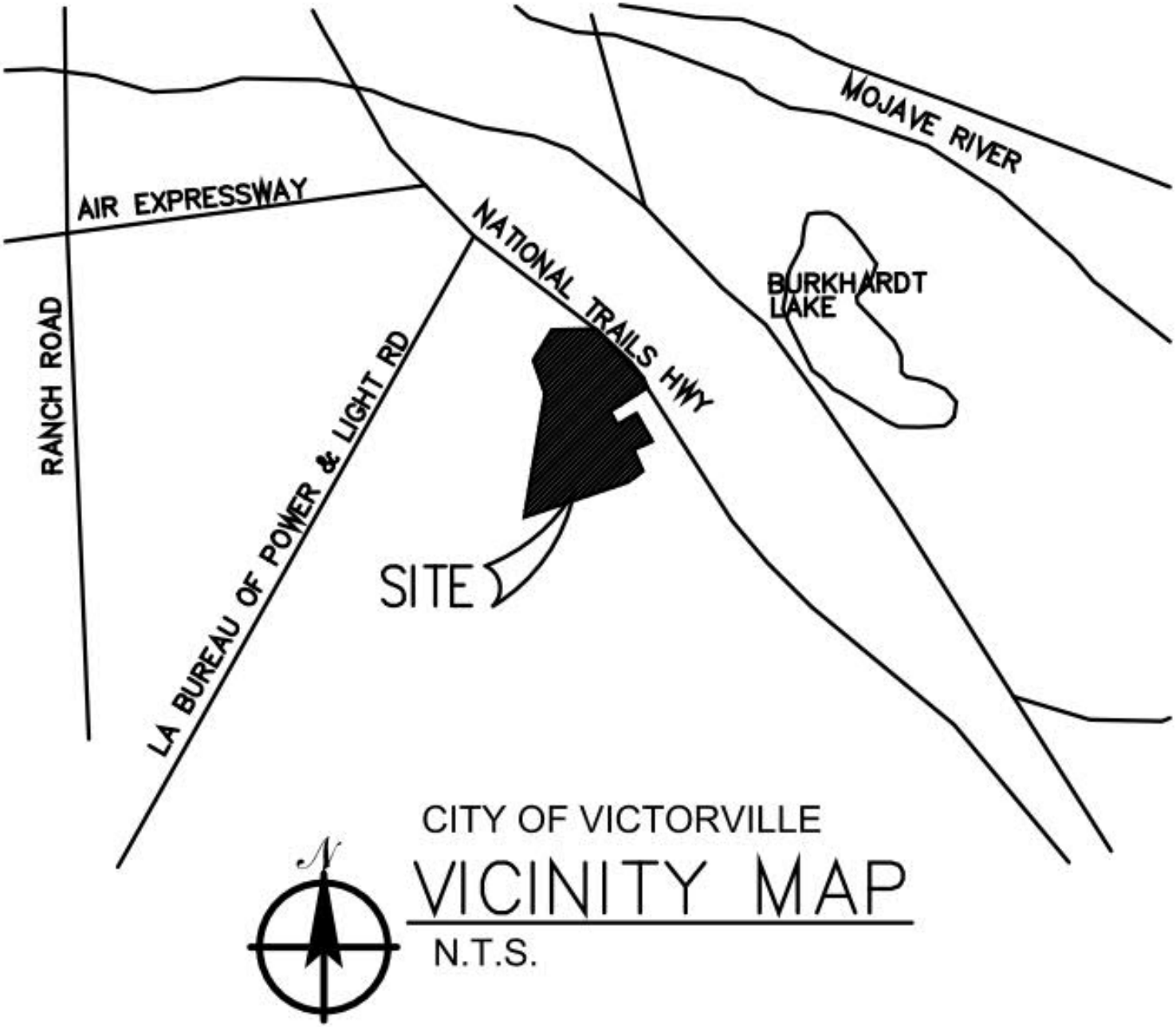
Peak Flow Summary Table

Q100 Proposed Condition (cfs)	
A1-A4	14.28
B1-B2*	11.8
C1-C3*	2.36
D1-D3	3.0
E1-E5*	28.05
Total	59.49
Q100 Existing Condition Total	64.91

*Routed Flow Rates

The WQMP will provide additional calculations for the 10-year storm and 85% average annual runoff. However, the volumes provide in this report will govern the size of the system and exceeds that amount of storage required in the WQMP.

Reference Material



CITY OF VICTORVILLE

VICINITY MAP

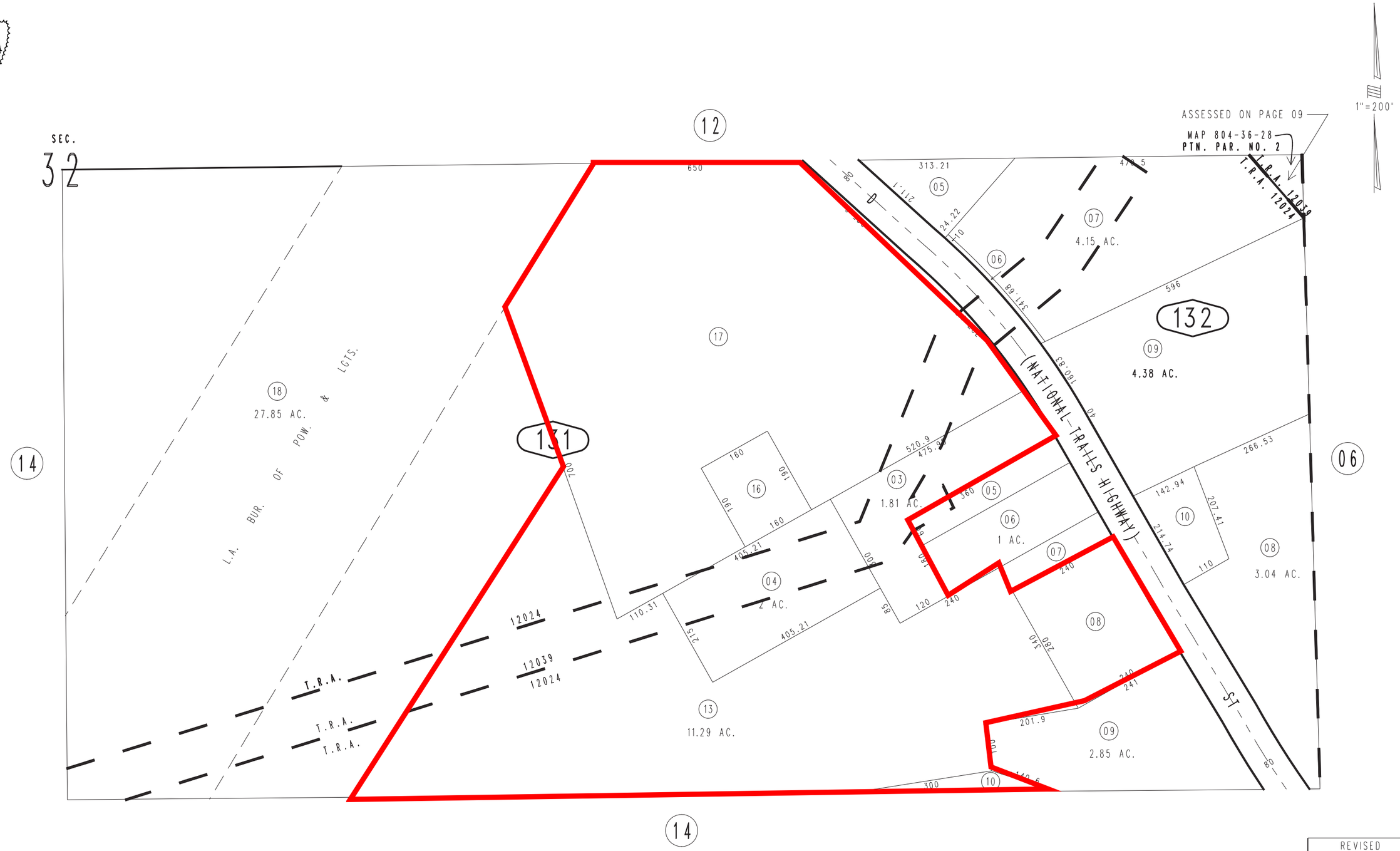
N.T.S.

THIS MAP IS FOR THE PURPOSE OF AD VALOREM TAXATION ONLY.

N.1/2, S.E.1/4, Sec.32, T.6N., R.4W., S.B.B.&M.

City of Victorville
Tax Rate Area
12024 12039

0472- 13



REVISED
03/04/10 RM

Assessor's Map
Book 0472 Page 13
San Bernardino County

June 2004

NOAA Atlas 14, Volume 6, Version 2
Location name: Victorville, California, USA*
Latitude: 34.5631°, Longitude: -117.3169°
Elevation: 2777.35 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point 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	0.101 (0.083-0.124)	0.138 (0.113-0.169)	0.189 (0.156-0.233)	0.234 (0.191-0.290)	0.300 (0.237-0.384)	0.354 (0.273-0.463)	0.413 (0.311-0.553)	0.476 (0.349-0.656)	0.569 (0.401-0.817)	0.647 (0.440-0.960)
10-min	0.145 (0.119-0.177)	0.197 (0.163-0.242)	0.271 (0.223-0.334)	0.336 (0.274-0.416)	0.430 (0.339-0.550)	0.507 (0.392-0.664)	0.591 (0.446-0.792)	0.683 (0.501-0.940)	0.816 (0.574-1.17)	0.927 (0.631-1.38)
15-min	0.175 (0.144-0.214)	0.239 (0.197-0.292)	0.328 (0.270-0.403)	0.406 (0.331-0.503)	0.520 (0.410-0.666)	0.614 (0.474-0.802)	0.715 (0.539-0.958)	0.826 (0.606-1.14)	0.987 (0.695-1.42)	1.12 (0.763-1.66)
30-min	0.233 (0.192-0.285)	0.317 (0.261-0.389)	0.436 (0.359-0.536)	0.540 (0.440-0.669)	0.691 (0.545-0.885)	0.816 (0.630-1.07)	0.951 (0.717-1.27)	1.10 (0.805-1.51)	1.31 (0.924-1.88)	1.49 (1.01-2.21)
60-min	0.265 (0.218-0.324)	0.361 (0.297-0.443)	0.497 (0.408-0.610)	0.614 (0.501-0.762)	0.787 (0.620-1.01)	0.929 (0.717-1.21)	1.08 (0.816-1.45)	1.25 (0.917-1.72)	1.49 (1.05-2.14)	1.70 (1.15-2.52)
2-hr	0.367 (0.303-0.450)	0.491 (0.405-0.602)	0.663 (0.545-0.815)	0.811 (0.661-1.00)	1.02 (0.807-1.31)	1.20 (0.924-1.56)	1.38 (1.04-1.85)	1.58 (1.16-2.17)	1.86 (1.31-2.67)	2.10 (1.43-3.11)
3-hr	0.431 (0.356-0.528)	0.573 (0.472-0.703)	0.769 (0.632-0.945)	0.936 (0.763-1.16)	1.17 (0.926-1.50)	1.37 (1.06-1.79)	1.57 (1.18-2.10)	1.79 (1.31-2.46)	2.09 (1.47-3.01)	2.34 (1.59-3.48)
6-hr	0.575 (0.474-0.704)	0.763 (0.628-0.935)	1.02 (0.836-1.25)	1.23 (1.00-1.53)	1.53 (1.21-1.96)	1.77 (1.37-2.32)	2.02 (1.52-2.71)	2.29 (1.68-3.15)	2.65 (1.87-3.81)	2.95 (2.01-4.38)
12-hr	0.726 (0.599-0.889)	0.975 (0.803-1.20)	1.31 (1.07-1.61)	1.58 (1.29-1.96)	1.96 (1.54-2.50)	2.25 (1.74-2.94)	2.55 (1.92-3.42)	2.87 (2.10-3.95)	3.30 (2.32-4.73)	3.63 (2.47-5.39)
24-hr	0.912 (0.809-1.05)	1.25 (1.10-1.43)	1.68 (1.49-1.94)	2.04 (1.79-2.38)	2.52 (2.14-3.04)	2.90 (2.40-3.56)	3.28 (2.65-4.13)	3.67 (2.89-4.75)	4.19 (3.17-5.66)	4.60 (3.36-6.43)
2-day	1.05 (0.926-1.20)	1.45 (1.28-1.67)	1.99 (1.75-2.29)	2.42 (2.12-2.82)	3.02 (2.56-3.64)	3.48 (2.89-4.28)	3.95 (3.20-4.98)	4.44 (3.49-5.75)	5.09 (3.85-6.88)	5.61 (4.09-7.83)
3-day	1.14 (1.01-1.31)	1.60 (1.41-1.84)	2.20 (1.94-2.54)	2.70 (2.36-3.14)	3.37 (2.86-4.06)	3.90 (3.24-4.79)	4.43 (3.59-5.58)	4.99 (3.93-6.46)	5.75 (4.34-7.76)	6.34 (4.63-8.86)
4-day	1.21 (1.08-1.40)	1.70 (1.50-1.96)	2.34 (2.07-2.71)	2.87 (2.52-3.34)	3.59 (3.04-4.32)	4.14 (3.44-5.09)	4.71 (3.82-5.93)	5.30 (4.17-6.86)	6.09 (4.60-8.22)	6.71 (4.90-9.37)
7-day	1.30 (1.15-1.49)	1.80 (1.60-2.08)	2.47 (2.18-2.85)	3.01 (2.64-3.51)	3.75 (3.17-4.51)	4.31 (3.57-5.29)	4.87 (3.94-6.13)	5.45 (4.29-7.05)	6.22 (4.70-8.40)	6.81 (4.97-9.52)
10-day	1.36 (1.21-1.57)	1.89 (1.67-2.17)	2.58 (2.28-2.98)	3.14 (2.75-3.65)	3.89 (3.30-4.68)	4.46 (3.71-5.49)	5.04 (4.08-6.35)	5.62 (4.43-7.28)	6.40 (4.84-8.65)	7.00 (5.11-9.77)
20-day	1.54 (1.37-1.78)	2.16 (1.92-2.49)	2.99 (2.64-3.45)	3.67 (3.21-4.27)	4.59 (3.89-5.53)	5.30 (4.40-6.52)	6.02 (4.88-7.58)	6.75 (5.32-8.74)	7.73 (5.84-10.4)	8.47 (6.18-11.8)
30-day	1.73 (1.53-1.99)	2.45 (2.17-2.82)	3.44 (3.04-3.97)	4.26 (3.73-4.96)	5.41 (4.59-6.51)	6.31 (5.24-7.75)	7.23 (5.85-9.10)	8.18 (6.44-10.6)	9.46 (7.15-12.8)	10.5 (7.63-14.6)
45-day	1.99 (1.77-2.29)	2.86 (2.54-3.30)	4.08 (3.61-4.72)	5.13 (4.49-5.97)	6.64 (5.62-7.99)	7.85 (6.52-9.65)	9.12 (7.39-11.5)	10.5 (8.24-13.5)	12.3 (9.32-16.6)	13.8 (10.1-19.3)
60-day	2.15 (1.91-2.47)	3.11 (2.76-3.59)	4.50 (3.98-5.20)	5.73 (5.02-6.67)	7.53 (6.38-9.06)	9.01 (7.48-11.1)	10.6 (8.59-13.4)	12.3 (9.71-16.0)	14.8 (11.2-19.9)	16.8 (12.2-23.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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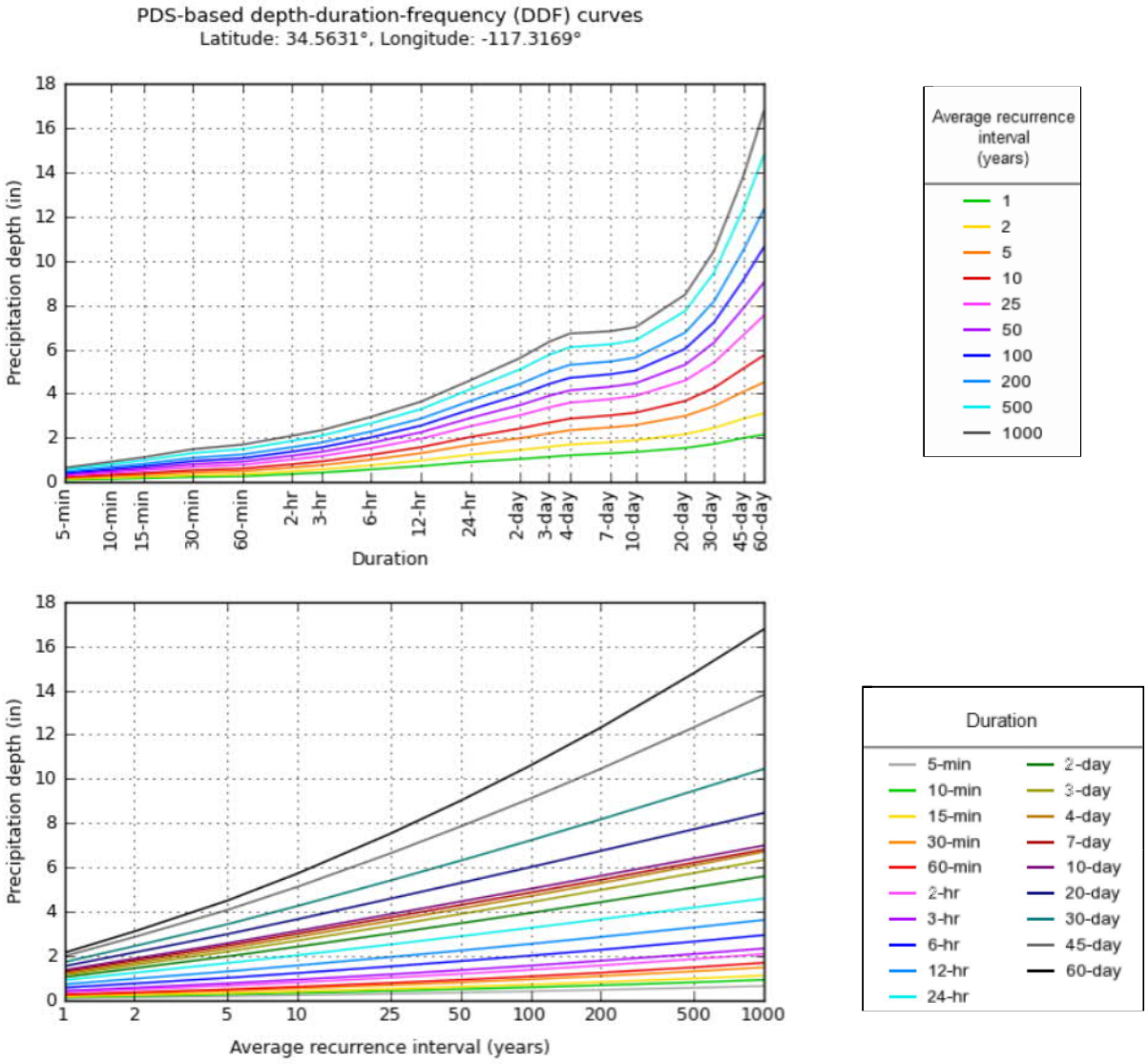
PF graphical



NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Sat May 11 23:16:55 2019

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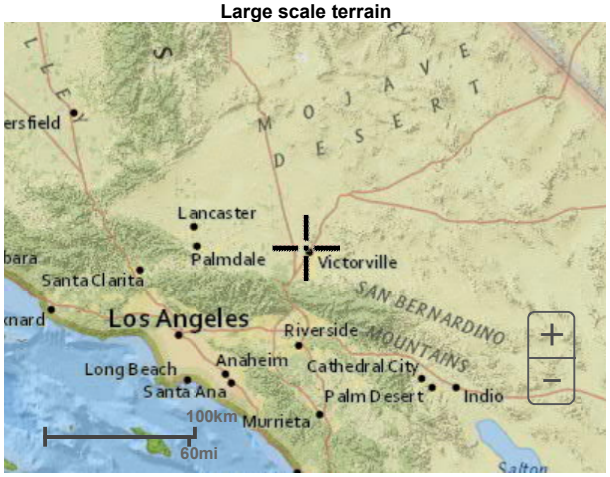
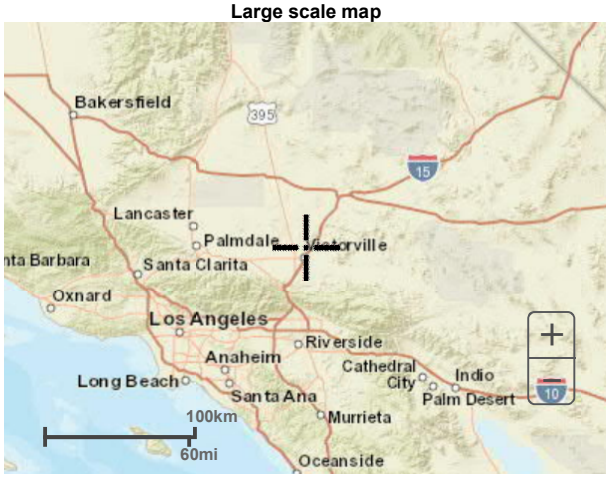
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



Large scale aerial

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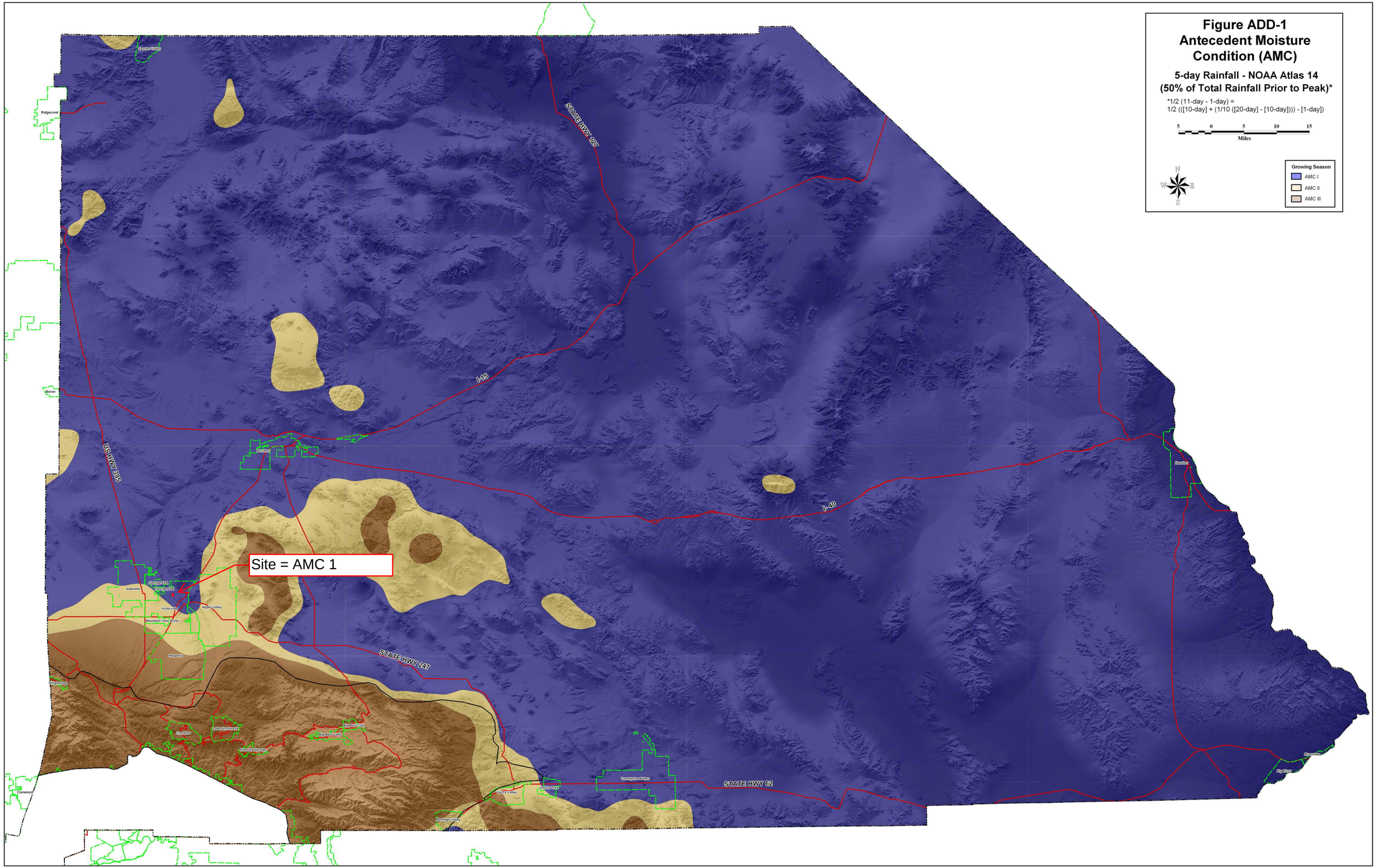
Figure ADD-1
Antecedent Moisture Condition (AMC)
5-day Rainfall - NOAA Atlas 14
(50% of Total Rainfall Prior to Peak)*
*1/2 (11-day - 1-day) =
1/2 (([10-day] + (1/10 ([20-day] - [10-day]))) - [1-day])
5 0 5 10 15
Miles
N
W
E
S
Growing Season
AMC I
AMC II
AMC III
Site = AMC 1
STATE HWY 127
I-15
I-40
US HWY 395
STATE HWY 247
STATE HWY 62
Barstow City
Ridgecrest
Boron
Barstow
Needles
Adelanto
George A.F.B.
Victorville
Apple Valley
Mountain View Acres
Hesperia
Wrightwood
Crestline
Lake Arrowhead
Running Springs
Big Bear City
Big Bear Lake
Twentynine Palms
Yucca Valley
Joshua Tree
Morongo Valley
Yucca Mesa
Big River
Homestead
Claremont

SBCHM Soils Exhibit

Rational Methods

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
         (c) Copyright 1983-2011 Advanced Engineering Software (aes)
             Ver. 18.0  Release Date: 07/01/2011  License ID 1501

                          Analysis prepared by:

                          JE Miller & Associates
                      17995 Outer Highway 18, Suite 1
                          Apple Valley, CA 92307




 ************************** DESCRIPTION OF STUDY **************************
* APN 0472-131-03, 04, 08, 10, 13, 16, 17 & 0472-141-16                   *
* Existing Condition                                                      *
* 100 Year Storm Event                                                    *
 **************************************************************************

  FILE NAME: 0472E.DAT
  TIME/DATE OF STUDY: 10:27 08/25/2019
============================================================================
  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 = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0800

  *ANTECEDENT MOISTURE CONDITION (AMC) I 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      0.00 TO NODE      0.50 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  ELEVATION DATA: UPSTREAM(FEET) =   2809.40  DOWNSTREAM(FEET) =   2743.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.555
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.421
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        2.00      0.43     1.000    76   11.56
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      5.39
  TOTAL AREA(ACRES) =      2.00   PEAK FLOW RATE(CFS) =      5.39

****************************************************************************
  FLOW PROCESS FROM NODE      0.50 TO NODE      1.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2745.00  DOWNSTREAM(FEET) =   2743.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   254.00   CHANNEL SLOPE =  0.0079
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       5.39
  FLOW VELOCITY(FEET/SEC.) =   2.98   FLOW DEPTH(FEET) =   0.95
  TRAVEL TIME(MIN.) =   1.42   Tc(MIN.) =   12.98
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      1.00 =     954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.98
  RAINFALL INTENSITY(INCH/HR) =   3.15
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       2.00
  TOTAL STREAM AREA(ACRES) =       2.00
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       5.39

****************************************************************************
  FLOW PROCESS FROM NODE      0.00 TO NODE      1.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   651.00
  ELEVATION DATA: UPSTREAM(FEET) =   2809.40  DOWNSTREAM(FEET) =   2743.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   11.063
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.527
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        2.80      0.43     1.000    76   11.06
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      7.81
  TOTAL AREA(ACRES) =      2.80   PEAK FLOW RATE(CFS) =      7.81

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      1.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.06
  RAINFALL INTENSITY(INCH/HR) =   3.53
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       2.80
  TOTAL STREAM AREA(ACRES) =       2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       7.81

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1        5.39   12.98    3.155  0.43( 0.43) 1.00       2.0       0.00
      2        7.81   11.06    3.527  0.43( 0.43) 1.00       2.8       0.00

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

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

```
     1       13.04   11.06    3.527  0.43( 0.43) 1.00       4.5       0.00
     2       12.27   12.98    3.155  0.43( 0.43) 1.00       4.8       0.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.04    Tc(MIN.) =    11.06
  EFFECTIVE AREA(ACRES) =       4.51   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        4.8
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      1.00 =     954.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      1.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2743.00  DOWNSTREAM(FEET) =   2740.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   160.00   CHANNEL SLOPE =  0.0188
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      13.04
  FLOW VELOCITY(FEET/SEC.) =   5.16   FLOW DEPTH(FEET) =   1.12
  TRAVEL TIME(MIN.) =   0.52   Tc(MIN.) =   11.58
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      4.00 =    1114.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.58
  RAINFALL INTENSITY(INCH/HR) =   3.42
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       4.51
  TOTAL STREAM AREA(ACRES) =       4.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      13.04

****************************************************************************
  FLOW PROCESS FROM NODE      2.00 TO NODE      3.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  ELEVATION DATA: UPSTREAM(FEET) =   2802.00  DOWNSTREAM(FEET) =   2765.70

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   13.039
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.144
```

```
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        5.90      0.43     1.000    76   13.04
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     14.43
  TOTAL AREA(ACRES) =      5.90   PEAK FLOW RATE(CFS) =     14.43

****************************************************************************
  FLOW PROCESS FROM NODE      3.00 TO NODE      4.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2765.70  DOWNSTREAM(FEET) =   2740.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   400.00   CHANNEL SLOPE =  0.0642
  CHANNEL BASE(FEET) =   25.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   2.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.906
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        2.20      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.89
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.29
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =   14.59
  SUBAREA AREA(ACRES) =     2.20       SUBAREA RUNOFF(CFS) =    4.91
  EFFECTIVE AREA(ACRES) =      8.10     AREA-AVERAGED Fm(INCH/HR) =   0.43
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        8.1         PEAK FLOW RATE(CFS) =      18.08

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   4.38
  LONGEST FLOWPATH FROM NODE      2.00 TO NODE      4.00 =    1100.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      4.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.59
  RAINFALL INTENSITY(INCH/HR) =   2.91
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
```

```
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       8.10
  TOTAL STREAM AREA(ACRES) =       8.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      18.08

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       13.04   11.58    3.416  0.43( 0.43) 1.00       4.5       0.00
      1       12.27   13.50    3.068  0.43( 0.43) 1.00       4.8       0.00
      2       18.08   14.59    2.906  0.43( 0.43) 1.00       8.1       2.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.34   11.58    3.416  0.43( 0.43) 1.00      10.9       0.00
      2       30.09   13.50    3.068  0.43( 0.43) 1.00      12.3       0.00
      3       29.59   14.59    2.906  0.43( 0.43) 1.00      12.9       2.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      30.34    Tc(MIN.) =    11.58
  EFFECTIVE AREA(ACRES) =      10.93   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       12.9
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      4.00 =    1114.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      4.00 TO NODE      8.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2740.00  DOWNSTREAM(FEET) =   2723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   305.00   CHANNEL SLOPE =  0.0557
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  CHANNEL FLOW THRU SUBAREA(CFS) =      30.34
  FLOW VELOCITY(FEET/SEC.) =   9.53   FLOW DEPTH(FEET) =   1.26
  TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   12.11
  LONGEST FLOWPATH FROM NODE      0.00 TO NODE      8.00 =    1419.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.11
  RAINFALL INTENSITY(INCH/HR) =   3.31
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      10.93
  TOTAL STREAM AREA(ACRES) =      12.90
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      30.34

****************************************************************************
  FLOW PROCESS FROM NODE      5.00 TO NODE      6.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  ELEVATION DATA: UPSTREAM(FEET) =   2812.00  DOWNSTREAM(FEET) =   2772.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.788
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.187
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        3.90      0.43     1.000    76   12.79
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      9.69
  TOTAL AREA(ACRES) =      3.90   PEAK FLOW RATE(CFS) =      9.69

****************************************************************************
  FLOW PROCESS FROM NODE      6.00 TO NODE      7.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2772.00  DOWNSTREAM(FEET) =   2741.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   540.00   CHANNEL SLOPE =  0.0574
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.015
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        7.80      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      18.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   8.56
  AVERAGE FLOW DEPTH(FEET) =   0.83   TRAVEL TIME(MIN.) =   1.05
  Tc(MIN.) =   13.84
  SUBAREA AREA(ACRES) =     7.80       SUBAREA RUNOFF(CFS) =   18.18
  EFFECTIVE AREA(ACRES) =     11.70     AREA-AVERAGED Fm(INCH/HR) =   0.43
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       11.7         PEAK FLOW RATE(CFS) =      27.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.98   FLOW VELOCITY(FEET/SEC.) =   9.41
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      7.00 =    1240.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      7.00 TO NODE      8.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2741.00  DOWNSTREAM(FEET) =   2723.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   280.00   CHANNEL SLOPE =  0.0643
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   3.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        2.40      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      29.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.09
  AVERAGE FLOW DEPTH(FEET) =   0.99   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =   14.30
  SUBAREA AREA(ACRES) =     2.40       SUBAREA RUNOFF(CFS) =    5.44
  EFFECTIVE AREA(ACRES) =     14.10     AREA-AVERAGED Fm(INCH/HR) =   0.43
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =       14.1         PEAK FLOW RATE(CFS) =      31.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  1.03   FLOW VELOCITY(FEET/SEC.) =  10.23
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      8.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   14.30
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.947
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        1.25      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    1.25      SUBAREA RUNOFF(CFS) =    2.84
```

```
  EFFECTIVE AREA(ACRES) =     15.35   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       15.4       PEAK FLOW RATE(CFS) =      34.83

****************************************************************************
  FLOW PROCESS FROM NODE      8.00 TO NODE      8.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.30
  RAINFALL INTENSITY(INCH/HR) =   2.95
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =      15.35
  TOTAL STREAM AREA(ACRES) =      15.35
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      34.83

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       30.34   12.11    3.310  0.43( 0.43) 1.00      10.9       0.00
      1       30.09   14.04    2.986  0.43( 0.43) 1.00      12.3       0.00
      1       29.59   15.13    2.834  0.43( 0.43) 1.00      12.9       2.00
      2       34.83   14.30    2.947  0.43( 0.43) 1.00      15.4       5.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       64.09   12.11    3.310  0.43( 0.43) 1.00      23.9       0.00
      2       64.79   14.04    2.986  0.43( 0.43) 1.00      27.4       0.00
      3       64.79   14.30    2.947  0.43( 0.43) 1.00      27.8       5.00
      4       62.85   15.13    2.834  0.43( 0.43) 1.00      28.2       2.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      64.79    Tc(MIN.) =    14.04
  EFFECTIVE AREA(ACRES) =      27.36   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =       28.2
  LONGEST FLOWPATH FROM NODE      5.00 TO NODE      8.00 =    1520.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       28.2  TC(MIN.) =     14.04
  EFFECTIVE AREA(ACRES) =     27.36  AREA-AVERAGED Fm(INCH/HR)=  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap = 1.000
  PEAK FLOW RATE(CFS)   =      64.79
```

** PEAK FLOW RATE TABLE **

STREAM NUMBER	Q (CFS)	Tc (MIN.)	Intensity (INCH/HR)	Fp(Fm) (INCH/HR)	Ap	Ae (ACRES)	HEADWATER NODE
1	64.09	12.11	3.310	0.43(0.43)	1.00	23.9	0.00
2	64.79	14.04	2.986	0.43(0.43)	1.00	27.4	0.00
3	64.79	14.30	2.947	0.43(0.43)	1.00	27.8	5.00
4	62.85	15.13	2.834	0.43(0.43)	1.00	28.2	2.00

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

END OF RATIONAL METHOD ANALYSIS

```
****************************************************************************
             RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          (Reference: 1986 SAN BERNARDINO CO. HYDROLOGY CRITERION)
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                           Analysis prepared by:

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                           Apple Valley, CA 92307




 ************************** DESCRIPTION OF STUDY **************************
* APN 0472-131-03, 04, 08, 10, 13, 16, 17 & 0472-141-16                   *
* Developed Condition                                                     *
* 100 Year Storm Event                                                    *
 ***************************************************************************

  FILE NAME: RE.DAT
  TIME/DATE OF STUDY: 11:50 08/25/2019
============================================================================
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
============================================================================
                    --*TIME-OF-CONCENTRATION MODEL*--

  USER SPECIFIED STORM EVENT(YEAR) =  100.00
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  *USER-DEFINED LOGARITHMIC INTERPOLATION USED FOR RAINFALL*

  SLOPE OF INTENSITY DURATION CURVE(LOG(I;IN/HR) vs. LOG(Tc;MIN)) = 0.7000
  USER SPECIFIED 1-HOUR INTENSITY(INCH/HOUR) = 1.0800

  *ANTECEDENT MOISTURE CONDITION (AMC) I 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     10.00 TO NODE     11.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   704.00
  ELEVATION DATA: UPSTREAM(FEET) =   2788.60  DOWNSTREAM(FEET) =   2746.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.671
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.207
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.81      0.43     1.000    76   12.67
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.03
  TOTAL AREA(ACRES) =      0.81   PEAK FLOW RATE(CFS) =      2.03

****************************************************************************
  FLOW PROCESS FROM NODE     11.00 TO NODE     14.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2746.00  DOWNSTREAM(FEET) =   2744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0143
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.03
  FLOW VELOCITY(FEET/SEC) =   2.06 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.13   Tc(MIN.) =   13.80
  LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     844.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.80
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.021
```

```
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.25      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.25      SUBAREA RUNOFF(CFS) =    0.58
  EFFECTIVE AREA(ACRES) =      1.06   AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
  TOTAL AREA(ACRES) =        1.1       PEAK FLOW RATE(CFS) =       2.48

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   13.80
  RAINFALL INTENSITY(INCH/HR) =   3.02
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       1.06
  TOTAL STREAM AREA(ACRES) =       1.06
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.48

****************************************************************************
  FLOW PROCESS FROM NODE     12.00 TO NODE     13.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   504.00
  ELEVATION DATA: UPSTREAM(FEET) =   2788.00  DOWNSTREAM(FEET) =   2769.12

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.202
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.293
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        4.56      0.43     1.000    76   12.20
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =     11.77
  TOTAL AREA(ACRES) =      4.56   PEAK FLOW RATE(CFS) =     11.77
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     13.00 TO NODE     14.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2769.12  DOWNSTREAM(FEET) =   2744.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   275.00   CHANNEL SLOPE =  0.0913
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   4.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.201
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.18      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      11.99
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.09
  AVERAGE FLOW DEPTH(FEET) =   0.60   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =   12.71
  SUBAREA AREA(ACRES) =     0.18       SUBAREA RUNOFF(CFS) =    0.45
  EFFECTIVE AREA(ACRES) =      4.74     AREA-AVERAGED Fm(INCH/HR) =   0.43
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   1.00
  TOTAL AREA(ACRES) =        4.7         PEAK FLOW RATE(CFS) =      11.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.60   FLOW VELOCITY(FEET/SEC.) =   9.02
  LONGEST FLOWPATH FROM NODE     12.00 TO NODE     14.00 =     779.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     14.00 TO NODE     14.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   12.71
  RAINFALL INTENSITY(INCH/HR) =   3.20
  AREA-AVERAGED Fm(INCH/HR) =  0.43
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       4.74
  TOTAL STREAM AREA(ACRES) =       4.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      11.84
```

```
** CONFLUENCE DATA **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1        2.48   13.80    3.021  0.43( 0.43) 1.00       1.1      10.00
    2       11.84   12.71    3.201  0.43( 0.43) 1.00       4.7      12.00

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

** PEAK FLOW RATE TABLE **
 STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
 NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
    1       14.28   12.71    3.201  0.43( 0.43) 1.00       5.7      12.00
    2       13.55   13.80    3.021  0.43( 0.43) 1.00       5.8      10.00

COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
PEAK FLOW RATE(CFS) =      14.28    Tc(MIN.) =    12.71
EFFECTIVE AREA(ACRES) =       5.72   AREA-AVERAGED Fm(INCH/HR) =  0.43
AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  1.00
TOTAL AREA(ACRES) =        5.8
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     14.00 =     844.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     14.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =   2744.00  DOWNSTREAM(FEET) =   2740.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   259.00   CHANNEL SLOPE =  0.0154
CHANNEL FLOW THRU SUBAREA(CFS) =      14.28
FLOW VELOCITY(FEET/SEC) =   3.40 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   1.27   Tc(MIN.) =   13.97
LONGEST FLOWPATH FROM NODE     10.00 TO NODE     23.00 =    1103.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
>>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
TOTAL NUMBER OF STREAMS =  2
CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
TIME OF CONCENTRATION(MIN.) =   13.97
RAINFALL INTENSITY(INCH/HR) =   3.00
AREA-AVERAGED Fm(INCH/HR) =  0.43
AREA-AVERAGED Fp(INCH/HR) =  0.43
AREA-AVERAGED Ap =  1.00
EFFECTIVE STREAM AREA(ACRES) =       5.72
TOTAL STREAM AREA(ACRES) =       5.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      14.28

****************************************************************************
  FLOW PROCESS FROM NODE     20.00 TO NODE     21.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   762.00
  ELEVATION DATA: UPSTREAM(FEET) =   2802.00  DOWNSTREAM(FEET) =   2769.80

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    8.137
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.373
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        1.40      0.81     0.100    50    8.14
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        3.19      0.43     1.000    76   14.05
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.44
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.725
  SUBAREA RUNOFF(CFS) =     16.74
  TOTAL AREA(ACRES) =      4.59   PEAK FLOW RATE(CFS) =     16.74

****************************************************************************
  FLOW PROCESS FROM NODE     21.00 TO NODE     22.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2769.80  DOWNSTREAM(FEET) =   2737.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.1262
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.240
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        1.92      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      20.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.75
  AVERAGE FLOW DEPTH(FEET) =   0.71   TRAVEL TIME(MIN.) =   0.37
  Tc(MIN.) =    8.51
  SUBAREA AREA(ACRES) =     1.92       SUBAREA RUNOFF(CFS) =    6.59
  EFFECTIVE AREA(ACRES) =      6.51     AREA-AVERAGED Fm(INCH/HR) =   0.35
```

```
  AREA-AVERAGED Fp(INCH/HR) =   0.44  AREA-AVERAGED Ap =   0.81
  TOTAL AREA(ACRES) =        6.5         PEAK FLOW RATE(CFS) =      22.78

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.75   FLOW VELOCITY(FEET/SEC.) =  12.09
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     22.00 =    1022.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     22.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    8.51
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.240
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.19      0.81     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.81
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.19      SUBAREA RUNOFF(CFS) =    0.71
  EFFECTIVE AREA(ACRES) =      6.70   AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.44  AREA-AVERAGED Ap =  0.79
  TOTAL AREA(ACRES) =        6.7       PEAK FLOW RATE(CFS) =      23.49

****************************************************************************
  FLOW PROCESS FROM NODE     22.00 TO NODE     23.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2740.01  DOWNSTREAM(FEET) =   2740.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0001
  NOTE: CHANNEL SLOPE OF .001 WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =      23.49
  FLOW VELOCITY(FEET/SEC) =   0.99 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.19   Tc(MIN.) =   10.69
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     23.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.69
  RAINFALL INTENSITY(INCH/HR) =   3.61
```

```
  AREA-AVERAGED Fm(INCH/HR) =  0.34
  AREA-AVERAGED Fp(INCH/HR) =  0.44
  AREA-AVERAGED Ap =  0.79
  EFFECTIVE STREAM AREA(ACRES) =       6.70
  TOTAL STREAM AREA(ACRES) =       6.70
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      23.49

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       14.28   13.97    2.995  0.43( 0.43) 1.00       5.7      12.00
      1       13.55   15.09    2.839  0.43( 0.43) 1.00       5.8      10.00
      2       23.49   10.69    3.612  0.44( 0.34) 0.79       6.7      20.00

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

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       37.04   10.69    3.612  0.43( 0.38) 0.87      11.1      20.00
      2       33.33   13.97    2.995  0.43( 0.38) 0.88      12.4      12.00
      3       31.48   15.09    2.839  0.43( 0.38) 0.89      12.5      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      37.04    Tc(MIN.) =    10.69
  EFFECTIVE AREA(ACRES) =      11.07   AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.87
  TOTAL AREA(ACRES) =       12.5
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     23.00 =    1152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     23.00 TO NODE     31.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2740.00  DOWNSTREAM(FEET) =   2733.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0493
  CHANNEL FLOW THRU SUBAREA(CFS) =      37.04
  FLOW VELOCITY(FEET/SEC) =   7.89 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =   11.00
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =    1294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.00
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.38
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  0.87
  EFFECTIVE STREAM AREA(ACRES) =      11.07
  TOTAL STREAM AREA(ACRES) =      12.50
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      37.04

****************************************************************************
  FLOW PROCESS FROM NODE     30.00 TO NODE     31.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   400.00
  ELEVATION DATA: UPSTREAM(FEET) =   2769.80  DOWNSTREAM(FEET) =   2733.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.294
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.984
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   ( 1.0%)   C        0.73      0.40     1.000    78    9.29
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.40
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      2.36
  TOTAL AREA(ACRES) =      0.73   PEAK FLOW RATE(CFS) =      2.36

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.29
  RAINFALL INTENSITY(INCH/HR) =   3.98
  AREA-AVERAGED Fm(INCH/HR) =  0.40
  AREA-AVERAGED Fp(INCH/HR) =  0.40
  AREA-AVERAGED Ap =  1.00
  EFFECTIVE STREAM AREA(ACRES) =       0.73
  TOTAL STREAM AREA(ACRES) =       0.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.36
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     40.00 TO NODE     41.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   238.00
  ELEVATION DATA: UPSTREAM(FEET) =   2781.00  DOWNSTREAM(FEET) =   2773.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    9.236
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  4.002
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.21      0.43     1.000    76    9.24
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      0.68
  TOTAL AREA(ACRES) =      0.21   PEAK FLOW RATE(CFS) =      0.68

****************************************************************************
  FLOW PROCESS FROM NODE     41.00 TO NODE     42.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) = 2773.00  DOWNSTREAM ELEVATION(FEET) = 2736.69
  STREET LENGTH(FEET) =   310.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 10.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.75
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.21
    HALFSTREET FLOOD WIDTH(FEET) =    4.39
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    5.62
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.20
  STREET FLOW TRAVEL TIME(MIN.) =   0.92   Tc(MIN.) =   10.15
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.745
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
```

```
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.17      0.81     0.100    50
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)  C        0.53      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.44
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.781
  SUBAREA AREA(ACRES) =    0.70      SUBAREA RUNOFF(CFS) =    2.14
  EFFECTIVE AREA(ACRES) =      0.91    AREA-AVERAGED Fm(INCH/HR) =  0.36
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.83
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.77

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.24   HALFSTREET FLOOD WIDTH(FEET) =   5.85
  FLOW VELOCITY(FEET/SEC.) =  6.02   DEPTH*VELOCITY(FT*FT/SEC.) =   1.46
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     42.00 =     548.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     42.00 TO NODE     43.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2736.69  DOWNSTREAM(FEET) =  2732.69
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.36
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.77
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =   10.24
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     43.00 =     601.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     43.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.24
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.723
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
     LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                C        0.27      0.81     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.81
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    0.89
  EFFECTIVE AREA(ACRES) =      1.18   AREA-AVERAGED Fm(INCH/HR) =  0.30
  AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.66
  TOTAL AREA(ACRES) =        1.2       PEAK FLOW RATE(CFS) =       3.64
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     43.00 TO NODE     44.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2732.69  DOWNSTREAM(FEET) =  2732.00
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.93
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.64
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =   10.83
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     44.00 =     741.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.10      0.81     0.100    50
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.81
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.100
  SUBAREA AREA(ACRES) =    0.10      SUBAREA RUNOFF(CFS) =    0.31
  EFFECTIVE AREA(ACRES) =      1.28   AREA-AVERAGED Fm(INCH/HR) =  0.28
  AREA-AVERAGED Fp(INCH/HR) =  0.45  AREA-AVERAGED Ap =  0.62
  TOTAL AREA(ACRES) =        1.3       PEAK FLOW RATE(CFS) =       3.80

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     44.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   10.83
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.579
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.32      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA AREA(ACRES) =    0.32      SUBAREA RUNOFF(CFS) =    0.91
  EFFECTIVE AREA(ACRES) =      1.60   AREA-AVERAGED Fm(INCH/HR) =  0.31
```

```
  AREA-AVERAGED Fp(INCH/HR) =  0.44  AREA-AVERAGED Ap =  0.70
  TOTAL AREA(ACRES) =        1.6       PEAK FLOW RATE(CFS) =       4.71

****************************************************************************
  FLOW PROCESS FROM NODE     44.00 TO NODE     31.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2736.00  DOWNSTREAM(FEET) =   2733.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    48.00   CHANNEL SLOPE =  0.0625
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.71
  FLOW VELOCITY(FEET/SEC) =   5.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.15   Tc(MIN.) =   10.99
  LONGEST FLOWPATH FROM NODE     40.00 TO NODE     31.00 =     789.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     31.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.99
  RAINFALL INTENSITY(INCH/HR) =   3.54
  AREA-AVERAGED Fm(INCH/HR) =  0.31
  AREA-AVERAGED Fp(INCH/HR) =  0.44
  AREA-AVERAGED Ap =  0.70
  EFFECTIVE STREAM AREA(ACRES) =       1.60
  TOTAL STREAM AREA(ACRES) =       1.60
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       4.71

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       37.04   11.00    3.542  0.43( 0.38) 0.87      11.1      20.00
      1       33.33   14.28    2.950  0.43( 0.38) 0.88      12.4      12.00
      1       31.48   15.40    2.798  0.43( 0.38) 0.89      12.5      10.00
      2        2.36    9.29    3.984  0.40( 0.40) 1.00       0.7      30.00
      3        4.71   10.99    3.544  0.44( 0.31) 0.70       1.6      40.00

  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       42.56    9.29    3.984  0.43( 0.37) 0.86      11.4      30.00
```

```
     2       43.81   10.99    3.544  0.43( 0.37) 0.86      13.4      40.00
     3       43.81   11.00    3.542  0.43( 0.37) 0.86      13.4      20.00
     4       38.85   14.28    2.950  0.43( 0.37) 0.87      14.7      12.00
     5       36.68   15.40    2.798  0.43( 0.38) 0.87      14.8      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      43.81    Tc(MIN.) =    11.00
  EFFECTIVE AREA(ACRES) =      13.40   AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.86
  TOTAL AREA(ACRES) =       14.8
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     31.00 =    1294.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     31.00 TO NODE     56.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2733.00  DOWNSTREAM(FEET) =   2722.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   273.00   CHANNEL SLOPE =  0.0403
  CHANNEL FLOW THRU SUBAREA(CFS) =      43.81
  FLOW VELOCITY(FEET/SEC) =   7.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.61   Tc(MIN.) =   11.60
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     56.00 =    1567.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.60
  RAINFALL INTENSITY(INCH/HR) =   3.41
  AREA-AVERAGED Fm(INCH/HR) =  0.37
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  0.86
  EFFECTIVE STREAM AREA(ACRES) =      13.40
  TOTAL STREAM AREA(ACRES) =      14.83
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      43.81

****************************************************************************
  FLOW PROCESS FROM NODE     50.00 TO NODE     51.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   700.00
  ELEVATION DATA: UPSTREAM(FEET) =   2812.00  DOWNSTREAM(FEET) =   2774.40
```

```
  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =   12.947
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.159
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        3.96      0.43     1.000    76   12.95
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  SUBAREA RUNOFF(CFS) =      9.74
  TOTAL AREA(ACRES) =      3.96   PEAK FLOW RATE(CFS) =      9.74

****************************************************************************
  FLOW PROCESS FROM NODE     51.00 TO NODE     52.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2774.40  DOWNSTREAM(FEET) =  2754.00
  FLOW LENGTH(FEET) =   439.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.77
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.74
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =   13.57
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     52.00 =    1139.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     52.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =   13.57
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  3.057
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.27      0.81     0.100    50
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        6.64      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.965
  SUBAREA AREA(ACRES) =    6.91      SUBAREA RUNOFF(CFS) =   16.45
  EFFECTIVE AREA(ACRES) =     10.87   AREA-AVERAGED Fm(INCH/HR) =  0.42
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.98
  TOTAL AREA(ACRES) =       10.9       PEAK FLOW RATE(CFS) =      25.83
```

```
****************************************************************************
  FLOW PROCESS FROM NODE     52.00 TO NODE     53.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2754.00  DOWNSTREAM(FEET) =   2727.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   324.00   CHANNEL SLOPE =  0.0833
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.981
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.18      0.81     0.100    50
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.51      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.44
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.765
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      26.65
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.77
  AVERAGE FLOW DEPTH(FEET) =   0.89   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =   14.07
  SUBAREA AREA(ACRES) =     0.69       SUBAREA RUNOFF(CFS) =    1.64
  EFFECTIVE AREA(ACRES) =     11.56     AREA-AVERAGED Fm(INCH/HR) =   0.41
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   0.96
  TOTAL AREA(ACRES) =       11.6         PEAK FLOW RATE(CFS) =      26.72

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =  10.80
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     53.00 =    1463.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     56.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   2728.00  DOWNSTREAM(FEET) =   2721.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    68.00   CHANNEL SLOPE =  0.1029
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.025   MAXIMUM DEPTH(FEET) =   5.00
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  2.967
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        1.38      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  1.000
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      28.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  11.81
  AVERAGE FLOW DEPTH(FEET) =   0.87   TRAVEL TIME(MIN.) =   0.10
  Tc(MIN.) =   14.17
  SUBAREA AREA(ACRES) =     1.38       SUBAREA RUNOFF(CFS) =    3.16
  EFFECTIVE AREA(ACRES) =     12.94     AREA-AVERAGED Fm(INCH/HR) =   0.41
  AREA-AVERAGED Fp(INCH/HR) =   0.43  AREA-AVERAGED Ap =   0.97
  TOTAL AREA(ACRES) =       12.9         PEAK FLOW RATE(CFS) =      29.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.89   FLOW VELOCITY(FEET/SEC.) =  12.02
  LONGEST FLOWPATH FROM NODE     50.00 TO NODE     56.00 =    1531.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   14.17
  RAINFALL INTENSITY(INCH/HR) =   2.97
  AREA-AVERAGED Fm(INCH/HR) =  0.41
  AREA-AVERAGED Fp(INCH/HR) =  0.43
  AREA-AVERAGED Ap =  0.97
  EFFECTIVE STREAM AREA(ACRES) =      12.94
  TOTAL STREAM AREA(ACRES) =      12.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      29.73

****************************************************************************
  FLOW PROCESS FROM NODE     53.00 TO NODE     54.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
  >>USE TIME-OF-CONCENTRATION NOMOGRAPH FOR INITIAL SUBAREA<<
============================================================================
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   172.00
  ELEVATION DATA: UPSTREAM(FEET) =   2739.00  DOWNSTREAM(FEET) =   2723.00

  Tc = K*[(LENGTH** 3.00)/(ELEVATION CHANGE)]**0.20
  SUBAREA ANALYSIS USED MINIMUM Tc(MIN.) =    5.000
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  6.150
  SUBAREA Tc AND LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS   Tc
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN  (MIN.)
  COMMERCIAL                 C        0.06      0.81     0.100    50    5.00
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.31      0.43     1.000    76    6.62
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.43
```

```
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.854
  SUBAREA RUNOFF(CFS) =      1.92
  TOTAL AREA(ACRES) =      0.37   PEAK FLOW RATE(CFS) =      1.92

****************************************************************************
  FLOW PROCESS FROM NODE     54.00 TO NODE     55.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2723.00  DOWNSTREAM(FEET) =  2722.50
  FLOW LENGTH(FEET) =    53.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.34
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.92
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    5.20
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     55.00 =     225.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     55.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  MAINLINE Tc(MIN.) =    5.20
  * 100 YEAR RAINFALL INTENSITY(INCH/HR) =  5.980
  SUBAREA LOSS RATE DATA(AMC  I ):
   DEVELOPMENT TYPE/      SCS SOIL   AREA      Fp         Ap     SCS
       LAND USE            GROUP   (ACRES)  (INCH/HR)  (DECIMAL)  CN
  COMMERCIAL                 C        0.03      0.81     0.100    50
  NATURAL DESERT COVER
  "DESERT BRUSH"   (15.0%)   C        0.02      0.43     1.000    76
  SUBAREA AVERAGE PERVIOUS LOSS RATE, Fp(INCH/HR) =  0.48
  SUBAREA AVERAGE PERVIOUS AREA FRACTION, Ap =  0.460
  SUBAREA AREA(ACRES) =    0.05      SUBAREA RUNOFF(CFS) =    0.26
  EFFECTIVE AREA(ACRES) =      0.42   AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.44  AREA-AVERAGED Ap =  0.81
  TOTAL AREA(ACRES) =        0.4       PEAK FLOW RATE(CFS) =       2.13

****************************************************************************
  FLOW PROCESS FROM NODE     55.00 TO NODE     56.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =  2722.50  DOWNSTREAM(FEET) =  2722.00
  FLOW LENGTH(FEET) =    16.80   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.78
```

```
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.13
  PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    5.24
  LONGEST FLOWPATH FROM NODE     53.00 TO NODE     56.00 =     241.80 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE     56.00 TO NODE     56.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.24
  RAINFALL INTENSITY(INCH/HR) =   5.95
  AREA-AVERAGED Fm(INCH/HR) =  0.35
  AREA-AVERAGED Fp(INCH/HR) =  0.44
  AREA-AVERAGED Ap =  0.81
  EFFECTIVE STREAM AREA(ACRES) =       0.42
  TOTAL STREAM AREA(ACRES) =       0.42
  PEAK FLOW RATE(CFS) AT CONFLUENCE =       2.13

  ** CONFLUENCE DATA **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       42.56    9.91    3.810  0.43( 0.37) 0.86      11.4      30.00
      1       43.81   11.60    3.413  0.43( 0.37) 0.86      13.4      40.00
      1       43.81   11.60    3.411  0.43( 0.37) 0.86      13.4      20.00
      1       38.85   14.91    2.862  0.43( 0.37) 0.87      14.7      12.00
      1       36.68   16.04    2.719  0.43( 0.38) 0.87      14.8      10.00
      2       29.73   14.17    2.967  0.43( 0.41) 0.97      12.9      50.00
      3        2.13    5.24    5.947  0.44( 0.35) 0.81       0.4      53.00

  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       62.53    5.24    5.947  0.43( 0.39) 0.90      11.3      53.00
      2       71.54    9.91    3.810  0.43( 0.39) 0.91      20.9      30.00
      3       73.56   11.60    3.413  0.43( 0.39) 0.90      24.4      40.00
      4       73.56   11.60    3.411  0.43( 0.39) 0.90      24.4      20.00
      5       70.69   14.17    2.967  0.43( 0.39) 0.91      27.8      50.00
      6       68.31   14.91    2.862  0.43( 0.39) 0.91      28.1      12.00
      7       64.42   16.04    2.719  0.43( 0.39) 0.91      28.2      10.00

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      73.56    Tc(MIN.) =    11.60
```

```
  EFFECTIVE AREA(ACRES) =      24.42   AREA-AVERAGED Fm(INCH/HR) =  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap =  0.90
  TOTAL AREA(ACRES) =       28.2
  LONGEST FLOWPATH FROM NODE     20.00 TO NODE     56.00 =    1567.00 FEET.
==============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       28.2  TC(MIN.) =     11.60
  EFFECTIVE AREA(ACRES) =     24.42  AREA-AVERAGED Fm(INCH/HR)=  0.39
  AREA-AVERAGED Fp(INCH/HR) =  0.43  AREA-AVERAGED Ap = 0.905
  PEAK FLOW RATE(CFS)   =      73.56

  ** PEAK FLOW RATE TABLE **
   STREAM       Q      Tc   Intensity   Fp(Fm)     Ap     Ae     HEADWATER
   NUMBER     (CFS)  (MIN.) (INCH/HR) (INCH/HR)         (ACRES)    NODE
      1       62.53    5.24    5.947  0.43( 0.39) 0.90      11.3      53.00
      2       71.54    9.91    3.810  0.43( 0.39) 0.91      20.9      30.00
      3       73.56   11.60    3.413  0.43( 0.39) 0.90      24.4      40.00
      4       73.56   11.60    3.411  0.43( 0.39) 0.90      24.4      20.00
      5       70.69   14.17    2.967  0.43( 0.39) 0.91      27.8      50.00
      6       68.31   14.91    2.862  0.43( 0.39) 0.91      28.1      12.00
      7       64.42   16.04    2.719  0.43( 0.39) 0.91      28.2      10.00
==============================================================================
==============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Hydrographs

Hydrograph - Basin B Tributary to Infiltration Basin 1 - 100 Year Storm Event

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

   TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.28 (inches)

   SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
     TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
       1         5.11      100.00       90.(AMC II)     0.400       0.406
       2         0.32        0.00       98.(AMC II)     0.000       0.929
       3         1.27      100.00       91.(AMC II)     0.370       0.446

   TOTAL AREA (Acres) =      6.70

   AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.381

   AREA-AVERAGED LOW LOSS FRACTION, Y = 0.569
==============================================================================



   RATIONAL METHOD CALIBRATION COEFFICIENT = 1.05
   TOTAL CATCHMENT AREA(ACRES) =    6.70
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.381
   LOW LOSS FRACTION = 0.569
   TIME OF CONCENTRATION(MIN.) =  8.51
   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) =  0.41
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.95
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.08
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.57
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.02
    24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.28

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

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.02
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.81

****************************************************************************
  TIME     VOLUME       Q    0.        7.5       15.0       22.5       30.0
 (HOURS)    (AF)      (CFS)
----------------------------------------------------------------------------
  0.11     0.0009     0.15  Q         .         .         .         .
  0.26     0.0026     0.15  Q         .         .         .         .
  0.40     0.0043     0.15  Q         .         .         .         .
  0.54     0.0060     0.15  Q         .         .         .         .
  0.68     0.0077     0.15  Q         .         .         .         .
  0.82     0.0095     0.15  Q         .         .         .         .
  0.97     0.0113     0.15  Q         .         .         .         .
  1.11     0.0130     0.15  Q         .         .         .         .
```

1.25	0.0148	0.15	Q	.	.	.	.
1.39	0.0166	0.15	Q	.	.	.	.
1.53	0.0184	0.15	Q	.	.	.	.
1.67	0.0202	0.16	Q	.	.	.	.
1.82	0.0220	0.16	Q	.	.	.	.
1.96	0.0239	0.16	Q	.	.	.	.
2.10	0.0257	0.16	Q	.	.	.	.
2.24	0.0276	0.16	Q	.	.	.	.
2.38	0.0295	0.16	Q	.	.	.	.
2.53	0.0314	0.16	Q	.	.	.	.
2.67	0.0333	0.16	Q	.	.	.	.
2.81	0.0352	0.16	Q	.	.	.	.
2.95	0.0371	0.16	Q	.	.	.	.
3.09	0.0390	0.17	Q	.	.	.	.
3.23	0.0410	0.17	Q	.	.	.	.
3.38	0.0430	0.17	Q	.	.	.	.
3.52	0.0450	0.17	Q	.	.	.	.
3.66	0.0470	0.17	Q	.	.	.	.
3.80	0.0490	0.17	Q	.	.	.	.
3.94	0.0510	0.17	Q	.	.	.	.
4.09	0.0530	0.17	Q	.	.	.	.
4.23	0.0551	0.18	Q	.	.	.	.
4.37	0.0572	0.18	Q	.	.	.	.
4.51	0.0593	0.18	Q	.	.	.	.
4.65	0.0614	0.18	Q	.	.	.	.
4.80	0.0635	0.18	Q	.	.	.	.
4.94	0.0656	0.18	Q	.	.	.	.
5.08	0.0678	0.19	Q	.	.	.	.
5.22	0.0700	0.19	Q	.	.	.	.
5.36	0.0722	0.19	Q	.	.	.	.
5.50	0.0744	0.19	Q	.	.	.	.
5.65	0.0766	0.19	Q	.	.	.	.
5.79	0.0789	0.19	Q	.	.	.	.
5.93	0.0812	0.20	Q	.	.	.	.
6.07	0.0834	0.20	Q	.	.	.	.
6.21	0.0858	0.20	Q	.	.	.	.
6.36	0.0881	0.20	Q	.	.	.	.
6.50	0.0905	0.20	Q	.	.	.	.
6.64	0.0928	0.20	Q	.	.	.	.
6.78	0.0953	0.21	Q	.	.	.	.
6.92	0.0977	0.21	Q	.	.	.	.
7.06	0.1001	0.21	Q	.	.	.	.
7.21	0.1026	0.21	Q	.	.	.	.
7.35	0.1051	0.22	Q	.	.	.	.
7.49	0.1077	0.22	Q	.	.	.	.
7.63	0.1102	0.22	Q	.	.	.	.
7.77	0.1128	0.22	Q	.	.	.	.
7.92	0.1154	0.22	Q	.	.	.	.
8.06	0.1181	0.23	Q	.	.	.	.
8.20	0.1207	0.23	Q	.	.	.	.
8.34	0.1235	0.23	Q	.	.	.	.
8.48	0.1262	0.24	Q	.	.	.	.
8.62	0.1290	0.24	Q	.	.	.	.
8.77	0.1318	0.24	Q	.	.	.	.
8.91	0.1346	0.24	Q	.	.	.	.

9.05	0.1375	0.25	Q	.	.	.	.
9.19	0.1404	0.25	Q	.	.	.	.
9.33	0.1434	0.25	Q	.	.	.	.
9.48	0.1464	0.26	Q	.	.	.	.
9.62	0.1494	0.26	Q	.	.	.	.
9.76	0.1525	0.26	Q	.	.	.	.
9.90	0.1556	0.27	Q	.	.	.	.
10.04	0.1588	0.27	Q	.	.	.	.
10.18	0.1620	0.28	Q	.	.	.	.
10.33	0.1653	0.28	Q	.	.	.	.
10.47	0.1686	0.29	Q	.	.	.	.
10.61	0.1720	0.29	Q	.	.	.	.
10.75	0.1754	0.30	Q	.	.	.	.
10.89	0.1789	0.30	Q	.	.	.	.
11.04	0.1825	0.31	Q	.	.	.	.
11.18	0.1861	0.31	Q	.	.	.	.
11.32	0.1898	0.32	Q	.	.	.	.
11.46	0.1936	0.32	Q	.	.	.	.
11.60	0.1974	0.33	Q	.	.	.	.
11.74	0.2013	0.34	Q	.	.	.	.
11.89	0.2053	0.35	Q	.	.	.	.
12.03	0.2094	0.35	Q	.	.	.	.
12.17	0.2137	0.38	Q	.	.	.	.
12.31	0.2182	0.38	Q	.	.	.	.
12.45	0.2227	0.40	Q	.	.	.	.
12.60	0.2274	0.40	Q	.	.	.	.
12.74	0.2322	0.42	Q	.	.	.	.
12.88	0.2371	0.42	Q	.	.	.	.
13.02	0.2422	0.44	Q	.	.	.	.
13.16	0.2474	0.45	Q	.	.	.	.
13.31	0.2528	0.47	Q	.	.	.	.
13.45	0.2583	0.48	Q	.	.	.	.
13.59	0.2641	0.50	Q	.	.	.	.
13.73	0.2700	0.51	Q	.	.	.	.
13.87	0.2762	0.54	Q	.	.	.	.
14.01	0.2826	0.56	Q	.	.	.	.
14.16	0.2891	0.55	Q	.	.	.	.
14.30	0.2957	0.57	Q	.	.	.	.
14.44	0.3027	0.61	Q	.	.	.	.
14.58	0.3100	0.64	Q	.	.	.	.
14.72	0.3179	0.70	Q	.	.	.	.
14.87	0.3262	0.73	Q	.	.	.	.
15.01	0.3352	0.81	.Q	.	.	.	.
15.15	0.3450	0.86	.Q	.	.	.	.
15.29	0.3559	0.99	.Q	.	.	.	.
15.43	0.3678	1.05	.Q	.	.	.	.
15.57	0.3783	0.75	Q	.	.	.	.
15.72	0.3879	0.88	.Q	.	.	.	.
15.86	0.4217	4.90	.	Q	.	.	.
16.00	0.4936	7.37	.	Q.	.	.	.
16.14	0.6745	23.49	.	.	.	.Q	.
16.28	0.8237	1.97	. Q	.	.	.	.
16.43	0.8390	0.65	Q	.	.	.	.
16.57	0.8482	0.92	.Q	.	.	.	.
16.71	0.8581	0.77	.Q	.	.	.	.

16.85	0.8665	0.67	Q	.	.	.	.
16.99	0.8739	0.59	Q	.	.	.	.
17.13	0.8807	0.57	Q	.	.	.	.
17.28	0.8871	0.53	Q	.	.	.	.
17.42	0.8931	0.49	Q	.	.	.	.
17.56	0.8986	0.46	Q	.	.	.	.
17.70	0.9038	0.43	Q	.	.	.	.
17.84	0.9088	0.41	Q	.	.	.	.
17.99	0.9134	0.39	Q	.	.	.	.
18.13	0.9178	0.36	Q	.	.	.	.
18.27	0.9220	0.34	Q	.	.	.	.
18.41	0.9259	0.33	Q	.	.	.	.
18.55	0.9297	0.32	Q	.	.	.	.
18.69	0.9333	0.30	Q	.	.	.	.
18.84	0.9368	0.29	Q	.	.	.	.
18.98	0.9402	0.28	Q	.	.	.	.
19.12	0.9434	0.27	Q	.	.	.	.
19.26	0.9466	0.27	Q	.	.	.	.
19.40	0.9497	0.26	Q	.	.	.	.
19.55	0.9527	0.25	Q	.	.	.	.
19.69	0.9556	0.25	Q	.	.	.	.
19.83	0.9585	0.24	Q	.	.	.	.
19.97	0.9612	0.23	Q	.	.	.	.
20.11	0.9639	0.23	Q	.	.	.	.
20.26	0.9666	0.22	Q	.	.	.	.
20.40	0.9692	0.22	Q	.	.	.	.
20.54	0.9717	0.21	Q	.	.	.	.
20.68	0.9742	0.21	Q	.	.	.	.
20.82	0.9766	0.21	Q	.	.	.	.
20.96	0.9790	0.20	Q	.	.	.	.
21.11	0.9813	0.20	Q	.	.	.	.
21.25	0.9836	0.19	Q	.	.	.	.
21.39	0.9859	0.19	Q	.	.	.	.
21.53	0.9881	0.19	Q	.	.	.	.
21.67	0.9903	0.18	Q	.	.	.	.
21.82	0.9924	0.18	Q	.	.	.	.
21.96	0.9945	0.18	Q	.	.	.	.
22.10	0.9966	0.18	Q	.	.	.	.
22.24	0.9987	0.17	Q	.	.	.	.
22.38	1.0007	0.17	Q	.	.	.	.
22.52	1.0026	0.17	Q	.	.	.	.
22.67	1.0046	0.17	Q	.	.	.	.
22.81	1.0065	0.16	Q	.	.	.	.
22.95	1.0084	0.16	Q	.	.	.	.
23.09	1.0103	0.16	Q	.	.	.	.
23.23	1.0122	0.16	Q	.	.	.	.
23.38	1.0140	0.15	Q	.	.	.	.
23.52	1.0158	0.15	Q	.	.	.	.
23.66	1.0176	0.15	Q	.	.	.	.
23.80	1.0193	0.15	Q	.	.	.	.
23.94	1.0211	0.15	Q	.	.	.	.
24.08	1.0228	0.15	Q	.	.	.	.
24.23	1.0236	0.00	Q	.	.	.	.

Routed Hydrograph - Basin B Routed Thru Infiltration Basin 1 - 100 Year Storm Event

==========:

FLOW-THROUGH DETENTION BASIN MODEL

SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
CONSTANT HYDROGRAPH TIME UNIT(MINUTES) = 8.510
DEAD STORAGE(AF) = 0.00
SPECIFIED DEAD STORAGE(AF) FILLED = 0.00
ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN = 0.00

```
            INFLOW
              |
              |
              |
              V              __effective depth
        -------------         |   (and volume)
        |          |    |    |
        | detention |    |....V.............
        |   basin   |<-->|          outflow
        |          |    |.........__________
        -------------    |         |   \
              |          | storage |     basin outlet
              V          -----------
            OUTFLOW
```

DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES = 3
*BASIN-DEPTH STORAGE OUTFLOW **BASIN-DEPTH STORAGE OUTFLOW *
* (FEET) (ACRE-FEET) (CFS) ** (FEET) (ACRE-FEET) (CFS) *
* 0.000 0.000 0.000** 1.000 0.250 0.010*
* 2.000 0.530 23.490**

BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:

INTERVAL NUMBER	DEPTH (FEET)	{S-O*DT/2} (ACRE-FEET)	{S+O*DT/2} (ACRE-FEET)
1	0.00	0.00000	0.00000
2	1.00	0.24994	0.25006
3	2.00	0.39233	0.66767

WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)

DETENTION BASIN ROUTING RESULTS:
NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

TIME (HRS)	DEAD-STORAGE FILLED(AF)	INFLOW (CFS)	EFFECTIVE DEPTH(FT)	OUTFLOW (CFS)	EFFECTIVE VOLUME(AF)
0.115	0.000	0.15	0.01	0.00	0.002
0.256	0.000	0.15	0.01	0.00	0.003
0.398	0.000	0.15	0.02	0.00	0.005
0.540	0.000	0.15	0.03	0.00	0.007
0.682	0.000	0.15	0.03	0.00	0.009

0.824	0.000	0.15	0.04	0.00	0.010
0.966	0.000	0.15	0.05	0.00	0.012
1.107	0.000	0.15	0.06	0.00	0.014
1.249	0.000	0.15	0.06	0.00	0.016
1.391	0.000	0.15	0.07	0.00	0.017
1.533	0.000	0.15	0.08	0.00	0.019
1.675	0.000	0.16	0.08	0.00	0.021
1.817	0.000	0.16	0.09	0.00	0.023
1.958	0.000	0.16	0.10	0.00	0.025
2.100	0.000	0.16	0.11	0.00	0.027
2.242	0.000	0.16	0.11	0.00	0.028
2.384	0.000	0.16	0.12	0.00	0.030
2.526	0.000	0.16	0.13	0.00	0.032
2.668	0.000	0.16	0.14	0.00	0.034
2.809	0.000	0.16	0.14	0.00	0.036
2.951	0.000	0.16	0.15	0.00	0.038
3.093	0.000	0.17	0.16	0.00	0.040
3.235	0.000	0.17	0.17	0.00	0.042
3.377	0.000	0.17	0.17	0.00	0.044
3.519	0.000	0.17	0.18	0.00	0.046
3.660	0.000	0.17	0.19	0.00	0.048
3.802	0.000	0.17	0.20	0.00	0.050
3.944	0.000	0.17	0.21	0.00	0.052
4.086	0.000	0.17	0.21	0.00	0.054
4.228	0.000	0.18	0.22	0.00	0.056
4.370	0.000	0.18	0.23	0.00	0.058
4.511	0.000	0.18	0.24	0.00	0.060
4.653	0.000	0.18	0.25	0.00	0.062
4.795	0.000	0.18	0.26	0.00	0.064
4.937	0.000	0.18	0.26	0.00	0.066
5.079	0.000	0.19	0.27	0.00	0.068
5.221	0.000	0.19	0.28	0.00	0.070
5.362	0.000	0.19	0.29	0.00	0.073
5.504	0.000	0.19	0.30	0.00	0.075
5.646	0.000	0.19	0.31	0.00	0.077
5.788	0.000	0.19	0.32	0.00	0.079
5.930	0.000	0.20	0.33	0.00	0.082
6.072	0.000	0.20	0.34	0.00	0.084
6.214	0.000	0.20	0.34	0.00	0.086
6.355	0.000	0.20	0.35	0.00	0.088
6.497	0.000	0.20	0.36	0.00	0.091
6.639	0.000	0.20	0.37	0.00	0.093
6.781	0.000	0.21	0.38	0.00	0.095
6.923	0.000	0.21	0.39	0.00	0.098
7.064	0.000	0.21	0.40	0.00	0.100
7.206	0.000	0.21	0.41	0.00	0.103
7.348	0.000	0.22	0.42	0.00	0.105
7.490	0.000	0.22	0.43	0.00	0.108
7.632	0.000	0.22	0.44	0.00	0.110
7.774	0.000	0.22	0.45	0.00	0.113
7.915	0.000	0.22	0.46	0.00	0.115
8.057	0.000	0.23	0.47	0.00	0.118
8.199	0.000	0.23	0.48	0.00	0.121
8.341	0.000	0.23	0.49	0.00	0.123
8.483	0.000	0.24	0.50	0.00	0.126

8.625	0.000	0.24	0.51	0.01	0.129
8.766	0.000	0.24	0.53	0.01	0.131
8.908	0.000	0.24	0.54	0.01	0.134
9.050	0.000	0.25	0.55	0.01	0.137
9.192	0.000	0.25	0.56	0.01	0.140
9.334	0.000	0.25	0.57	0.01	0.143
9.476	0.000	0.26	0.58	0.01	0.146
9.617	0.000	0.26	0.60	0.01	0.149
9.759	0.000	0.26	0.61	0.01	0.152
9.901	0.000	0.27	0.62	0.01	0.155
10.043	0.000	0.27	0.63	0.01	0.158
10.185	0.000	0.28	0.64	0.01	0.161
10.327	0.000	0.28	0.66	0.01	0.164
10.469	0.000	0.29	0.67	0.01	0.168
10.610	0.000	0.29	0.68	0.01	0.171
10.752	0.000	0.30	0.70	0.01	0.174
10.894	0.000	0.30	0.71	0.01	0.178
11.036	0.000	0.31	0.73	0.01	0.181
11.178	0.000	0.31	0.74	0.01	0.185
11.319	0.000	0.32	0.75	0.01	0.189
11.461	0.000	0.32	0.77	0.01	0.192
11.603	0.000	0.33	0.78	0.01	0.196
11.745	0.000	0.34	0.80	0.01	0.200
11.887	0.000	0.35	0.82	0.01	0.204
12.029	0.000	0.35	0.83	0.01	0.208
12.170	0.000	0.38	0.85	0.01	0.212
12.312	0.000	0.38	0.87	0.01	0.217
12.454	0.000	0.40	0.88	0.01	0.221
12.596	0.000	0.40	0.90	0.01	0.226
12.738	0.000	0.42	0.92	0.01	0.231
12.880	0.000	0.42	0.94	0.01	0.235
13.021	0.000	0.44	0.96	0.01	0.240
13.163	0.000	0.45	0.98	0.01	0.246
13.305	0.000	0.47	1.00	0.04	0.251
13.447	0.000	0.48	1.01	0.20	0.254
13.589	0.000	0.50	1.02	0.39	0.255
13.731	0.000	0.51	1.02	0.47	0.256
13.872	0.000	0.54	1.02	0.51	0.256
14.014	0.000	0.56	1.02	0.53	0.256
14.156	0.000	0.55	1.02	0.55	0.256
14.298	0.000	0.57	1.02	0.56	0.257
14.440	0.000	0.61	1.03	0.58	0.257
14.582	0.000	0.64	1.03	0.61	0.257
14.723	0.000	0.70	1.03	0.65	0.258
14.865	0.000	0.73	1.03	0.69	0.258
15.007	0.000	0.81	1.03	0.74	0.259
15.149	0.000	0.86	1.03	0.80	0.260
15.291	0.000	0.99	1.04	0.88	0.261
15.433	0.000	1.05	1.04	0.97	0.262
15.574	0.000	0.75	1.04	0.92	0.260
15.716	0.000	0.88	1.04	0.85	0.260
15.858	0.000	4.90	1.15	2.19	0.292
16.000	0.000	7.37	1.26	4.79	0.322
16.142	0.000	23.49	1.75	11.80	0.459
16.284	0.000	1.97	1.31	12.41	0.337

16.426	0.000	0.65	1.12	5.09	0.285
16.567	0.000	0.92	1.07	2.25	0.269
16.709	0.000	0.77	1.04	1.32	0.262
16.851	0.000	0.67	1.03	0.92	0.259
16.993	0.000	0.59	1.03	0.73	0.258
17.135	0.000	0.57	1.03	0.63	0.257
17.276	0.000	0.53	1.02	0.58	0.256
17.418	0.000	0.49	1.02	0.53	0.256
17.560	0.000	0.46	1.02	0.49	0.256
17.702	0.000	0.43	1.02	0.46	0.255
17.844	0.000	0.41	1.02	0.43	0.255
17.986	0.000	0.39	1.02	0.41	0.255
18.128	0.000	0.36	1.02	0.39	0.254
18.269	0.000	0.34	1.01	0.36	0.254
18.411	0.000	0.33	1.01	0.34	0.254
18.553	0.000	0.32	1.01	0.33	0.254
18.695	0.000	0.30	1.01	0.32	0.254
18.837	0.000	0.29	1.01	0.30	0.253
18.978	0.000	0.28	1.01	0.29	0.253
19.120	0.000	0.27	1.01	0.28	0.253
19.262	0.000	0.27	1.01	0.28	0.253
19.404	0.000	0.26	1.01	0.27	0.253
19.546	0.000	0.25	1.01	0.26	0.253
19.688	0.000	0.25	1.01	0.25	0.253
19.830	0.000	0.24	1.01	0.25	0.253
19.971	0.000	0.23	1.01	0.24	0.253
20.113	0.000	0.23	1.01	0.23	0.253
20.255	0.000	0.22	1.01	0.23	0.253
20.397	0.000	0.22	1.01	0.22	0.253
20.539	0.000	0.21	1.01	0.22	0.252
20.681	0.000	0.21	1.01	0.21	0.252
20.822	0.000	0.21	1.01	0.21	0.252
20.964	0.000	0.20	1.01	0.21	0.252
21.106	0.000	0.20	1.01	0.20	0.252
21.248	0.000	0.19	1.01	0.20	0.252
21.390	0.000	0.19	1.01	0.19	0.252
21.531	0.000	0.19	1.01	0.19	0.252
21.673	0.000	0.18	1.01	0.19	0.252
21.815	0.000	0.18	1.01	0.18	0.252
21.957	0.000	0.18	1.01	0.18	0.252
22.099	0.000	0.18	1.01	0.18	0.252
22.241	0.000	0.17	1.01	0.18	0.252
22.382	0.000	0.17	1.01	0.17	0.252
22.524	0.000	0.17	1.01	0.17	0.252
22.666	0.000	0.17	1.01	0.17	0.252
22.808	0.000	0.16	1.01	0.17	0.252
22.950	0.000	0.16	1.01	0.16	0.252
23.092	0.000	0.16	1.01	0.16	0.252
23.233	0.000	0.16	1.01	0.16	0.252
23.375	0.000	0.15	1.01	0.16	0.252
23.517	0.000	0.15	1.01	0.15	0.252
23.659	0.000	0.15	1.01	0.15	0.252
23.801	0.000	0.15	1.01	0.15	0.252
23.943	0.000	0.15	1.01	0.15	0.252
24.085	0.000	0.15	1.01	0.15	0.252

24.226	0.000	0.00	1.00	0.10	0.250

Hydrograph - Basin D Tributary to Infiltration Basin 2 - 100 Year Storm Event

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

    TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.28 (inches)

    SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
      TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
        1         1.08      100.00       90.(AMC II)     0.400       0.406
        2         0.52        0.00       98.(AMC II)     0.000       0.929

    TOTAL AREA (Acres) =      1.60

    AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.272

    AREA-AVERAGED LOW LOSS FRACTION, Y = 0.426
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-----------------------------------------------------------------------------


    RATIONAL METHOD CALIBRATION COEFFICIENT = 0.98
    TOTAL CATCHMENT AREA(ACRES) =    1.60
    SOIL-LOSS RATE, Fm,(INCH/HR) =  0.272
    LOW LOSS FRACTION = 0.426
    TIME OF CONCENTRATION(MIN.) = 10.83
    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) =  0.41
     30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.95
      1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.08
      3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.57
      6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.02
     24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.28

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    TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     0.28
    TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     0.16

 ******************************************************************************
  TIME     VOLUME       Q    0.        2.5       5.0       7.5      10.0
 (HOURS)    (AF)      (CFS)
 ------------------------------------------------------------------------------
  0.12     0.0000      0.00  Q         .         .         .         .
  0.30     0.0003      0.04  Q         .         .         .         .
  0.48     0.0010      0.04  Q         .         .         .         .
  0.66     0.0016      0.04  Q         .         .         .         .
  0.84     0.0023      0.04  Q         .         .         .         .
  1.02     0.0030      0.04  Q         .         .         .         .
  1.20     0.0036      0.05  Q         .         .         .         .
  1.38     0.0043      0.05  Q         .         .         .         .
  1.56     0.0050      0.05  Q         .         .         .         .
```

1.74	0.0057	0.05	Q	.	.	.	.
1.92	0.0064	0.05	Q	.	.	.	.
2.10	0.0071	0.05	Q	.	.	.	.
2.28	0.0078	0.05	Q	.	.	.	.
2.46	0.0085	0.05	Q	.	.	.	.
2.64	0.0092	0.05	Q	.	.	.	.
2.82	0.0099	0.05	Q	.	.	.	.
3.00	0.0106	0.05	Q	.	.	.	.
3.18	0.0114	0.05	Q	.	.	.	.
3.37	0.0121	0.05	Q	.	.	.	.
3.55	0.0129	0.05	Q	.	.	.	.
3.73	0.0136	0.05	Q	.	.	.	.
3.91	0.0144	0.05	Q	.	.	.	.
4.09	0.0151	0.05	Q	.	.	.	.
4.27	0.0159	0.05	Q	.	.	.	.
4.45	0.0167	0.05	Q	.	.	.	.
4.63	0.0175	0.05	Q	.	.	.	.
4.81	0.0183	0.05	Q	.	.	.	.
4.99	0.0191	0.05	Q	.	.	.	.
5.17	0.0199	0.06	Q	.	.	.	.
5.35	0.0208	0.06	Q	.	.	.	.
5.53	0.0216	0.06	Q	.	.	.	.
5.71	0.0224	0.06	Q	.	.	.	.
5.89	0.0233	0.06	Q	.	.	.	.
6.07	0.0242	0.06	Q	.	.	.	.
6.25	0.0250	0.06	Q	.	.	.	.
6.43	0.0259	0.06	Q	.	.	.	.
6.61	0.0268	0.06	Q	.	.	.	.
6.79	0.0277	0.06	Q	.	.	.	.
6.97	0.0286	0.06	Q	.	.	.	.
7.16	0.0296	0.06	Q	.	.	.	.
7.34	0.0305	0.06	Q	.	.	.	.
7.52	0.0315	0.06	Q	.	.	.	.
7.70	0.0324	0.07	Q	.	.	.	.
7.88	0.0334	0.07	Q	.	.	.	.
8.06	0.0344	0.07	Q	.	.	.	.
8.24	0.0354	0.07	Q	.	.	.	.
8.42	0.0364	0.07	Q	.	.	.	.
8.60	0.0375	0.07	Q	.	.	.	.
8.78	0.0385	0.07	Q	.	.	.	.
8.96	0.0396	0.07	Q	.	.	.	.
9.14	0.0407	0.07	Q	.	.	.	.
9.32	0.0418	0.08	Q	.	.	.	.
9.50	0.0429	0.08	Q	.	.	.	.
9.68	0.0441	0.08	Q	.	.	.	.
9.86	0.0453	0.08	Q	.	.	.	.
10.04	0.0465	0.08	Q	.	.	.	.
10.22	0.0477	0.08	Q	.	.	.	.
10.40	0.0489	0.08	Q	.	.	.	.
10.59	0.0502	0.09	Q	.	.	.	.
10.77	0.0515	0.09	Q	.	.	.	.
10.95	0.0528	0.09	Q	.	.	.	.
11.13	0.0541	0.09	Q	.	.	.	.
11.31	0.0555	0.09	Q	.	.	.	.
11.49	0.0569	0.10	Q	.	.	.	.

11.67	0.0584	0.10	Q	.	.	.	.
11.85	0.0599	0.10	Q	.	.	.	.
12.03	0.0614	0.10	Q	.	.	.	.
12.21	0.0630	0.11	Q	.	.	.	.
12.39	0.0647	0.11	Q	.	.	.	.
12.57	0.0665	0.12	Q	.	.	.	.
12.75	0.0683	0.12	Q	.	.	.	.
12.93	0.0701	0.13	Q	.	.	.	.
13.11	0.0721	0.13	Q	.	.	.	.
13.29	0.0741	0.14	Q	.	.	.	.
13.47	0.0761	0.14	Q	.	.	.	.
13.65	0.0783	0.15	Q	.	.	.	.
13.83	0.0806	0.16	Q	.	.	.	.
14.01	0.0830	0.17	Q	.	.	.	.
14.20	0.0855	0.17	Q	.	.	.	.
14.38	0.0880	0.18	Q	.	.	.	.
14.56	0.0907	0.18	Q	.	.	.	.
14.74	0.0936	0.21	Q	.	.	.	.
14.92	0.0968	0.22	Q	.	.	.	.
15.10	0.1003	0.25	.Q	.	.	.	.
15.28	0.1042	0.27	.Q	.	.	.	.
15.46	0.1081	0.25	.Q	.	.	.	.
15.64	0.1115	0.21	Q	.	.	.	.
15.82	0.1196	0.87	. Q	.	.	.	.
16.00	0.1376	1.54	. Q	.	.	.	.
16.18	0.1842	4.71	.	.	Q	.	.
16.36	0.2213	0.26	.Q	.	.	.	.
16.54	0.2255	0.30	.Q	.	.	.	.
16.72	0.2294	0.23	Q	.	.	.	.
16.90	0.2326	0.19	Q	.	.	.	.
17.08	0.2353	0.17	Q	.	.	.	.
17.26	0.2378	0.16	Q	.	.	.	.
17.44	0.2401	0.15	Q	.	.	.	.
17.62	0.2422	0.13	Q	.	.	.	.
17.81	0.2441	0.12	Q	.	.	.	.
17.99	0.2459	0.12	Q	.	.	.	.
18.17	0.2475	0.11	Q	.	.	.	.
18.35	0.2491	0.10	Q	.	.	.	.
18.53	0.2505	0.10	Q	.	.	.	.
18.71	0.2519	0.09	Q	.	.	.	.
18.89	0.2533	0.09	Q	.	.	.	.
19.07	0.2545	0.08	Q	.	.	.	.
19.25	0.2557	0.08	Q	.	.	.	.
19.43	0.2569	0.08	Q	.	.	.	.
19.61	0.2580	0.07	Q	.	.	.	.
19.79	0.2591	0.07	Q	.	.	.	.
19.97	0.2602	0.07	Q	.	.	.	.
20.15	0.2612	0.07	Q	.	.	.	.
20.33	0.2622	0.07	Q	.	.	.	.
20.51	0.2632	0.06	Q	.	.	.	.
20.69	0.2641	0.06	Q	.	.	.	.
20.87	0.2650	0.06	Q	.	.	.	.
21.05	0.2659	0.06	Q	.	.	.	.
21.23	0.2668	0.06	Q	.	.	.	.
21.42	0.2677	0.06	Q	.	.	.	.

21.60	0.2685	0.06	Q	.	.	.	.
21.78	0.2693	0.05	Q	.	.	.	.
21.96	0.2701	0.05	Q	.	.	.	.
22.14	0.2709	0.05	Q	.	.	.	.
22.32	0.2717	0.05	Q	.	.	.	.
22.50	0.2724	0.05	Q	.	.	.	.
22.68	0.2732	0.05	Q	.	.	.	.
22.86	0.2739	0.05	Q	.	.	.	.
23.04	0.2746	0.05	Q	.	.	.	.
23.22	0.2753	0.05	Q	.	.	.	.
23.40	0.2760	0.05	Q	.	.	.	.
23.58	0.2767	0.05	Q	.	.	.	.
23.76	0.2774	0.04	Q	.	.	.	.
23.94	0.2780	0.04	Q	.	.	.	.
24.12	0.2787	0.04	Q	.	.	.	.
24.30	0.2790	0.00	Q	.	.	.	.

Routed Hydrograph - Basin D Routed Thru Infiltration Basin 2 - 100 Year Storm Event

```
==============================================================================:
    FLOW-THROUGH DETENTION BASIN MODEL

    SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
    CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   10.830
    DEAD STORAGE(AF) =       0.00
    SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
    ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


                INFLOW
                  |
                  |
                  |
                  V                __effective depth
             -------------         |   (and volume)
             |           |    |    |
             | detention |    |....V.............
             |   basin   |<-->|          outflow
             |           |    |.........__________
             -------------    |         |   \
                  |           | storage |     basin outlet
                  V           -----------
                OUTFLOW


    DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
    TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   4
    *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
    *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
    *      0.000      0.000      0.000**      1.000      0.010      0.010*
    *      2.000      0.030      0.010**      3.000      0.070      4.710*
-----------------------------------------------------------------------------
    BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
     INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
      NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
         1     0.00       0.00000      0.00000
         2     1.00       0.00993      0.01007
         3     2.00       0.02993      0.03007
         4     3.00       0.03487      0.10513
    WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
-----------------------------------------------------------------------------
    DETENTION BASIN ROUTING RESULTS:
    NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
          OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
          AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

       TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
      (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
-----------------------------------------------------------------------------
      0.116       0.000     0.00      0.00     0.00      0.000
      0.297       0.000     0.04      0.06     0.00      0.001
      0.477       0.000     0.04      0.13     0.00      0.001
      0.658       0.000     0.04      0.19     0.00      0.002
```

0.838	0.000	0.04	0.25	0.00	0.003
1.019	0.000	0.04	0.32	0.00	0.003
1.199	0.000	0.05	0.38	0.00	0.004
1.380	0.000	0.05	0.44	0.00	0.004
1.560	0.000	0.05	0.50	0.00	0.005
1.741	0.000	0.05	0.56	0.01	0.006
1.921	0.000	0.05	0.62	0.01	0.006
2.102	0.000	0.05	0.68	0.01	0.007
2.282	0.000	0.05	0.74	0.01	0.007
2.463	0.000	0.05	0.80	0.01	0.008
2.643	0.000	0.05	0.86	0.01	0.009
2.824	0.000	0.05	0.92	0.01	0.009
3.004	0.000	0.05	0.98	0.01	0.010
3.185	0.000	0.05	1.02	0.01	0.010
3.365	0.000	0.05	1.05	0.01	0.011
3.546	0.000	0.05	1.08	0.01	0.012
3.726	0.000	0.05	1.11	0.01	0.012
3.907	0.000	0.05	1.14	0.01	0.013
4.087	0.000	0.05	1.17	0.01	0.013
4.268	0.000	0.05	1.20	0.01	0.014
4.448	0.000	0.05	1.24	0.01	0.015
4.628	0.000	0.05	1.27	0.01	0.015
4.809	0.000	0.05	1.30	0.01	0.016
4.990	0.000	0.05	1.33	0.01	0.017
5.170	0.000	0.06	1.37	0.01	0.017
5.351	0.000	0.06	1.40	0.01	0.018
5.531	0.000	0.06	1.44	0.01	0.019
5.712	0.000	0.06	1.47	0.01	0.019
5.892	0.000	0.06	1.51	0.01	0.020
6.073	0.000	0.06	1.54	0.01	0.021
6.253	0.000	0.06	1.58	0.01	0.022
6.434	0.000	0.06	1.62	0.01	0.022
6.614	0.000	0.06	1.65	0.01	0.023
6.795	0.000	0.06	1.69	0.01	0.024
6.975	0.000	0.06	1.73	0.01	0.025
7.156	0.000	0.06	1.77	0.01	0.025
7.336	0.000	0.06	1.81	0.01	0.026
7.516	0.000	0.06	1.85	0.01	0.027
7.697	0.000	0.07	1.89	0.01	0.028
7.878	0.000	0.07	1.93	0.01	0.029
8.058	0.000	0.07	1.98	0.01	0.030
8.238	0.000	0.07	2.01	0.02	0.030
8.419	0.000	0.07	2.01	0.05	0.030
8.600	0.000	0.07	2.01	0.07	0.031
8.780	0.000	0.07	2.01	0.07	0.031
8.960	0.000	0.07	2.01	0.07	0.031
9.141	0.000	0.07	2.01	0.07	0.031
9.321	0.000	0.08	2.01	0.07	0.031
9.502	0.000	0.08	2.01	0.08	0.031
9.682	0.000	0.08	2.01	0.08	0.031
9.863	0.000	0.08	2.01	0.08	0.031
10.043	0.000	0.08	2.02	0.08	0.031
10.224	0.000	0.08	2.02	0.08	0.031
10.405	0.000	0.08	2.02	0.08	0.031
10.585	0.000	0.09	2.02	0.08	0.031

10.766	0.000	0.09	2.02	0.09	0.031
10.946	0.000	0.09	2.02	0.09	0.031
11.127	0.000	0.09	2.02	0.09	0.031
11.307	0.000	0.09	2.02	0.09	0.031
11.488	0.000	0.10	2.02	0.09	0.031
11.668	0.000	0.10	2.02	0.10	0.031
11.848	0.000	0.10	2.02	0.10	0.031
12.029	0.000	0.10	2.02	0.10	0.031
12.210	0.000	0.11	2.02	0.11	0.031
12.390	0.000	0.11	2.02	0.11	0.031
12.570	0.000	0.12	2.02	0.12	0.031
12.751	0.000	0.12	2.02	0.12	0.031
12.932	0.000	0.13	2.02	0.12	0.031
13.112	0.000	0.13	2.03	0.13	0.031
13.292	0.000	0.14	2.03	0.13	0.031
13.473	0.000	0.14	2.03	0.14	0.031
13.654	0.000	0.15	2.03	0.15	0.031
13.834	0.000	0.16	2.03	0.15	0.031
14.014	0.000	0.17	2.03	0.16	0.031
14.195	0.000	0.17	2.03	0.17	0.031
14.376	0.000	0.18	2.04	0.17	0.031
14.556	0.000	0.18	2.04	0.18	0.031
14.736	0.000	0.21	2.04	0.19	0.032
14.917	0.000	0.22	2.04	0.21	0.032
15.097	0.000	0.25	2.05	0.23	0.032
15.278	0.000	0.27	2.06	0.26	0.032
15.458	0.000	0.25	2.05	0.26	0.032
15.639	0.000	0.21	2.04	0.23	0.032
15.819	0.000	0.87	2.17	0.52	0.037
16.000	0.000	1.54	2.32	1.16	0.043
16.181	0.000	4.71	2.95	3.00	0.068
16.361	0.000	0.26	2.11	2.52	0.035
16.542	0.000	0.30	2.06	0.43	0.033
16.722	0.000	0.23	2.05	0.28	0.032
16.903	0.000	0.19	2.04	0.22	0.032
17.083	0.000	0.17	2.03	0.18	0.031
17.264	0.000	0.16	2.03	0.17	0.031
17.444	0.000	0.15	2.03	0.15	0.031
17.625	0.000	0.13	2.03	0.14	0.031
17.805	0.000	0.12	2.02	0.13	0.031
17.986	0.000	0.12	2.02	0.12	0.031
18.166	0.000	0.11	2.02	0.11	0.031
18.347	0.000	0.10	2.02	0.10	0.031
18.527	0.000	0.10	2.02	0.10	0.031
18.707	0.000	0.09	2.02	0.09	0.031
18.888	0.000	0.09	2.02	0.09	0.031
19.069	0.000	0.08	2.02	0.09	0.031
19.249	0.000	0.08	2.01	0.08	0.031
19.430	0.000	0.08	2.01	0.08	0.031
19.610	0.000	0.07	2.01	0.08	0.031
19.791	0.000	0.07	2.01	0.07	0.031
19.971	0.000	0.07	2.01	0.07	0.031
20.151	0.000	0.07	2.01	0.07	0.030
20.332	0.000	0.07	2.01	0.07	0.030
20.513	0.000	0.06	2.01	0.07	0.030

20.693	0.000	0.06	2.01	0.06	0.030
20.874	0.000	0.06	2.01	0.06	0.030
21.054	0.000	0.06	2.01	0.06	0.030
21.234	0.000	0.06	2.01	0.06	0.030
21.415	0.000	0.06	2.01	0.06	0.030
21.595	0.000	0.06	2.01	0.06	0.030
21.776	0.000	0.05	2.01	0.05	0.030
21.957	0.000	0.05	2.01	0.05	0.030
22.137	0.000	0.05	2.01	0.05	0.030
22.318	0.000	0.05	2.01	0.05	0.030
22.498	0.000	0.05	2.01	0.05	0.030
22.678	0.000	0.05	2.01	0.05	0.030
22.859	0.000	0.05	2.01	0.05	0.030
23.039	0.000	0.05	2.01	0.05	0.030
23.220	0.000	0.05	2.01	0.05	0.030
23.401	0.000	0.05	2.01	0.05	0.030
23.581	0.000	0.05	2.01	0.05	0.030
23.761	0.000	0.04	2.01	0.04	0.030
23.942	0.000	0.04	2.01	0.04	0.030
24.122	0.000	0.04	2.01	0.04	0.030
24.303	0.000	0.00	1.99	0.03	0.030

Hydrograph - Basin E Tributary to Infiltration Basin 3 - 100 Year Storm Event

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

   TOTAL 24-HOUR DURATION RAINFALL DEPTH =     3.28 (inches)

   SOIL-COVER     AREA      PERCENT OF    SCS CURVE    LOSS RATE
     TYPE      (Acres)   PERVIOUS AREA     NUMBER    Fp(in./hr.)    YIELD
       1         0.53        0.00       98.(AMC II)     0.000       0.929
       2        12.84      100.00       90.(AMC II)     0.400       0.406

   TOTAL AREA (Acres) =     13.37

   AREA-AVERAGED LOSS RATE, Fm (in./hr.) =  0.384

   AREA-AVERAGED LOW LOSS FRACTION, Y = 0.573
==============================================================================
------------------------------------------------------------------------------


   RATIONAL METHOD CALIBRATION COEFFICIENT = 0.93
   TOTAL CATCHMENT AREA(ACRES) =   13.37
   SOIL-LOSS RATE, Fm,(INCH/HR) =  0.384
   LOW LOSS FRACTION = 0.573
   TIME OF CONCENTRATION(MIN.) = 14.17
   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) =  0.41
    30-MINUTE POINT RAINFALL VALUE(INCHES) =  0.95
     1-HOUR   POINT RAINFALL VALUE(INCHES) =  1.08
     3-HOUR   POINT RAINFALL VALUE(INCHES) =  1.57
     6-HOUR   POINT RAINFALL VALUE(INCHES) =  2.02
    24-HOUR   POINT RAINFALL VALUE(INCHES) =  3.28

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

   TOTAL CATCHMENT   RUNOFF  VOLUME(ACRE-FEET) =     1.79
   TOTAL CATCHMENT SOIL-LOSS VOLUME(ACRE-FEET) =     1.86

******************************************************************************
  TIME     VOLUME       Q    0.       10.0      20.0      30.0      40.0
 (HOURS)    (AF)      (CFS)
------------------------------------------------------------------------------
  0.18     0.0018      0.25  Q        .         .         .         .
  0.41     0.0068      0.25  Q        .         .         .         .
  0.65     0.0118      0.26  Q        .         .         .         .
  0.89     0.0169      0.26  Q        .         .         .         .
  1.12     0.0220      0.26  Q        .         .         .         .
  1.36     0.0271      0.26  Q        .         .         .         .
  1.59     0.0323      0.27  Q        .         .         .         .
  1.83     0.0376      0.27  Q        .         .         .         .
  2.07     0.0429      0.27  Q        .         .         .         .
  2.30     0.0483      0.28  Q        .         .         .         .
```

2.54	0.0537	0.28	Q	.	.	.	.
2.77	0.0592	0.28	Q	.	.	.	.
3.01	0.0648	0.29	Q	.	.	.	.
3.25	0.0704	0.29	Q	.	.	.	.
3.48	0.0761	0.29	Q	.	.	.	.
3.72	0.0818	0.30	Q	.	.	.	.
3.96	0.0877	0.30	Q	.	.	.	.
4.19	0.0936	0.30	Q	.	.	.	.
4.43	0.0996	0.31	Q	.	.	.	.
4.66	0.1056	0.31	Q	.	.	.	.
4.90	0.1118	0.32	Q	.	.	.	.
5.14	0.1180	0.32	Q	.	.	.	.
5.37	0.1243	0.33	Q	.	.	.	.
5.61	0.1307	0.33	Q	.	.	.	.
5.84	0.1372	0.34	Q	.	.	.	.
6.08	0.1438	0.34	Q	.	.	.	.
6.32	0.1505	0.35	Q	.	.	.	.
6.55	0.1573	0.35	Q	.	.	.	.
6.79	0.1642	0.36	Q	.	.	.	.
7.03	0.1712	0.36	Q	.	.	.	.
7.26	0.1784	0.37	Q	.	.	.	.
7.50	0.1856	0.37	Q	.	.	.	.
7.73	0.1930	0.38	Q	.	.	.	.
7.97	0.2006	0.39	Q	.	.	.	.
8.21	0.2082	0.40	Q	.	.	.	.
8.44	0.2160	0.40	Q	.	.	.	.
8.68	0.2240	0.41	Q	.	.	.	.
8.91	0.2322	0.42	Q	.	.	.	.
9.15	0.2405	0.43	Q	.	.	.	.
9.39	0.2490	0.44	Q	.	.	.	.
9.62	0.2577	0.45	Q	.	.	.	.
9.86	0.2666	0.46	Q	.	.	.	.
10.10	0.2757	0.47	Q	.	.	.	.
10.33	0.2850	0.48	Q	.	.	.	.
10.57	0.2946	0.50	Q	.	.	.	.
10.80	0.3045	0.51	Q	.	.	.	.
11.04	0.3147	0.53	Q	.	.	.	.
11.28	0.3251	0.54	Q	.	.	.	.
11.51	0.3359	0.56	Q	.	.	.	.
11.75	0.3471	0.58	Q	.	.	.	.
11.99	0.3586	0.61	Q	.	.	.	.
12.22	0.3707	0.63	Q	.	.	.	.
12.46	0.3835	0.68	Q	.	.	.	.
12.69	0.3969	0.70	Q	.	.	.	.
12.93	0.4110	0.74	Q	.	.	.	.
13.17	0.4257	0.77	Q	.	.	.	.
13.40	0.4412	0.82	Q	.	.	.	.
13.64	0.4575	0.85	Q	.	.	.	.
13.87	0.4748	0.92	Q	.	.	.	.
14.11	0.4933	0.97	Q	.	.	.	.
14.35	0.5126	1.01	.Q	.	.	.	.
14.58	0.5328	1.07	.Q	.	.	.	.
14.82	0.5553	1.23	.Q	.	.	.	.
15.06	0.5803	1.33	.Q	.	.	.	.
15.29	0.6093	1.64	.Q	.	.	.	.

15.53	0.6415	1.66	.Q	.	.	.	.
15.76	0.6770	1.98	.Q	.	.	.	.
16.00	0.7812	8.70	.	Q .	.	.	.
16.24	1.1616	30.28	.	.	.	Q	.
16.47	1.4692	1.24	.Q	.	.	.	.
16.71	1.4956	1.47	.Q	.	.	.	.
16.94	1.5211	1.14	.Q	.	.	.	.
17.18	1.5417	0.97	Q	.	.	.	.
17.42	1.5598	0.89	Q	.	.	.	.
17.65	1.5762	0.79	Q	.	.	.	.
17.89	1.5910	0.72	Q	.	.	.	.
18.13	1.6045	0.66	Q	.	.	.	.
18.36	1.6167	0.59	Q	.	.	.	.
18.60	1.6279	0.55	Q	.	.	.	.
18.83	1.6383	0.52	Q	.	.	.	.
19.07	1.6482	0.49	Q	.	.	.	.
19.31	1.6576	0.47	Q	.	.	.	.
19.54	1.6665	0.45	Q	.	.	.	.
19.78	1.6750	0.43	Q	.	.	.	.
20.01	1.6831	0.41	Q	.	.	.	.
20.25	1.6909	0.39	Q	.	.	.	.
20.49	1.6985	0.38	Q	.	.	.	.
20.72	1.7057	0.37	Q	.	.	.	.
20.96	1.7128	0.35	Q	.	.	.	.
21.20	1.7196	0.34	Q	.	.	.	.
21.43	1.7262	0.33	Q	.	.	.	.
21.67	1.7326	0.32	Q	.	.	.	.
21.90	1.7388	0.31	Q	.	.	.	.
22.14	1.7449	0.31	Q	.	.	.	.
22.38	1.7508	0.30	Q	.	.	.	.
22.61	1.7565	0.29	Q	.	.	.	.
22.85	1.7621	0.28	Q	.	.	.	.
23.08	1.7676	0.28	Q	.	.	.	.
23.32	1.7730	0.27	Q	.	.	.	.
23.56	1.7783	0.27	Q	.	.	.	.
23.79	1.7834	0.26	Q	.	.	.	.
24.03	1.7885	0.26	Q	.	.	.	.
24.27	1.7910	0.00	Q	.	.	.	.

Routed Hydrograph - Basin E Routed Thru Infiltration Basin 3 - 100 Year Storm Event

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==============================================================================:
    FLOW-THROUGH DETENTION BASIN MODEL

    SPECIFIED BASIN CONDITIONS ARE AS FOLLOWS:
    CONSTANT HYDROGRAPH TIME UNIT(MINUTES) =   14.170
    DEAD STORAGE(AF) =       0.00
    SPECIFIED DEAD STORAGE(AF) FILLED =       0.00
    ASSUMED INITIAL DEPTH(FEET) IN STORAGE BASIN =    0.00


                INFLOW
                  |
                  |
                  |
                  V                __effective depth
             -------------         |   (and volume)
             |           |    |    |
             | detention |    |....V.............
             |   basin   |<-->|          outflow
             |           |    |.........__________
             -------------    |         |   \
                  |           | storage |     basin outlet
                  V           -----------
                OUTFLOW


    DEPTH-VS.-STORAGE AND DEPTH-VS.-DISCHARGE INFORMATION:
    TOTAL NUMBER OF BASIN DEPTH INFORMATION ENTRIES =   3
    *BASIN-DEPTH  STORAGE    OUTFLOW  **BASIN-DEPTH  STORAGE    OUTFLOW  *
    *   (FEET)  (ACRE-FEET)   (CFS)   **   (FEET)  (ACRE-FEET)   (CFS)   *
    *      0.000      0.000      0.000**      1.000      0.080      0.010*
    *      2.000      0.170     43.500**
-----------------------------------------------------------------------------
    BASIN STORAGE, OUTFLOW AND DEPTH ROUTING VALUES:
     INTERVAL   DEPTH   {S-O*DT/2}   {S+O*DT/2}
      NUMBER   (FEET)   (ACRE-FEET)  (ACRE-FEET)
         1     0.00       0.00000      0.00000
         2     1.00       0.07990      0.08010
         3     2.00      -0.25451      0.59451
    WHERE S=STORAGE(AF);O=OUTFLOW(AF/MIN.);DT=UNIT INTERVAL(MIN.)
-----------------------------------------------------------------------------
    DETENTION BASIN ROUTING RESULTS:
    NOTE: COMPUTED BASIN DEPTH, OUTFLOW, AND STORAGE QUANTITIES
        OCCUR AT THE GIVEN TIME. BASIN INFLOW VALUES REPRESENT THE
        AVERAGE INFLOW DURING THE RECENT HYDROGRAPH UNIT INTERVAL.

      TIME  DEAD-STORAGE  INFLOW  EFFECTIVE  OUTFLOW  EFFECTIVE
     (HRS)   FILLED(AF)    (CFS)  DEPTH(FT)   (CFS)   VOLUME(AF)
-----------------------------------------------------------------------------
      0.177       0.000     0.25      0.06     0.00      0.005
      0.413       0.000     0.25      0.12     0.00      0.010
      0.649       0.000     0.26      0.19     0.00      0.015
      0.885       0.000     0.26      0.25     0.00      0.020
      1.121       0.000     0.26      0.31     0.00      0.025
```

1.358	0.000	0.26	0.38	0.00	0.030
1.594	0.000	0.27	0.44	0.00	0.035
1.830	0.000	0.27	0.51	0.00	0.040
2.066	0.000	0.27	0.57	0.01	0.046
2.302	0.000	0.28	0.64	0.01	0.051
2.539	0.000	0.28	0.70	0.01	0.056
2.775	0.000	0.28	0.77	0.01	0.062
3.011	0.000	0.29	0.84	0.01	0.067
3.247	0.000	0.29	0.91	0.01	0.073
3.483	0.000	0.29	0.98	0.01	0.078
3.719	0.000	0.30	1.01	0.17	0.081
3.956	0.000	0.30	1.01	0.31	0.081
4.192	0.000	0.30	1.01	0.30	0.081
4.428	0.000	0.31	1.01	0.31	0.081
4.664	0.000	0.31	1.01	0.31	0.081
4.900	0.000	0.32	1.01	0.32	0.081
5.136	0.000	0.32	1.01	0.32	0.081
5.372	0.000	0.33	1.01	0.33	0.081
5.609	0.000	0.33	1.01	0.33	0.081
5.845	0.000	0.34	1.01	0.34	0.081
6.081	0.000	0.34	1.01	0.34	0.081
6.317	0.000	0.35	1.01	0.35	0.081
6.553	0.000	0.35	1.01	0.35	0.081
6.789	0.000	0.36	1.01	0.36	0.081
7.026	0.000	0.36	1.01	0.36	0.081
7.262	0.000	0.37	1.01	0.37	0.081
7.498	0.000	0.37	1.01	0.37	0.081
7.734	0.000	0.38	1.01	0.38	0.081
7.970	0.000	0.39	1.01	0.39	0.081
8.207	0.000	0.40	1.01	0.40	0.081
8.443	0.000	0.40	1.01	0.40	0.081
8.679	0.000	0.41	1.01	0.41	0.081
8.915	0.000	0.42	1.01	0.42	0.081
9.151	0.000	0.43	1.01	0.43	0.081
9.387	0.000	0.44	1.01	0.44	0.081
9.623	0.000	0.45	1.01	0.45	0.081
9.860	0.000	0.46	1.01	0.46	0.081
10.096	0.000	0.47	1.01	0.47	0.081
10.332	0.000	0.48	1.01	0.48	0.081
10.568	0.000	0.50	1.01	0.50	0.081
10.804	0.000	0.51	1.01	0.51	0.081
11.040	0.000	0.53	1.01	0.53	0.081
11.277	0.000	0.54	1.01	0.54	0.081
11.513	0.000	0.56	1.01	0.56	0.081
11.749	0.000	0.58	1.01	0.58	0.081
11.985	0.000	0.61	1.01	0.60	0.081
12.221	0.000	0.63	1.01	0.63	0.081
12.458	0.000	0.68	1.02	0.67	0.081
12.694	0.000	0.70	1.02	0.70	0.081
12.930	0.000	0.74	1.02	0.73	0.082
13.166	0.000	0.77	1.02	0.77	0.082
13.402	0.000	0.82	1.02	0.81	0.082
13.638	0.000	0.85	1.02	0.85	0.082
13.874	0.000	0.92	1.02	0.91	0.082
14.111	0.000	0.97	1.02	0.97	0.082

14.347	0.000	1.01	1.02	1.00	0.082
14.583	0.000	1.07	1.02	1.06	0.082
14.819	0.000	1.23	1.03	1.20	0.083
15.055	0.000	1.33	1.03	1.33	0.083
15.292	0.000	1.64	1.04	1.59	0.084
15.528	0.000	1.66	1.04	1.69	0.083
15.764	0.000	1.98	1.05	1.90	0.085
16.000	0.000	8.70	1.30	7.57	0.107
16.236	0.000	30.28	1.99	28.05	0.169
16.472	0.000	1.24	0.30	21.60	0.024
16.708	0.000	1.47	0.66	0.00	0.053
16.945	0.000	1.14	0.94	0.01	0.075
17.181	0.000	0.97	1.03	0.59	0.082
17.417	0.000	0.89	1.02	0.93	0.081
17.653	0.000	0.79	1.02	0.78	0.082
17.889	0.000	0.72	1.01	0.74	0.081
18.125	0.000	0.66	1.02	0.66	0.081
18.362	0.000	0.59	1.01	0.61	0.081
18.598	0.000	0.55	1.01	0.55	0.081
18.834	0.000	0.52	1.01	0.53	0.081
19.070	0.000	0.49	1.01	0.49	0.081
19.306	0.000	0.47	1.01	0.47	0.081
19.543	0.000	0.45	1.01	0.45	0.081
19.779	0.000	0.43	1.01	0.43	0.081
20.015	0.000	0.41	1.01	0.41	0.081
20.251	0.000	0.39	1.01	0.40	0.081
20.487	0.000	0.38	1.01	0.38	0.081
20.723	0.000	0.37	1.01	0.37	0.081
20.959	0.000	0.35	1.01	0.36	0.081
21.196	0.000	0.34	1.01	0.34	0.081
21.432	0.000	0.33	1.01	0.33	0.081
21.668	0.000	0.32	1.01	0.32	0.081
21.904	0.000	0.31	1.01	0.32	0.081
22.140	0.000	0.31	1.01	0.31	0.081
22.376	0.000	0.30	1.01	0.30	0.081
22.613	0.000	0.29	1.01	0.29	0.081
22.849	0.000	0.28	1.01	0.29	0.081
23.085	0.000	0.28	1.01	0.28	0.081
23.321	0.000	0.27	1.01	0.27	0.081
23.557	0.000	0.27	1.01	0.27	0.081
23.793	0.000	0.26	1.01	0.26	0.081
24.030	0.000	0.26	1.01	0.26	0.081
24.266	0.000	0.00	0.97	0.13	0.078

Hydraulic Calculations

Line A Inlet 1 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
0.36	0.09

User Input

Line A Inlet 2 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
0.36	0.09

User Input

Line B Inlet 1 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
2.77	0.35

User Input

Line B Inlet 2 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
0.89	0.16

User Input

Line C Inlet 1 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
0.31	0.08

User Input

Line D Inlet 1 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
1.92	0.27

User Input

Line D Inlet 2 Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing into inlet

C	3.4
Length (ft)	4

Q (cfs)	H = depth (ft)
0.26	**0.07**

User Input

Line A - 12" Storm Drain

```
*****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
   PIPE DIAMETER(FEET) =   1.000
   PIPE SLOPE(FEET/FEET) =  0.0050
   PIPEFLOW(CFS) =        0.71
   MANNINGS FRICTION FACTOR = 0.013000
=============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   CRITICAL DEPTH(FEET) =      0.35
   CRITICAL FLOW AREA(SQUARE FEET) =     0.246
   CRITICAL FLOW TOP-WIDTH(FEET) =   0.955
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =           6.22
   CRITICAL FLOW VELOCITY(FEET/SEC.) =     2.882
   CRITICAL FLOW VELOCITY HEAD(FEET) =           0.13
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.26
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =           0.48
=============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =      0.36
   FLOW AREA(SQUARE FEET) =      0.26
   FLOW TOP-WIDTH(FEET) =     0.962
   FLOW PRESSURE + MOMENTUM(POUNDS) =           6.22
   FLOW VELOCITY(FEET/SEC.) =          2.756
   FLOW VELOCITY HEAD(FEET) =          0.118
   HYDRAULIC DEPTH(FEET) =      0.27
   FROUDE NUMBER =     0.939
   SPECIFIC ENERGY(FEET) =           0.48
=============================================================================
```

Line B - 15" Storm Drain

```
*****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
   PIPE DIAMETER(FEET) =   1.250
   PIPE SLOPE(FEET/FEET) =  0.0050
   PIPEFLOW(CFS) =        3.64
   MANNINGS FRICTION FACTOR = 0.013000
=============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   CRITICAL DEPTH(FEET) =      0.77
   CRITICAL FLOW AREA(SQUARE FEET) =     0.794
   CRITICAL FLOW TOP-WIDTH(FEET) =   1.216
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          48.89
   CRITICAL FLOW VELOCITY(FEET/SEC.) =     4.585
   CRITICAL FLOW VELOCITY HEAD(FEET) =           0.33
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.65
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =           1.10
=============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =      0.84
   FLOW AREA(SQUARE FEET) =      0.88
   FLOW TOP-WIDTH(FEET) =     1.171
   FLOW PRESSURE + MOMENTUM(POUNDS) =          49.51
   FLOW VELOCITY(FEET/SEC.) =          4.132
   FLOW VELOCITY HEAD(FEET) =          0.265
   HYDRAULIC DEPTH(FEET) =      0.75
   FROUDE NUMBER =     0.840
   SPECIFIC ENERGY(FEET) =           1.11
=============================================================================
```

Line C - 6 " Storm Drain

```
****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
----------------------------------------------------------------------------
   PIPE DIAMETER(FEET) =   0.500
   PIPE SLOPE(FEET/FEET) =  0.0050
   PIPEFLOW(CFS) =        0.31
   MANNINGS FRICTION FACTOR = 0.013000
============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   CRITICAL DEPTH(FEET) =      0.28
   CRITICAL FLOW AREA(SQUARE FEET) =     0.114
   CRITICAL FLOW TOP-WIDTH(FEET) =   0.496
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =           4.27
   CRITICAL FLOW VELOCITY(FEET/SEC.) =     2.720
   CRITICAL FLOW VELOCITY HEAD(FEET) =           0.11
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =      0.23
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =           0.40
============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =      0.33
   FLOW AREA(SQUARE FEET) =      0.14
   FLOW TOP-WIDTH(FEET) =     0.472
   FLOW PRESSURE + MOMENTUM(POUNDS) =           4.55
   FLOW VELOCITY(FEET/SEC.) =          2.235
   FLOW VELOCITY HEAD(FEET) =          0.078
   HYDRAULIC DEPTH(FEET) =      0.29
   FROUDE NUMBER =     0.727
   SPECIFIC ENERGY(FEET) =           0.41
============================================================================
```

Line D - 12 " Storm Drain

```
****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
----------------------------------------------------------------------------
   PIPE DIAMETER(FEET) =   1.000
   PIPE SLOPE(FEET/FEET) =  0.0050
   PIPEFLOW(CFS) =        2.13
   MANNINGS FRICTION FACTOR = 0.013000
============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   CRITICAL DEPTH(FEET) =      0.62
   CRITICAL FLOW AREA(SQUARE FEET) =     0.515
   CRITICAL FLOW TOP-WIDTH(FEET) =   0.969
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =          25.77
   CRITICAL FLOW VELOCITY(FEET/SEC.) =     4.137
   CRITICAL FLOW VELOCITY HEAD(FEET) =          0.27
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     0.53
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =          0.89
============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =      0.71
   FLOW AREA(SQUARE FEET) =      0.59
   FLOW TOP-WIDTH(FEET) =     0.912
   FLOW PRESSURE + MOMENTUM(POUNDS) =          26.36
   FLOW VELOCITY(FEET/SEC.) =          3.598
   FLOW VELOCITY HEAD(FEET) =          0.201
   HYDRAULIC DEPTH(FEET) =      0.65
   FROUDE NUMBER =     0.787
   SPECIFIC ENERGY(FEET) =          0.91
============================================================================
```

Line E - 18 " Storm Drain

```
*****************************************************************************
>>>>PIPEFLOW HYDRAULIC INPUT INFORMATION<<<<
-----------------------------------------------------------------------------
   PIPE DIAMETER(FEET) =   1.500
   PIPE SLOPE(FEET/FEET) =  0.0450
   PIPEFLOW(CFS) =        9.74
   MANNINGS FRICTION FACTOR = 0.013000
=============================================================================
   CRITICAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   CRITICAL DEPTH(FEET) =      1.20
   CRITICAL FLOW AREA(SQUARE FEET) =     1.521
   CRITICAL FLOW TOP-WIDTH(FEET) =   1.194
   CRITICAL FLOW PRESSURE + MOMENTUM(POUNDS) =         172.93
   CRITICAL FLOW VELOCITY(FEET/SEC.) =     6.405
   CRITICAL FLOW VELOCITY HEAD(FEET) =          0.64
   CRITICAL FLOW HYDRAULIC DEPTH(FEET) =     1.27
   CRITICAL FLOW SPECIFIC ENERGY(FEET) =          1.84
=============================================================================
   NORMAL-DEPTH FLOW INFORMATION:
-----------------------------------------------------------------------------
   NORMAL DEPTH(FEET) =      0.69
   FLOW AREA(SQUARE FEET) =      0.80
   FLOW TOP-WIDTH(FEET) =     1.496
   FLOW PRESSURE + MOMENTUM(POUNDS) =         244.61
   FLOW VELOCITY(FEET/SEC.) =         12.186
   FLOW VELOCITY HEAD(FEET) =          2.306
   HYDRAULIC DEPTH(FEET) =      0.53
   FROUDE NUMBER =     2.938
   SPECIFIC ENERGY(FEET) =          3.00
=============================================================================
```

Infiltration Basin 1 Spillway Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing over spillway

C	3.4
Length (ft)	10

Q (cfs)	H = depth (ft)
23.49	0.78

User Input

Infiltration Basin 2 Spillway Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

H = depth of water flowing over spillway

C	3.4
Length (ft)	10

Q (cfs)	H = depth (ft)
4.71	0.27

User Input

Infiltration Basin 3 Spillway Calculation

Purpose - To size spillway

H=((Q^2)/(CL^2))^(1/3)

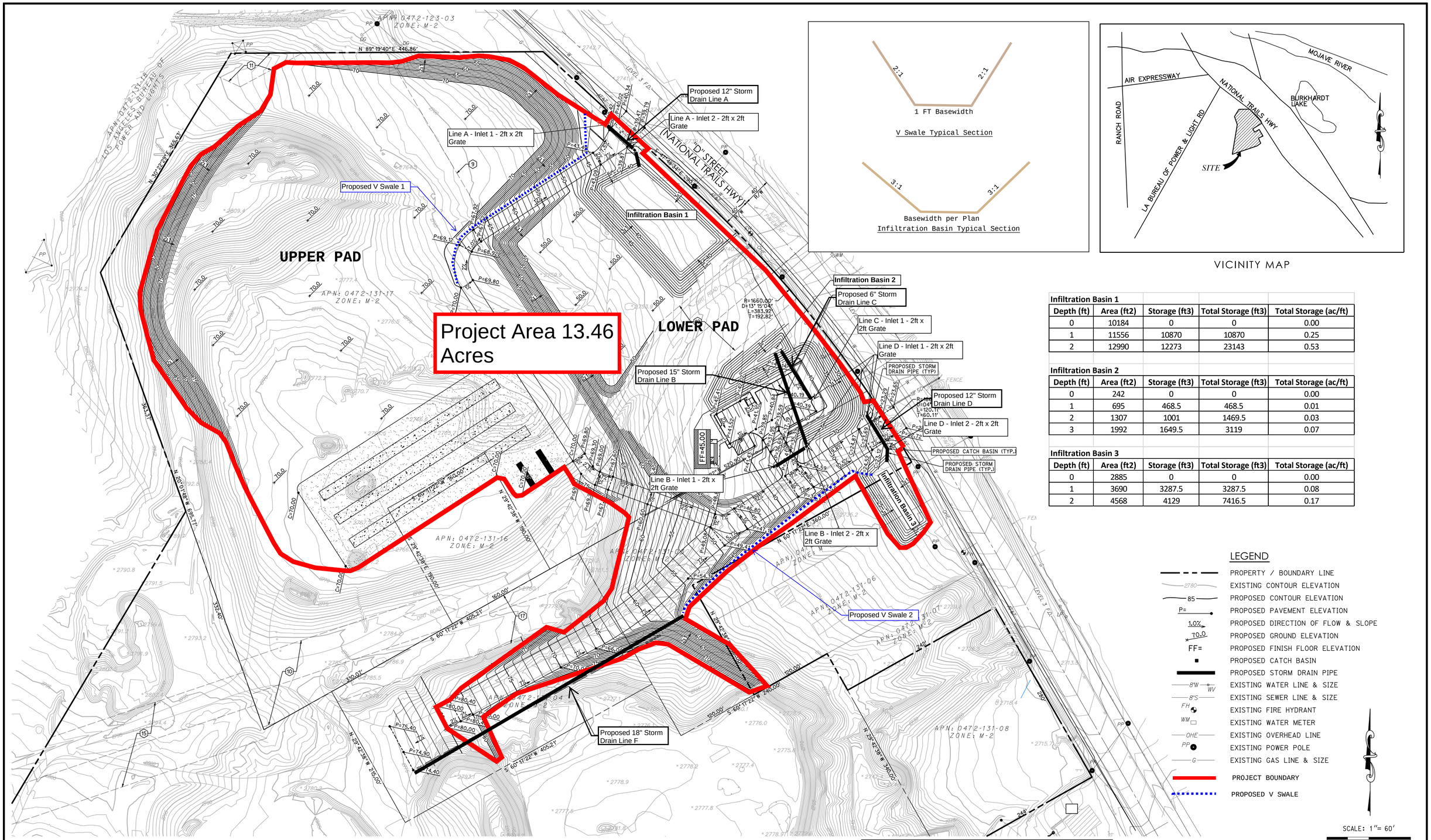
H = depth of water flowing over spillway

C	3.4
Length (ft)	10

Q (cfs)	H = depth (ft)
31.86	0.96

User Input

Hydrology Exhibits



VICINITY MAP

Infiltration Basin 1

Depth (ft)	Area (ft2)	Storage (ft3)	Total Storage (ft3)	Total Storage (ac/ft)
0	10184	0	0	0.00
1	11556	10870	10870	0.25
2	12990	12273	23143	0.53

Infiltration Basin 2

Depth (ft)	Area (ft2)	Storage (ft3)	Total Storage (ft3)	Total Storage (ac/ft)
0	242	0	0	0.00
1	695	468.5	468.5	0.01
2	1307	1001	1469.5	0.03
3	1992	1649.5	3119	0.07

Infiltration Basin 3

Depth (ft)	Area (ft2)	Storage (ft3)	Total Storage (ft3)	Total Storage (ac/ft)
0	2885	0	0	0.00
1	3690	3287.5	3287.5	0.08
2	4568	4129	7416.5	0.17

LEGEND

- PROPERTY / BOUNDARY LINE
- 2780 — EXISTING CONTOUR ELEVATION
- 85 — PROPOSED CONTOUR ELEVATION
- P= — PROPOSED PAVEMENT ELEVATION
- 1.0% — PROPOSED DIRECTION OF FLOW & SLOPE
- 70.0 — PROPOSED GROUND ELEVATION
- FF= — PROPOSED FINISH FLOOR ELEVATION
- PROPOSED CATCH BASIN
- PROPOSED STORM DRAIN PIPE
- 8"W WV — EXISTING WATER LINE & SIZE
- 8"S — EXISTING SEWER LINE & SIZE
- FH — EXISTING FIRE HYDRANT
- WM — EXISTING WATER METER
- OHE — EXISTING OVERHEAD LINE
- PP — EXISTING POWER POLE
- G — EXISTING GAS LINE & SIZE
- PROJECT BOUNDARY
- PROPOSED V SWALE

SCALE: 1"= 60'

0' 30' 60' 120'

DIG ALERT

CALL BEFORE YOU DIG!

1-800-227-2600

UNDERGROUND SERVICE ALERT

Call at least 2 working days prior to excavating.

BENCHMARK:

NO. V-12R
NW CORNER OF BEAR VALLEY ROAD AND AMARGOSA ROAD @ BCR

ELEVATION: 3178.86'

3 ENGINEERING, LLC
PROJECT NO.
1754

3engineering
planning civil engineering surveying
6370 E. THOMAS ROAD, SUITE # 200, SCOTTSDALE, ARIZONA 85251 - PHONE: (602) 334-4387 - FAX: (602) 490-3230 - WWW.3ENGINEERING.COM

PREPARED UNDER THE DIRECTION OF:

DANIEL G. MANN R.C.E. 69695
REGISTRATION EXPIRES 6/30/19

DATE: 8/15/19

REGISTERED PROFESSIONAL ENGINEER
DANIEL G. MANN
No. 69695
Exp.6-30-16
CIVIL
STATE OF CALIFORNIA

REVISIONS

No.	Description	Date	Approved

CITY CASE NO.

CITY OF VICTORVILLE
ENGINEERING DEPARTMENT
14343 Civic Drive, Victorville, CA 92392 (760) 955-5000

Approved By:

Brian W. Gengler, RCE C44730
City Engineer

DATE

PRELIMINARY GRADING PLAN
THE REINFORCED EARTH COMPANY
CONCRETE PANEL YARD

D STREET (NATIONAL TRAILS HWY)
APN'S 072-131-03, 04, 08, 10, 13, 16, 17, & 0472-141-16

PGRD01

SHEET NO.
1 of 1

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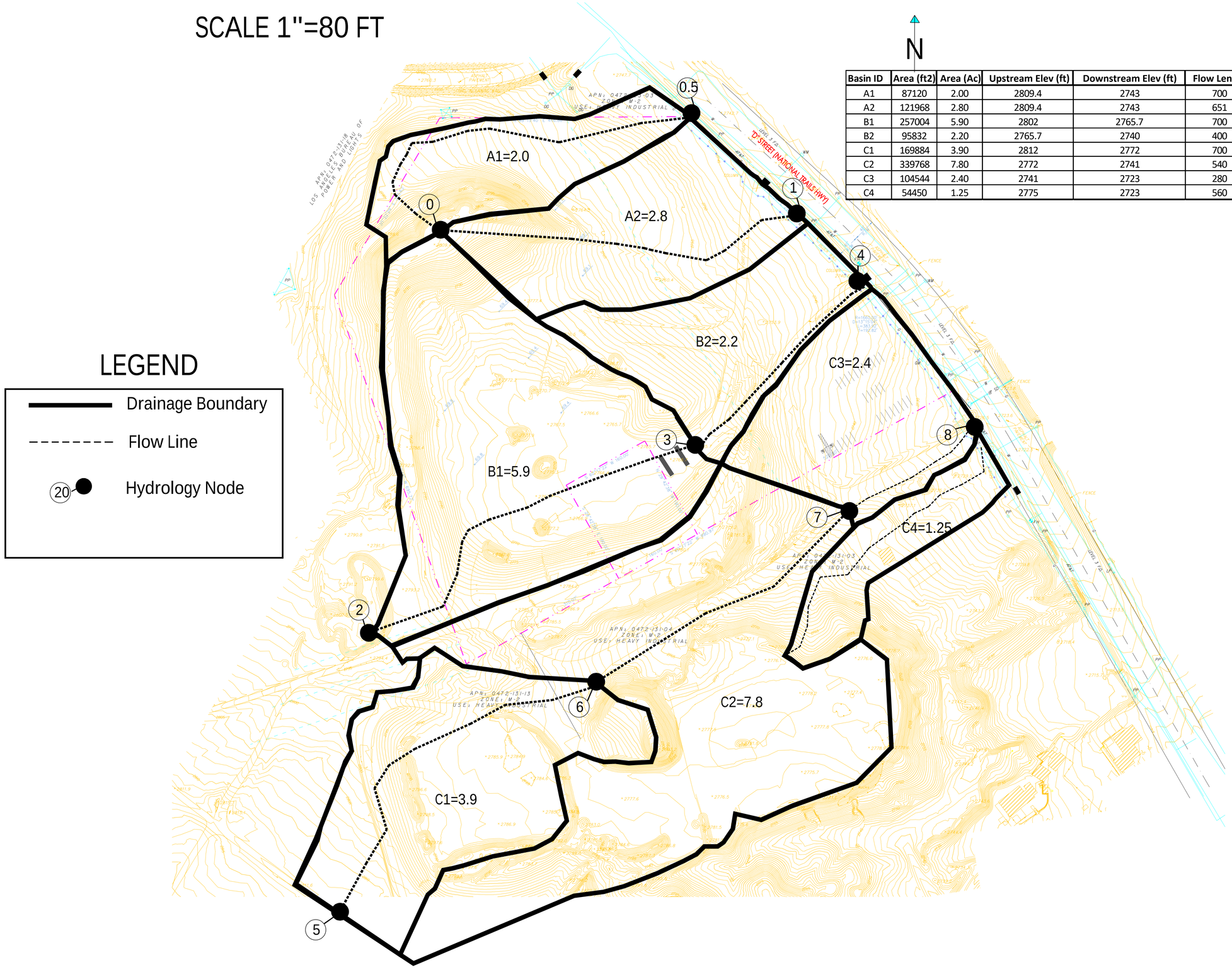
EXISTING CONDITION HYDROLOGY

SCALE 1"=80 FT

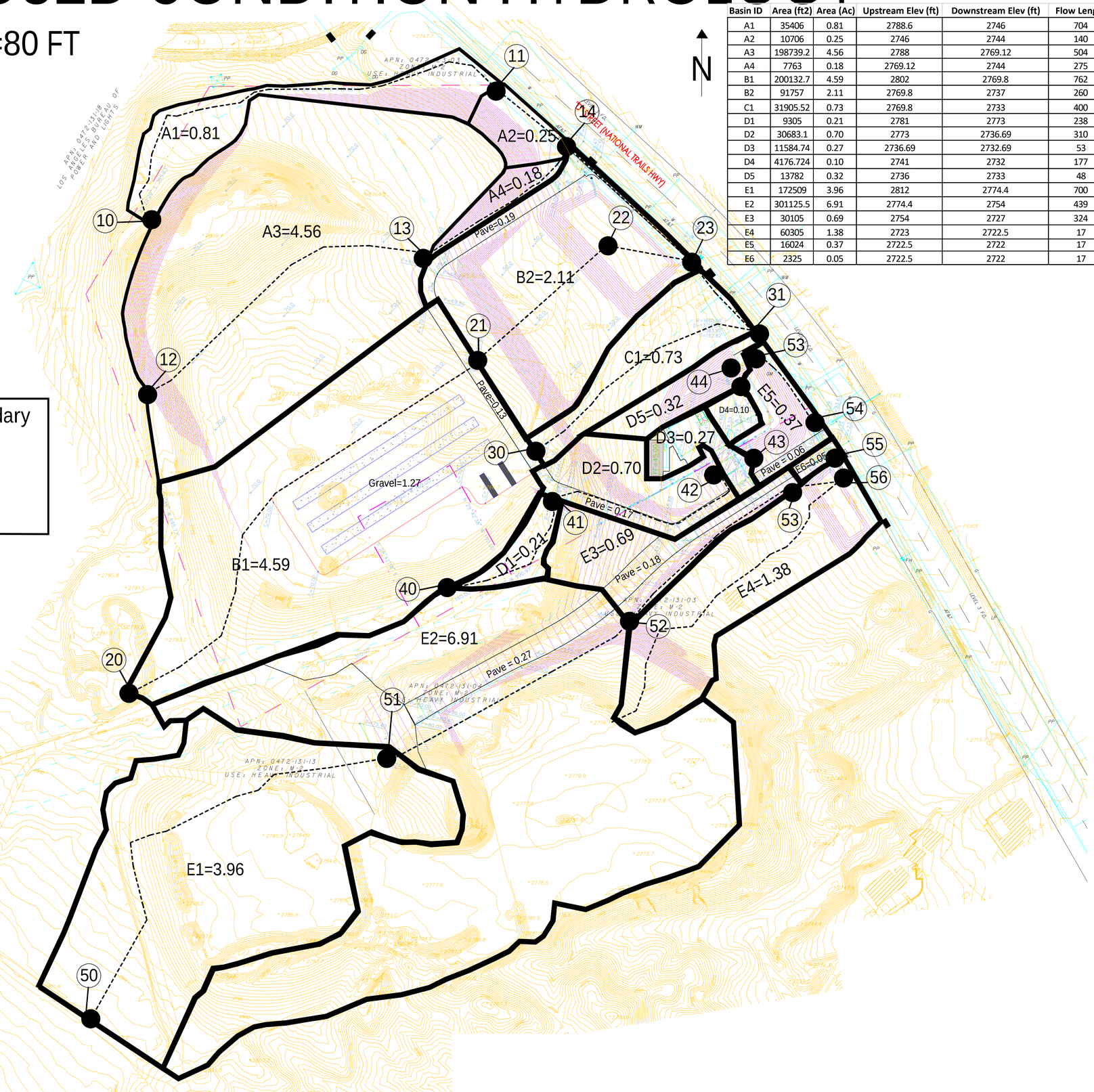


Basin ID	Area (ft2)	Area (Ac)	Upstream Elev (ft)	Downstream Elev (ft)	Flow Length	Slope (ft/ft)	Tc (mins)	Peak
A1	87120	2.00	2809.4	2743	700	0.09	11.55	5.39
A2	121968	2.80	2809.4	2743	651	0.10	11.06	7.81
B1	257004	5.90	2802	2765.7	700	0.05	13.04	14.43
B2	95832	2.20	2765.7	2740	400	0.06	14.59	18.08
C1	169884	3.90	2812	2772	700	0.06	12.79	9.69
C2	339768	7.80	2772	2741	540	0.06	13.84	18.18
C3	104544	2.40	2741	2723	280	0.06	14.30	5.44
C4	54450	1.25	2775	2723	560	0.09	14.04	64.79

PROPOSED CONDITION HYDROLOGY

SCALE 1"=80 FT

Basin ID	Area (ft2)	Area (Ac)	Upstream Elev (ft)	Downstream Elev (ft)	Flow Length	Slope (ft/ft)	Tc (mins)	Peak
A1	35406	0.81	2788.6	2746	704	0.06	12.67	2.03
A2	10706	0.25	2746	2744	140	0.01	13.8	2.48
A3	198739.2	4.56	2788	2769.12	504	0.04	12.2	11.77
A4	7763	0.18	2769.12	2744	275	0.09	12.71	11.84
B1	200132.7	4.59	2802	2769.8	762	0.04	8.137	16.74
B2	91757	2.11	2769.8	2737	260	0.13	8.51	23.49
C1	31905.52	0.73	2769.8	2733	400	0.09	9.29	2.36
D1	9305	0.21	2781	2773	238	0.03	9.236	0.68
D2	30683.1	0.70	2773	2736.69	310	0.12	10.15	2.77
D3	11584.74	0.27	2736.69	2732.69	53	0.08	10.15	3.64
D4	4176.724	0.10	2741	2732	177	0.05	10.15	3.8
D5	13782	0.32	2736	2733	48	0.06	10.83	5.51
E1	172509	3.96	2812	2774.4	700	0.05	12.9	9.74
E2	301125.5	6.91	2774.4	2754	439	0.05	13.57	25.83
E3	30105	0.69	2754	2727	324	0.08	14.07	26.72
E4	60305	1.38	2723	2722.5	17	0.03	5.2	29.73
E5	16024	0.37	2722.5	2722	17	0.03	5	1.92
E6	2325	0.05	2722.5	2722	17	0.03	5.2	2.13



LEGEND

- Drainage Boundary
- Flow Line
- Hydrology Node

NOTES TO USERS

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NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

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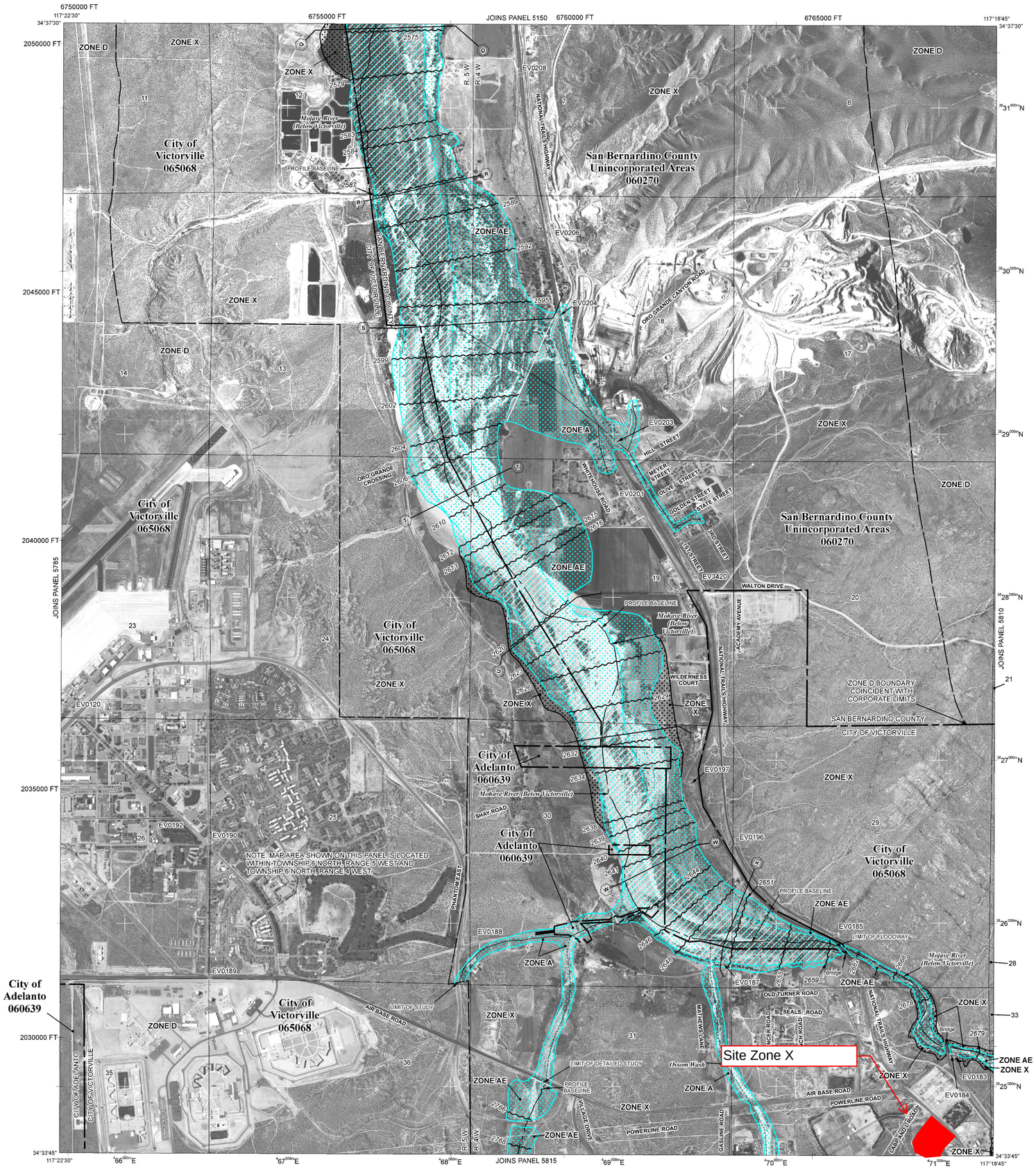

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

(A)———(A)	Cross section line
(23)- - - - -(23)	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
3976000mN	1000-meter Universal Transverse Mercator grid values, zone 11N
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DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
●M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
March 18, 1996

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MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 5805H

FIRM

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 5805 OF 9400

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ADELANTO, CITY OF	060639	5805	H
SAN BERNARDINO COUNTY	060270	5805	H
VICTORVILLE, CITY OF	065068	5805	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06071C5805H

MAP REVISED
AUGUST 28, 2008

Federal Emergency Management Agency

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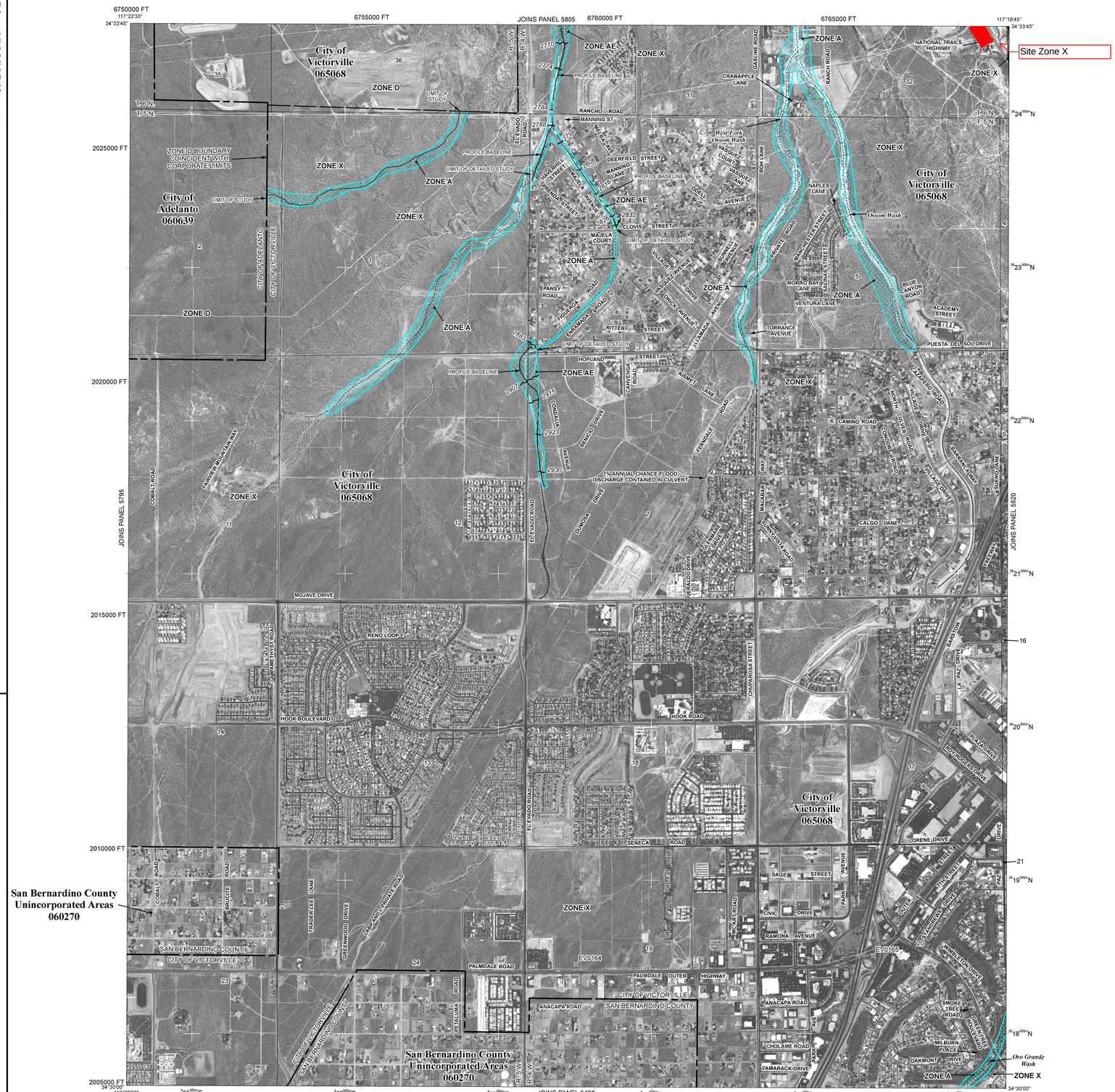

LEGEND

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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 5815H

FIRM

FLOOD INSURANCE RATE MAP

SAN BERNARDINO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 5815 OF 9400

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MAP NUMBER
06071C5815H

MAP REVISED
AUGUST 28, 2008

Federal Emergency Management Agency