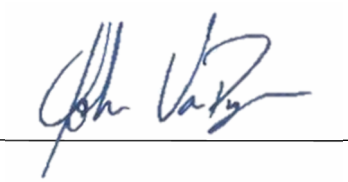
DRAINAGE STUDY

STONEPOINTE DR. – VACANT LOT

APN: 272-690-06

Stonepointe Drive,
Escondido, CA 92025

Prepared By:



John A. Van Ryn, P.E. RCE 80667 EXP: 3-31-27

Van Ryn Engineering, Inc.
16766 Bernardo Center Dr., Ste 115
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Prepared for:
David Hensel
21481 Trail Ridge Dr.
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July 3, 2025

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Figure 1 Vicinity Map

VICINITY MAP

NO SCALE

1. INTRODUCTION

1.1 Project Description

The project is located at the end of Stonepointe Drive in the City of Escondido. The site exists today as vacant lot. The project proposes to construct a new single-family residence along with a driveway made up partially of concrete, and partially pervious pavers. Also proposed are landscape improvements typical to residential development.

1.2 Existing Conditions

The existing lot is approximately 66,029 sq-ft or 1.52 acres. Currently there is only 179 square feet of impervious surfaces on the site, excluding the portion of the roundabout of Stonepointe drive within the public ROW. The existing area is made up of vacant land that has a high point towards the middle of the lot and slopes away from this high point to the east and west.

The project site has a hydrologic soil group type D, according to the USDA web soil survey. The peak storm water run-off for the site was calculated using the rational method equation (Q=CiA). The precipitation volume of 3.25 inches was used for design consideration according to the San Diego County 100yr 6hr Isopluvial Map. AES software was used to model the existing site runoff condition. The main drainage basin was divided into two sub basins called EX-1, and EX-2. The overall basin used for this drainage study has an area of 65,103 square feet. These basins are graphically portrayed on the Existing Condition Hydrology Map in Appendix 1. "POC-1" and "POC-2" were analyzed both for the existing and proposed condition runoff. See Appendix 2 of this report for detailed calculations.

1.3 Proposed Conditions

The proposed site conditions result in an increase of impervious surfaces resulting from the new PCC driveway and single-family residence. The proposed site conditions result in 8,56 square feet of imperious surfaces (0.20 ac), and 56,547 square feet of pervious surfaces (1.29 ac). The same overall basin with an area of 65,103 square feet was examined for both the proposed and existing site conditions. In the proposed condition, the site was divided into two main sub basins PR-1 and PR-2. PR-1 contains all the new impervious surfaces to be treated, while PR-2 is self-mitigating. AES software was used to model the proposed site runoff for both PR-1 and PR-2, to find the total Q value for the site post development. See Appendix 2 of this report for detailed calculations.

1.4 Detention & Treatment

As a result of the proposed increase in impervious area, the project peak runoff is increased in the proposed condition. Two storm water bio-filtration basins are proposed to collect and treat the peak run-off and discharge the design storm below the existing condition. The volumes have been calculated for the proposed basin towards the end of section 3. The volumes of the proposed basins have been sized to accommodate for the excess storm water produced from the proposed impervious area. Sub basin "PR-1" has been divided sectioned off into sub-basins based off the different treatment and flow areas. These sub-basins along with their corresponding adjusted C values can be seen on the Proposed Condition Hydrology Exhibit in Appendix 1 of this report.

Bio-filtration basin "BF-1" is located on the south-eastern side of the proposed house pad. This basin treats the runoff generated from the proposed residence, and treats the water collected from the area drain system surrounding the residence. Bio-filtration basin "BF-1" was sized to accommodate the increase in runoff from these areas and was also modeled in AutoCAD Hydrographs to find the Q value of runoff exiting the basin. The detained Q values were then run back through AES software to find the total "detained" Q value for the proposed conditions. See Appendix 2 for AutoCAD Hydrographs and AES reports.

Bio-filtration basin "BF-2" is located on the eastern side of the site near the right-of-way of Stonepointe Drive. This basin was designed to treat the runoff generated from the proposed PCC driveway, and treats the water collected from the proposed driveway via the proposed trench drain. Bio-filtration basin "BF-2" was sized to accommodate the increase in runoff from these areas and was also modeled in AutoCAD Hydrographs to find the Q value of runoff exiting the basin. The detained Q values were then run back through AES software to find the total "detained" Q value for the proposed conditions. See Appendix 2 for AutoCAD Hydrographs and AES reports.

2. METHODOLOGY

The proposed project has been analyzed to determine the peak runoff flow for the 100 year, 6 hour rainfall event using the Rational Method per the San Diego County Hydrology Manual. The Weighted Runoff Coefficient, C, for the existing and proposed conditions were calculated using Table 3-1 of the same manual.

The proposed LID best management practices have been sized and located such that runoff will be directed to pervious areas where feasible, and into an onsite storm water detention basin before ultimately discharging to the downstream curb-and-gutter.

2.1 Rational Method

As mentioned above, runoff from the project site was calculated for the 100-year storm events. Runoff was calculated using the Rational Method which is given by the following equation:
Q = C x I x A

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)
Rational Method calculations were performed using the San Diego County Hydrology Manual (Section 3.1)

2.2 Runoff Coefficient

The runoff coefficients for the project were calculated using section 3.1.2 of the San Diego County Hydrology Manual and using a weighted average runoff coefficient based on the existing and proposed impervious areas.

2.3 Rainfall Intensity

Rainfall intensity was determined using the Rainfall Intensity section of the San Diego County Hydrology Manual (Section 3.1.3).

2.4 Tributary Areas

Drainage basins are delineated in the Post-Project Hydrology Exhibit in Appendix 1 and graphically portray the tributary area for each drainage basin.

3. CALCULATIONS/RESULTS

3.1 Pre & Post-Development Peak Flow Comparison

3.1.1 Pre-Development Peak Flow

Below are a series of tables which summarize the calculations provided.

SITE IMPERVIOUS AREA COMPOSITION					
	TOTAL IMPERVIOUS AREA (SQ-FT)	TOTAL PERVIOUS AREA (SQ-FT)	TOTAL PROJECT AREA (SQ-FT)	% IMPERVIOUS SURFACES	WEIGHTED RUNOFF COEFFICIENT "C"
Existing	179	64,924	65,103	0.03%	0.35
Proposed	8,556	56,547	65,103	13.14%	0.42

Table 1. Runoff Coefficient "C" Comparison

The table above shows the difference in the weighted runoff coefficient, "C", between the existing and proposed condition. Calculations of the weighted runoff coefficients are based on Table 3-1 of the San Diego County Hydrology Manual and underlying hydrologic soil group D.

EXISTING DRAINAGE FLOWS				
DRAINAGE AREA	DRAINAGE AREA (SQ-FT)	WEIGHTED RUNOFF COEFFICIENT (C)	Q_{100} (CFS)	T_C (MIN)
EX-1	65,103	0.35	3.60	6.47
EX-2	65,103	0.35	3.17	7.21

Table 2. Existing Condition Peak Drainage Flow Rates

Table 2 above lists the peak flow rates for the project site in the existing condition for the respective rainfall events.

PROPOSED DRAINAGE FLOWS				
DRAINAGE AREA	DRAINAGE AREA (SQ-FT)	RUNOFF COEFFICIENT (C)	UNDETAINED Q_{100} (CFS)	DETAINED Q_{100} (CFS)
PR-1	43,465	0.44	6.58	3.78
PR-2 (SELF-MITIGATING)	21,638	0.35	1.83	1.83

Table 3. Proposed Condition Peak Drainage Flow Rates

Table 3 above lists the peak flow rates for the project site for the proposed condition for the respective rainfall events.

TOTAL PEAK FLOW COMPARISON			
CONDITION	DRAINAGE AREA (SQ-FT)	Q100 TOTAL UNDETAINED (CFS)	Q100 TOTAL DETAINED (CFS)
Existing (EX-1 & EX-2)	65,103	6.77	N/A
Proposed (PR-1 & PR-2)	65,103	8.41	5.61

Table 4. Proposed Condition Peak Drainage Flow Rates

Table 4 above shows a comparison between the total peak flow rates for the existing and proposed site condition, both detained and undetained.

4. CONCLUSION

As discussed previously, the result of the project increases the total runoff volume and peak design flow. The onsite storm water Bio-filtration basins are proposed to mitigate the runoff increase and discharge the peak 100 year 6 hour design storm below the existing condition. The existing site condition was calculated to have a total peak runoff of 6.77 CFS, and the proposed detained condition was calculated to have a total peak runoff of 5.61 CFS leaving the site. Therefore, the project will not negatively affect downstream facilities. Additionally, the project does not negatively impact adjacent properties. It is my professional opinion that the storm drain systems as proposed in this report and on the grading plans herein is adequate to intercept, contain and convey Q100 and will not create negative impacts to the downstream system.

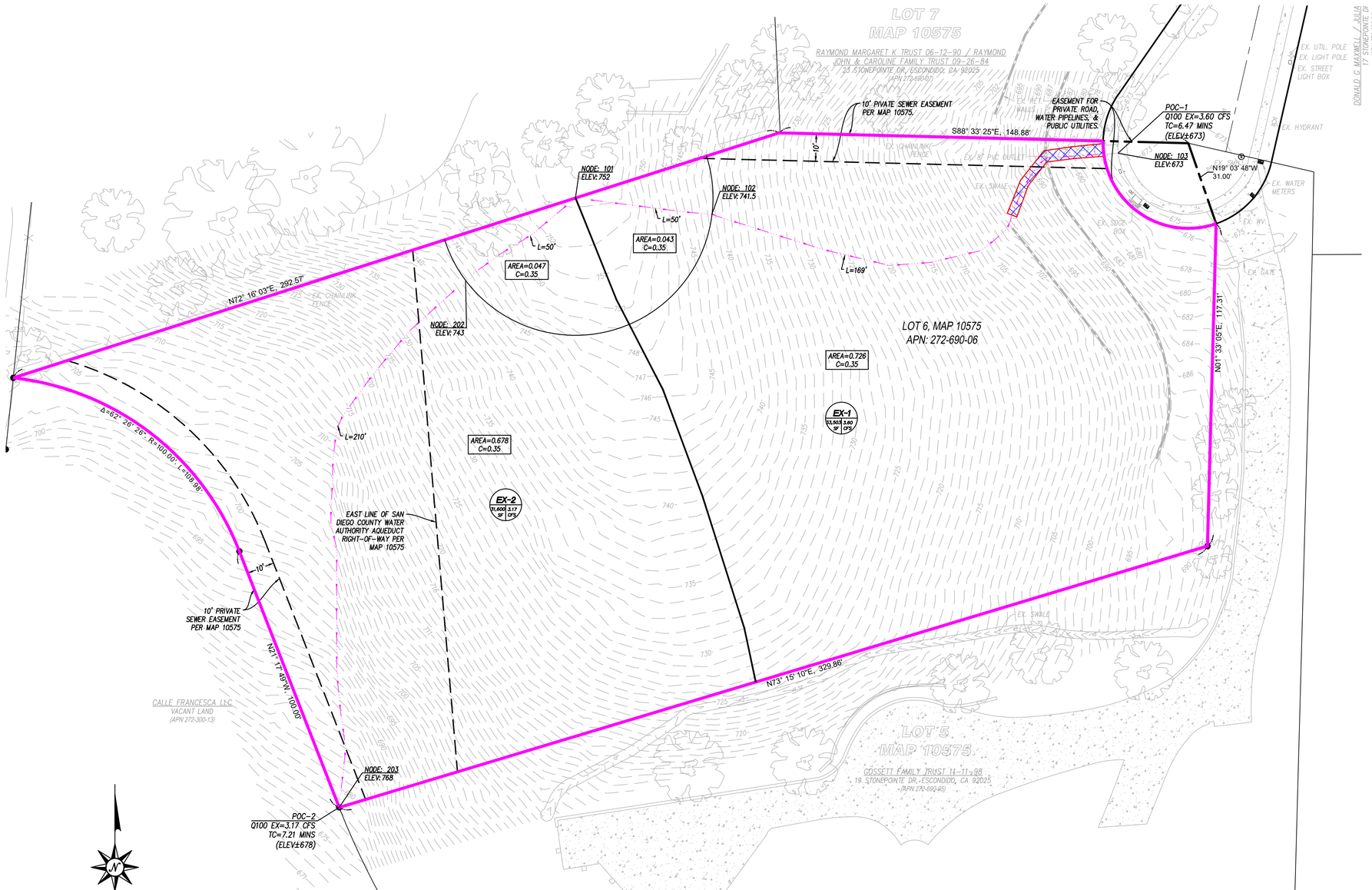
APPENDIX 1

EXISTING & PROPOSED

DRAINAGE EXHIBITS

STONEPOINTE DR. VACANT LOT - EXISTING CONDITION HYDROLOGY EXHIBIT

ESCONDIDO, CA 92025



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- ROAD CENTERLINE
- ADJACENT PROPERTY LINE
- DRAINAGE BASIN BOUNDARY
- BASIN SPLIT
- DRAINAGE FLOW PATH
- DRAINAGE FLOW ARROW
- PRE-PROJECT IMPERVIOUS AREA
- BASIN SUMMARY

EX-1
X.X SF | X.X CFS

AREA CALCULATIONS

TOTAL AREA	65,103 S.F (1.49 AC)
PERVIOUS AREA	64,924 S.F (1.49 AC)
IMPERVIOUS AREA	179 S.F (0.004 AC)
% IMP	0.03%

HYDROLOGIC SOIL GROUP

SOIL GROUP: D

GRAPHIC SCALE: 1" = 20'

20 10 0 20 40 60

REGISTERED PROFESSIONAL ENGINEER
JOHN A. VAN RYN
No. C80667
EXP. 03-31-27
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STATE OF CALIFORNIA

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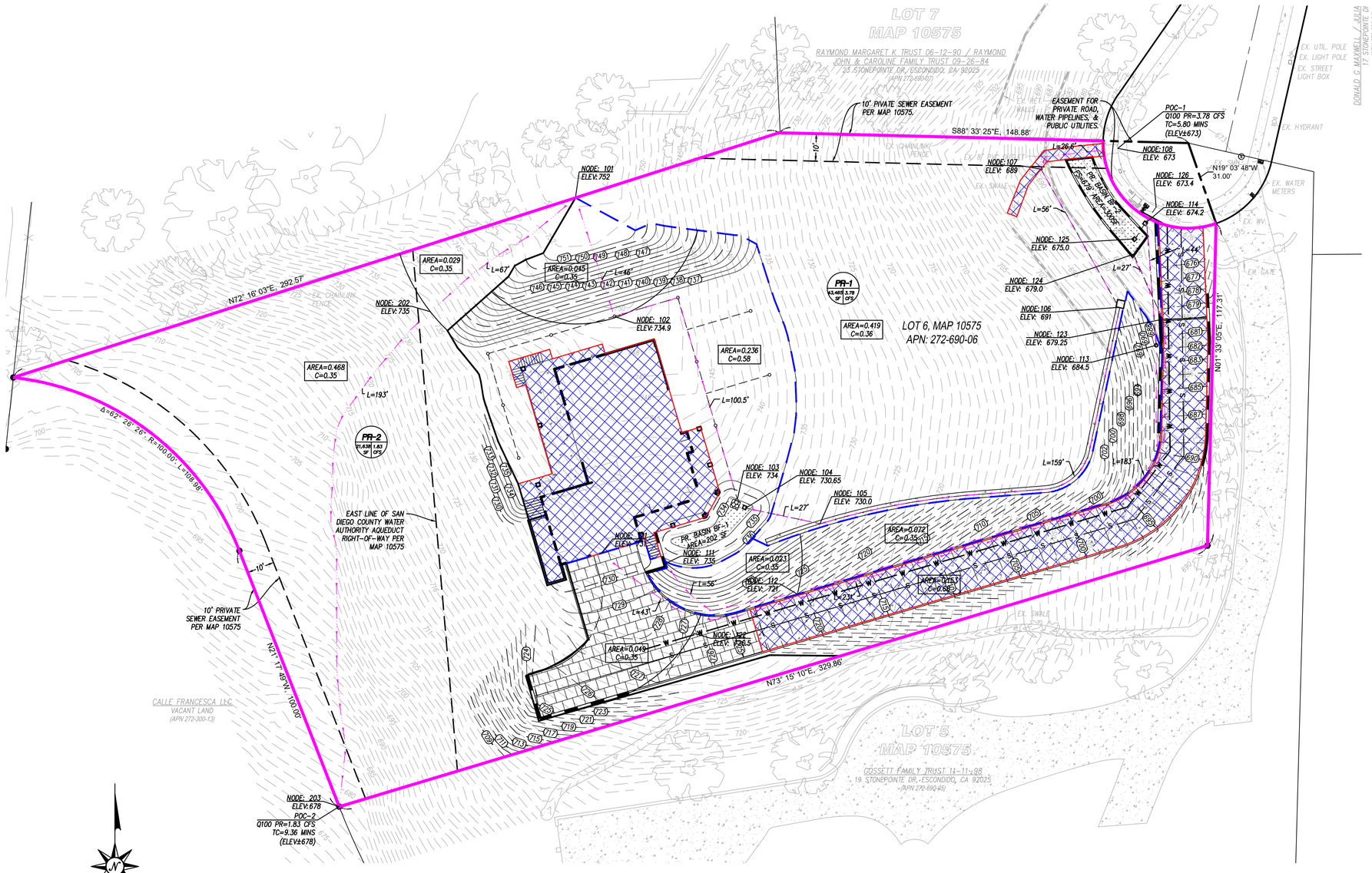
vanrynengineering.com

STONEPOINTE DR. VACANT LOT - PROPOSED CONDITION HYDROLOGY EXHIBIT

ESCONDIDO, CA 92025



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- ROAD CENTERLINE
- ADJACENT PROPERTY LINE
- DRAINAGE BASIN BOUNDARY
- DRAINAGE FLOW PATH
- DRAINAGE FLOW ARROW
- POST-PROJECT IMPERVIOUS AREA
- BASIN SUMMARY — PR 1 | X.X SF | X.X CFS
- PR. SUB-BASIN BOUNDARY
- PR. BOX INLET
- PR. PVC DRAIN PIPE

AREA CALCULATIONS

TOTAL AREA	65,103 S.F (1.49 AC)
PERVIOUS AREA	56,547 S.F (1.29 AC)
IMPERVIOUS AREA	8,556 S.F (0.20 AC)
% IMP	13.14%

HYDROLOGIC SOIL GROUP

SOIL GROUP: D

REGISTERED PROFESSIONAL ENGINEER
JOHN A. VAN RYN
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APPENDIX 2

SUPPLIMENTAL HYDROLOGIC

CALCULATIONS AND DOCUMENTS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1711

                              Analysis prepared by:

                             VAN RYN ENGINEERING INC
                          16766 BERNARDO CENTER DR. STE. 115
                                   VANRYNENG.COM


 ************************* DESCRIPTION OF STUDY *************************
* J2454 BASIN 1 EXISTING                                                 *
*                                                                        *
*                                                                        *
 **************************************************************************

  FILE NAME: 2454.EX1
  TIME/DATE OF STUDY: 12:52 06/30/2025
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   6.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*

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

```
  FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    752.00
  DOWNSTREAM ELEVATION(FEET) =    741.50
  ELEVATION DIFFERENCE(FEET) =     10.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
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  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    741.50  DOWNSTREAM(FEET) =    673.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   169.00   CHANNEL SLOPE =  0.4053
  CHANNEL BASE(FEET) =  300.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 13.392
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.98
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.38
  AVERAGE FLOW DEPTH(FEET) =   0.00   TRAVEL TIME(MIN.) =   2.04
  Tc(MIN.) =    6.47
  SUBAREA AREA(ACRES) =     0.73       SUBAREA RUNOFF(CFS) =    3.40
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       3.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.01   FLOW VELOCITY(FEET/SEC.) =   1.14
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  TOTAL AREA(ACRES)     =        0.8  TC(MIN.) =      6.47
  PEAK FLOW RATE(CFS)   =       3.60
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============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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 ************************* DESCRIPTION OF STUDY *************************
* J2454 BASIN 2 EXISTING                                                 *
*                                                                        *
*                                                                        *
 **************************************************************************

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  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   6.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*

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

```
  FLOW PROCESS FROM NODE    101.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    752.00
  DOWNSTREAM ELEVATION(FEET) =    743.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.431
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    743.00  DOWNSTREAM(FEET) =    678.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   210.00   CHANNEL SLOPE =  0.3095
  CHANNEL BASE(FEET) =  300.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 12.481
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.80
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.26
  AVERAGE FLOW DEPTH(FEET) =   0.00   TRAVEL TIME(MIN.) =   2.78
  Tc(MIN.) =    7.21
  SUBAREA AREA(ACRES) =     0.68       SUBAREA RUNOFF(CFS) =    2.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       3.17

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.01   FLOW VELOCITY(FEET/SEC.) =   1.00
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  TOTAL AREA(ACRES)     =        0.7  TC(MIN.) =      7.21
  PEAK FLOW RATE(CFS)   =       3.17
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

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                              Analysis prepared by:

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                          16766 BERNARDO CENTER DR. STE. 115
                                   VANRYNENG.COM


 ************************* DESCRIPTION OF STUDY *************************
* J2454 BASIN 1 UNDETAINED                                               *
*                                                                        *
*                                                                        *
 **************************************************************************

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  TIME/DATE OF STUDY: 10:10 07/03/2025
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  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   6.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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.*

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

```
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    46.00
 UPSTREAM ELEVATION(FEET) =    752.00
 DOWNSTREAM ELEVATION(FEET) =    735.00
 ELEVATION DIFFERENCE(FEET) =     17.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.250
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   735.00  DOWNSTREAM(FEET) =   734.00
 FLOW LENGTH(FEET) =   100.50   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.85
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.25
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    4.84
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     146.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5432
 SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    2.16
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       2.41
 TC(MIN.) =    4.84

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

```
 FLOW PROCESS FROM NODE    103.00 TO NODE    105.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   730.65  DOWNSTREAM(FEET) =   730.00
 FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.29
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.41
 PIPE TRAVEL TIME(MIN.) =   0.04    Tc(MIN.) =    4.87
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     173.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    730.00  DOWNSTREAM(FEET) =    691.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   159.00   CHANNEL SLOPE =  0.2453
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   1.500
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 CHANNEL FLOW THRU SUBAREA(CFS) =       2.41
 FLOW VELOCITY(FEET/SEC.) =   8.88   FLOW DEPTH(FEET) =   0.09
 TRAVEL TIME(MIN.) =   0.30   Tc(MIN.) =    5.17
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =     332.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   691.00  DOWNSTREAM(FEET) =   689.00
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =  12.29
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       2.41
 PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    5.25
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =     388.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.322
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4334
  SUBAREA AREA(ACRES) =    0.42   SUBAREA RUNOFF(CFS) =    2.32
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       4.66
  TC(MIN.) =    5.25

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    689.00  DOWNSTREAM(FEET) =    673.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    27.00   CHANNEL SLOPE =  0.5926
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       4.66
  FLOW VELOCITY(FEET/SEC.) =  13.80   FLOW DEPTH(FEET) =   0.08
  TRAVEL TIME(MIN.) =   0.03   Tc(MIN.) =    5.28
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =     415.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    43.00
  UPSTREAM ELEVATION(FEET) =    731.00
  DOWNSTREAM ELEVATION(FEET) =    726.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.109
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.28
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  726.00  DOWNSTREAM ELEVATION(FEET) =  679.25
  STREET LENGTH(FEET) =   231.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 10.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.010
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.010

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.010
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.08
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   11.27
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.23
  STREET FLOW TRAVEL TIME(MIN.) =   0.34   Tc(MIN.) =    4.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.597
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    1.61
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.89

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   2.00
  FLOW VELOCITY(FEET/SEC.) = 11.27   DEPTH*VELOCITY(FT*FT/SEC.) =   2.23
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    123.00 =     274.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   679.25  DOWNSTREAM(FEET) =   679.00
  FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.65
```

```
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.89
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.47
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    124.00 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    114.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   675.00  DOWNSTREAM(FEET) =   674.20
  FLOW LENGTH(FEET) =     6.75   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.62
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.89
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.48
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    114.00 =     307.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 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.) =    4.48
  RAINFALL INTENSITY(INCH/HR) =  15.81
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.89

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    56.00
  UPSTREAM ELEVATION(FEET) =    735.00
  DOWNSTREAM ELEVATION(FEET) =    721.00
  ELEVATION DIFFERENCE(FEET) =     14.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.690
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    721.00  DOWNSTREAM(FEET) =    684.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   183.00   CHANNEL SLOPE =  0.1995
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.13
  FLOW VELOCITY(FEET/SEC.) =   4.48   FLOW DEPTH(FEET) =   0.03
  TRAVEL TIME(MIN.) =   0.68   Tc(MIN.) =    5.37
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.37
  RAINFALL INTENSITY(INCH/HR) =  15.10
  TOTAL STREAM AREA(ACRES) =     0.02
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.13

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.89     4.48       15.808          0.20
      2        0.13     5.37       15.096          0.02

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.00     4.48      15.808
      2        1.93     5.37      15.096

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.00   Tc(MIN.) =    4.48
  TOTAL AREA(ACRES) =        0.2
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    114.00 =     307.75 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    126.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   674.20  DOWNSTREAM(FEET) =   673.40
  FLOW LENGTH(FEET) =     7.20   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  22.86
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    4.49
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    126.00 =     314.95 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.00     4.49      15.808         0.22
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    126.00 =     314.95 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        4.66     5.28      15.261         0.70
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    126.00 =     415.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       5.95       4.49       15.808
      2       6.58       5.28       15.261

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       6.58   Tc(MIN.) =    5.28
  TOTAL AREA(ACRES) =        0.9
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.9  TC(MIN.) =      5.28
  PEAK FLOW RATE(CFS)   =       6.58
============================================================================
============================================================================
```

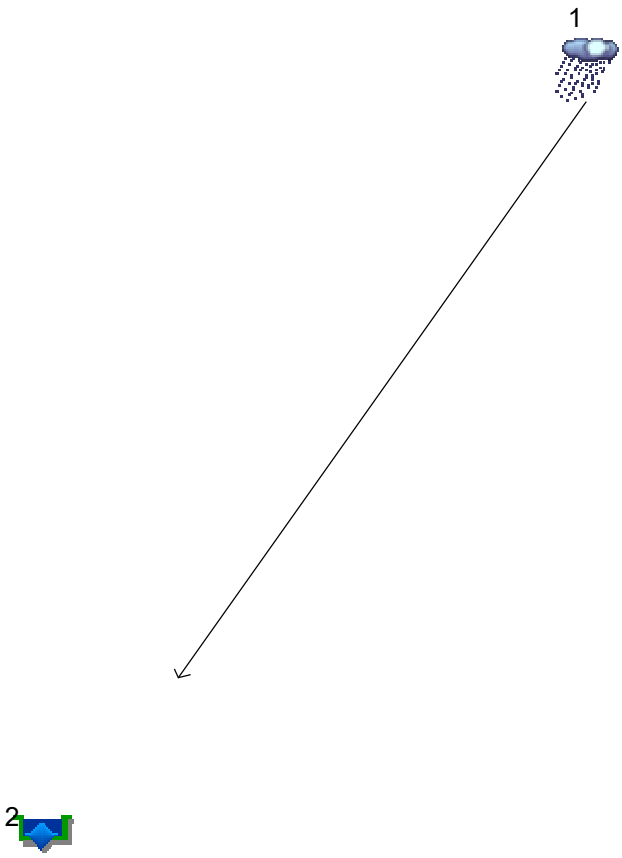
Hydraflow Table of Contents

2454-BF1-DET.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

Monday, 06 / 30 / 2025

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Manual	PR-1,BF-1
2	Reservoir	BF1-DETENTION

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Manual	------	-------	-------	-------	-------	-------	-------	-------	2.410	PR-1,BF-1
2	Reservoir	1	-------	-------	-------	-------	-------	-------	-------	0.669	BF1-DETENTION

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

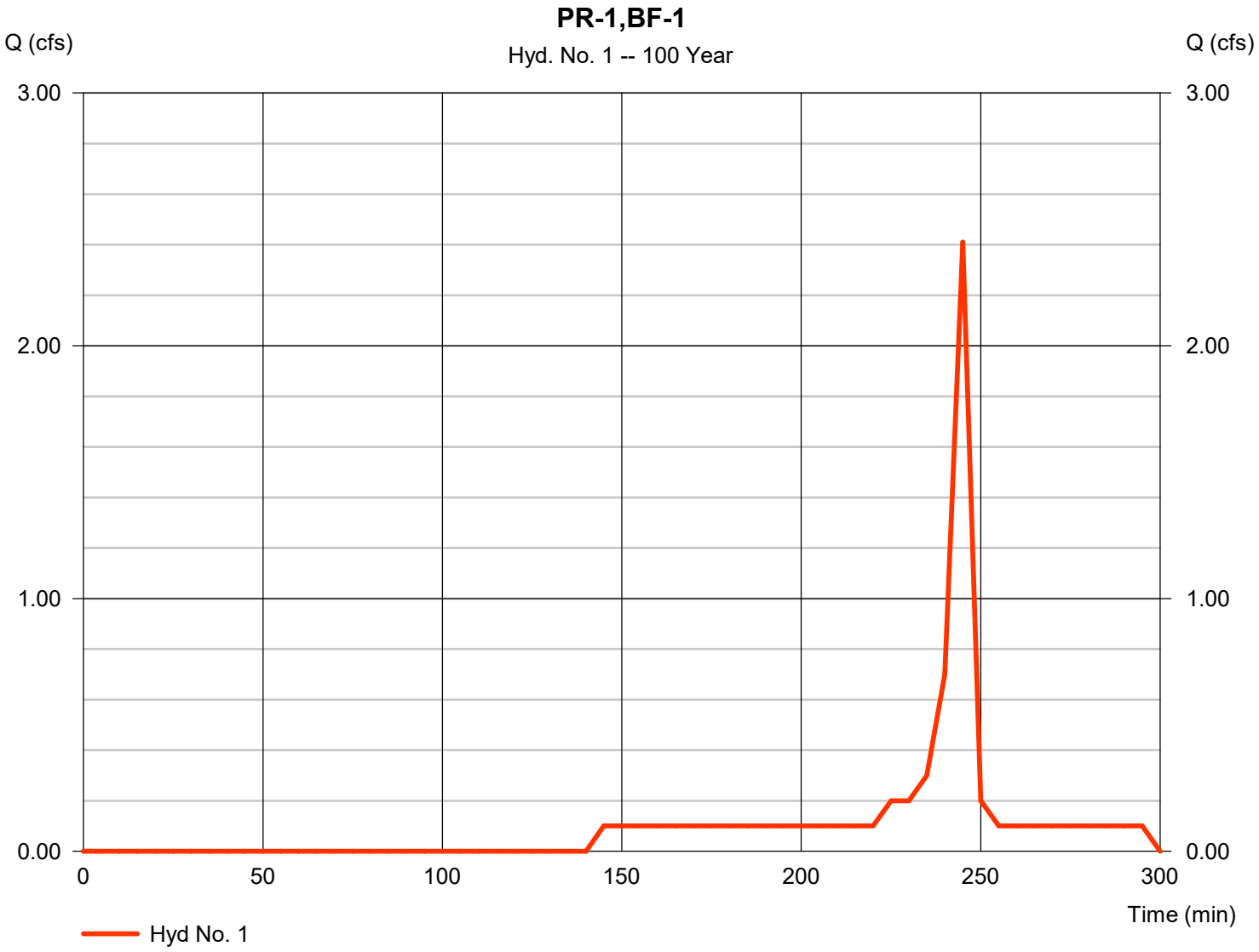
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	2.410	5	245	1,953	------	------	------	PR-1,BF-1
2	Reservoir	0.669	5	250	1,871	1	735.22	728	BF1-DETENTION

Hydrograph Report

Hyd. No. 1

PR-1,BF-1

Hydrograph type	= Manual	Peak discharge	= 2.410 cfs
Storm frequency	= 100 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 1,953 cuft



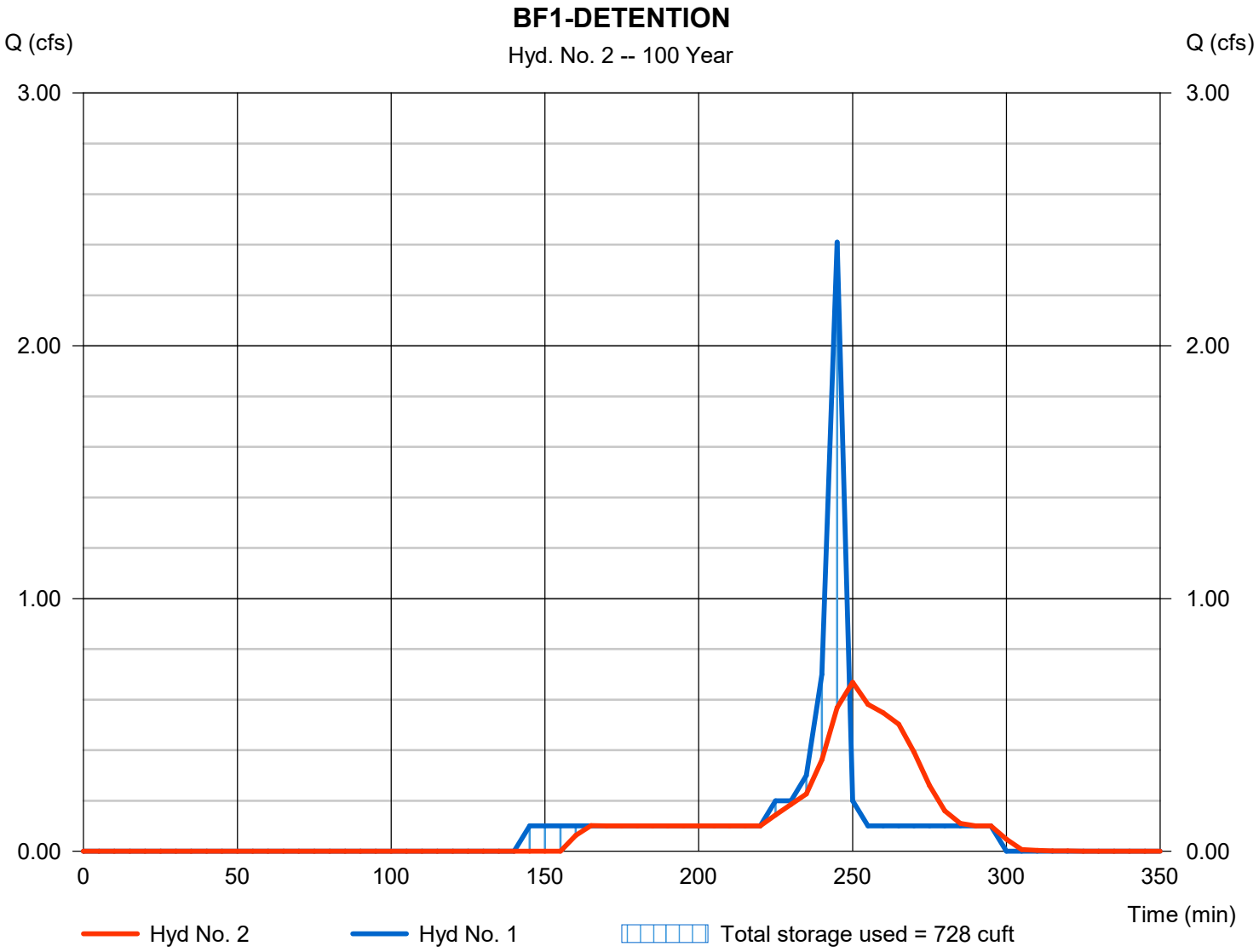
Hydrograph Report

Hyd. No. 2

BF1-DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.669 cfs
Storm frequency	=	100 yrs	Time to peak	=	250 min
Time interval	=	5 min	Hyd. volume	=	1,871 cuft
Inflow hyd. No.	=	1 - PR-1,BF-1	Max. Elevation	=	735.22 ft
Reservoir name	=	BF1	Max. Storage	=	728 cuft

Storage Indication method used.



Pond No. 1 - BF1

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 730.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	730.50	81	0	0
0.25	730.75	81	20	20
0.50	731.00	81	20	40
0.75	731.25	81	20	61
1.00	731.50	81	20	81
1.25	731.75	81	20	101
1.50	732.00	81	20	121
1.75	732.25	81	20	142
2.00	732.50	81	20	162
2.25	732.75	81	20	182
2.50	733.00	81	20	202
2.75	733.25	81	20	223
3.00	733.50	81	20	243
3.25	733.75	81	20	263
3.50	734.00	202	34	297
3.75	734.25	260	58	355
4.00	734.50	321	72	428
4.25	734.75	386	88	516
4.50	735.00	454	105	621
4.75	735.25	526	122	743
5.00	735.50	601	141	884

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	3.50	Inactive	0.00
Span (in)	= 6.00	3.50	2.70	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 730.65	731.50	732.76	0.00
Length (ft)	= 27.00	1.00	1.00	0.00
Slope (%)	= 2.40	1.00	1.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	Inactive	0.00	0.00
Crest El. (ft)	= 735.20	734.41	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No

Exfil.(in/hr) = 0.000 (by Contour)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	730.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.03	2	730.53	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.05	4	730.55	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.08	6	730.58	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.10	8	730.60	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.13	10	730.63	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.15	12	730.65	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.17	14	730.68	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.20	16	730.70	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.22	18	730.73	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.25	20	730.75	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.28	22	730.78	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.30	24	730.80	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.32	26	730.83	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.35	28	730.85	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.38	30	730.88	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.40	32	730.90	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.43	34	730.93	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.45	36	730.95	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.48	38	730.98	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.50	40	731.00	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.52	43	731.03	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000

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BF1

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.55	45	731.05	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.57	47	731.08	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.60	49	731.10	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.62	51	731.13	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.65	53	731.15	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.67	55	731.18	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.70	57	731.20	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.72	59	731.23	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.75	61	731.25	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.77	63	731.28	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.80	65	731.30	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.82	67	731.33	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.85	69	731.35	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.87	71	731.38	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.90	73	731.40	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.92	75	731.43	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.95	77	731.45	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
0.97	79	731.48	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.00	81	731.50	0.00	0.00	0.00	---	0.00	0.00	---	---	---	---	0.000
1.02	83	731.53	0.00 ic	0.00 ic	0.00	---	0.00	0.00	---	---	---	---	0.002
1.05	85	731.55	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.006
1.08	87	731.58	0.01 ic	0.01 ic	0.00	---	0.00	0.00	---	---	---	---	0.013
1.10	89	731.60	0.02 ic	0.02 ic	0.00	---	0.00	0.00	---	---	---	---	0.022
1.13	91	731.63	0.03 ic	0.03 ic	0.00	---	0.00	0.00	---	---	---	---	0.033
1.15	93	731.65	0.05 ic	0.05 ic	0.00	---	0.00	0.00	---	---	---	---	0.046
1.17	95	731.68	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	---	---	0.060
1.20	97	731.70	0.08 ic	0.08 ic	0.00	---	0.00	0.00	---	---	---	---	0.075
1.23	99	731.73	0.09 ic	0.09 ic	0.00	---	0.00	0.00	---	---	---	---	0.090
1.25	101	731.75	0.11 ic	0.10 ic	0.00	---	0.00	0.00	---	---	---	---	0.104
1.27	103	731.78	0.12 ic	0.12 ic	0.00	---	0.00	0.00	---	---	---	---	0.117
1.30	105	731.80	0.13 ic	0.13 ic	0.00	---	0.00	0.00	---	---	---	---	0.126
1.33	107	731.83	0.14 ic	0.14 ic	0.00	---	0.00	0.00	---	---	---	---	0.136
1.35	109	731.85	0.15 ic	0.15 ic	0.00	---	0.00	0.00	---	---	---	---	0.145
1.38	111	731.88	0.16 ic	0.15 ic	0.00	---	0.00	0.00	---	---	---	---	0.154
1.40	113	731.90	0.16 ic	0.16 ic	0.00	---	0.00	0.00	---	---	---	---	0.162
1.42	115	731.93	0.17 ic	0.17 ic	0.00	---	0.00	0.00	---	---	---	---	0.170
1.45	117	731.95	0.18 ic	0.18 ic	0.00	---	0.00	0.00	---	---	---	---	0.177
1.48	119	731.98	0.18 ic	0.18 ic	0.00	---	0.00	0.00	---	---	---	---	0.185
1.50	121	732.00	0.19 ic	0.19 ic	0.00	---	0.00	0.00	---	---	---	---	0.191
1.52	124	732.03	0.20 ic	0.20 ic	0.00	---	0.00	0.00	---	---	---	---	0.198
1.55	126	732.05	0.20 ic	0.20 ic	0.00	---	0.00	0.00	---	---	---	---	0.204
1.58	128	732.08	0.21 ic	0.21 ic	0.00	---	0.00	0.00	---	---	---	---	0.211
1.60	130	732.10	0.22 ic	0.22 ic	0.00	---	0.00	0.00	---	---	---	---	0.217
1.63	132	732.13	0.22 ic	0.22 ic	0.00	---	0.00	0.00	---	---	---	---	0.223
1.65	134	732.15	0.23 ic	0.23 ic	0.00	---	0.00	0.00	---	---	---	---	0.228
1.67	136	732.18	0.23 ic	0.23 ic	0.00	---	0.00	0.00	---	---	---	---	0.234
1.70	138	732.20	0.24 ic	0.24 ic	0.00	---	0.00	0.00	---	---	---	---	0.239
1.73	140	732.23	0.24 ic	0.24 ic	0.00	---	0.00	0.00	---	---	---	---	0.245
1.75	142	732.25	0.25 ic	0.25 ic	0.00	---	0.00	0.00	---	---	---	---	0.250
1.77	144	732.28	0.26 ic	0.26 ic	0.00	---	0.00	0.00	---	---	---	---	0.255
1.80	146	732.30	0.26 ic	0.26 ic	0.00	---	0.00	0.00	---	---	---	---	0.260
1.83	148	732.33	0.27 ic	0.27 ic	0.00	---	0.00	0.00	---	---	---	---	0.265
1.85	150	732.35	0.27 ic	0.27 ic	0.00	---	0.00	0.00	---	---	---	---	0.270
1.88	152	732.38	0.27 ic	0.27 ic	0.00	---	0.00	0.00	---	---	---	---	0.275
1.90	154	732.40	0.28 ic	0.28 ic	0.00	---	0.00	0.00	---	---	---	---	0.279
1.92	156	732.43	0.28 ic	0.28 ic	0.00	---	0.00	0.00	---	---	---	---	0.284
1.95	158	732.45	0.29 ic	0.29 ic	0.00	---	0.00	0.00	---	---	---	---	0.288
1.98	160	732.48	0.29 ic	0.29 ic	0.00	---	0.00	0.00	---	---	---	---	0.293
2.00	162	732.50	0.30 ic	0.30 ic	0.00	---	0.00	0.00	---	---	---	---	0.297
2.03	164	732.53	0.30 ic	0.30 ic	0.00	---	0.00	0.00	---	---	---	---	0.302
2.05	166	732.55	0.31 ic	0.31 ic	0.00	---	0.00	0.00	---	---	---	---	0.306
2.08	168	732.58	0.31 ic	0.31 ic	0.00	---	0.00	0.00	---	---	---	---	0.310
2.10	170	732.60	0.32 ic	0.31 ic	0.00	---	0.00	0.00	---	---	---	---	0.314
2.13	172	732.63	0.32 ic	0.32 ic	0.00	---	0.00	0.00	---	---	---	---	0.318
2.15	174	732.65	0.32 ic	0.32 ic	0.00	---	0.00	0.00	---	---	---	---	0.322
2.18	176	732.68	0.33 ic	0.33 ic	0.00	---	0.00	0.00	---	---	---	---	0.326
2.20	178	732.70	0.33 ic	0.33 ic	0.00	---	0.00	0.00	---	---	---	---	0.330
2.23	180	732.73	0.34 ic	0.33 ic	0.00	---	0.00	0.00	---	---	---	---	0.334
2.25	182	732.75	0.34 ic	0.34 ic	0.00	---	0.00	0.00	---	---	---	---	0.338
2.28	184	732.78	0.34 ic	0.34 ic	0.00	---	0.00	0.00	---	---	---	---	0.342
2.30	186	732.80	0.35 ic	0.35 ic	0.00	---	0.00	0.00	---	---	---	---	0.346
2.33	188	732.83	0.35 ic	0.35 ic	0.00	---	0.00	0.00	---	---	---	---	0.349

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.35	190	732.85	0.35 ic	0.35 ic	0.00	---	0.00	0.00	---	---	---	---	0.353
2.38	192	732.88	0.36 ic	0.36 ic	0.00	---	0.00	0.00	---	---	---	---	0.357
2.40	194	732.90	0.36 ic	0.36 ic	0.00	---	0.00	0.00	---	---	---	---	0.360
2.43	196	732.93	0.37 ic	0.36 ic	0.00	---	0.00	0.00	---	---	---	---	0.364
2.45	198	732.95	0.37 ic	0.37 ic	0.00	---	0.00	0.00	---	---	---	---	0.367
2.48	200	732.98	0.37 ic	0.37 ic	0.00	---	0.00	0.00	---	---	---	---	0.371
2.50	202	733.00	0.37 ic	0.37 ic	0.00	---	0.00	0.00	---	---	---	---	0.374
2.53	205	733.03	0.38 ic	0.38 ic	0.00	---	0.00	0.00	---	---	---	---	0.378
2.55	207	733.05	0.38 ic	0.38 ic	0.00	---	0.00	0.00	---	---	---	---	0.381
2.58	209	733.08	0.38 ic	0.38 ic	0.00	---	0.00	0.00	---	---	---	---	0.385
2.60	211	733.10	0.39 ic	0.39 ic	0.00	---	0.00	0.00	---	---	---	---	0.388
2.63	213	733.13	0.39 ic	0.39 ic	0.00	---	0.00	0.00	---	---	---	---	0.391
2.65	215	733.15	0.40 ic	0.39 ic	0.00	---	0.00	0.00	---	---	---	---	0.395
2.68	217	733.18	0.40 ic	0.40 ic	0.00	---	0.00	0.00	---	---	---	---	0.398
2.70	219	733.20	0.40 ic	0.40 ic	0.00	---	0.00	0.00	---	---	---	---	0.401
2.73	221	733.23	0.41 ic	0.40 ic	0.00	---	0.00	0.00	---	---	---	---	0.404
2.75	223	733.25	0.41 ic	0.41 ic	0.00	---	0.00	0.00	---	---	---	---	0.407
2.78	225	733.28	0.41 ic	0.41 ic	0.00	---	0.00	0.00	---	---	---	---	0.411
2.80	227	733.30	0.42 ic	0.41 ic	0.00	---	0.00	0.00	---	---	---	---	0.414
2.83	229	733.33	0.42 ic	0.42 ic	0.00	---	0.00	0.00	---	---	---	---	0.417
2.85	231	733.35	0.42 ic	0.42 ic	0.00	---	0.00	0.00	---	---	---	---	0.420
2.88	233	733.38	0.42 ic	0.42 ic	0.00	---	0.00	0.00	---	---	---	---	0.423
2.90	235	733.40	0.43 ic	0.43 ic	0.00	---	0.00	0.00	---	---	---	---	0.426
2.93	237	733.43	0.43 ic	0.43 ic	0.00	---	0.00	0.00	---	---	---	---	0.429
2.95	239	733.45	0.43 ic	0.43 ic	0.00	---	0.00	0.00	---	---	---	---	0.432
2.98	241	733.48	0.44 ic	0.44 ic	0.00	---	0.00	0.00	---	---	---	---	0.435
3.00	243	733.50	0.44 ic	0.44 ic	0.00	---	0.00	0.00	---	---	---	---	0.438
3.03	245	733.53	0.44 ic	0.44 ic	0.00	---	0.00	0.00	---	---	---	---	0.441
3.05	247	733.55	0.44 ic	0.44 ic	0.00	---	0.00	0.00	---	---	---	---	0.444
3.08	249	733.58	0.45 ic	0.45 ic	0.00	---	0.00	0.00	---	---	---	---	0.447
3.10	251	733.60	0.45 ic	0.45 ic	0.00	---	0.00	0.00	---	---	---	---	0.450
3.13	253	733.63	0.45 ic	0.45 ic	0.00	---	0.00	0.00	---	---	---	---	0.453
3.15	255	733.65	0.46 ic	0.46 ic	0.00	---	0.00	0.00	---	---	---	---	0.455
3.18	257	733.68	0.46 ic	0.46 ic	0.00	---	0.00	0.00	---	---	---	---	0.458
3.20	259	733.70	0.46 ic	0.46 ic	0.00	---	0.00	0.00	---	---	---	---	0.461
3.23	261	733.73	0.46 ic	0.46 ic	0.00	---	0.00	0.00	---	---	---	---	0.464
3.25	263	733.75	0.47 ic	0.47 ic	0.00	---	0.00	0.00	---	---	---	---	0.467
3.28	267	733.78	0.47 ic	0.47 ic	0.00	---	0.00	0.00	---	---	---	---	0.469
3.30	270	733.80	0.47 ic	0.47 ic	0.00	---	0.00	0.00	---	---	---	---	0.472
3.33	273	733.83	0.47 ic	0.47 ic	0.00	---	0.00	0.00	---	---	---	---	0.475
3.35	277	733.85	0.48 ic	0.48 ic	0.00	---	0.00	0.00	---	---	---	---	0.478
3.38	280	733.88	0.48 ic	0.48 ic	0.00	---	0.00	0.00	---	---	---	---	0.480
3.40	284	733.90	0.48 ic	0.48 ic	0.00	---	0.00	0.00	---	---	---	---	0.483
3.43	287	733.93	0.49 ic	0.49 ic	0.00	---	0.00	0.00	---	---	---	---	0.486
3.45	291	733.95	0.49 ic	0.49 ic	0.00	---	0.00	0.00	---	---	---	---	0.488
3.48	294	733.98	0.49 ic	0.49 ic	0.00	---	0.00	0.00	---	---	---	---	0.491
3.50	297	734.00	0.49 ic	0.49 ic	0.00	---	0.00	0.00	---	---	---	---	0.494
3.53	303	734.03	0.50 ic	0.50 ic	0.00	---	0.00	0.00	---	---	---	---	0.496
3.55	309	734.05	0.50 ic	0.50 ic	0.00	---	0.00	0.00	---	---	---	---	0.499
3.58	315	734.08	0.50 ic	0.50 ic	0.00	---	0.00	0.00	---	---	---	---	0.501
3.60	320	734.10	0.50 ic	0.50 ic	0.00	---	0.00	0.00	---	---	---	---	0.504
3.63	326	734.13	0.51 ic	0.51 ic	0.00	---	0.00	0.00	---	---	---	---	0.506
3.65	332	734.15	0.51 ic	0.51 ic	0.00	---	0.00	0.00	---	---	---	---	0.509
3.68	338	734.18	0.51 ic	0.51 ic	0.00	---	0.00	0.00	---	---	---	---	0.512
3.70	344	734.20	0.51 ic	0.51 ic	0.00	---	0.00	0.00	---	---	---	---	0.514
3.73	349	734.23	0.52 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.517
3.75	355	734.25	0.52 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.519
3.78	362	734.28	0.52 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.522
3.80	370	734.30	0.52 ic	0.52 ic	0.00	---	0.00	0.00	---	---	---	---	0.524
3.83	377	734.33	0.53 ic	0.53 ic	0.00	---	0.00	0.00	---	---	---	---	0.527
3.85	384	734.35	0.53 ic	0.53 ic	0.00	---	0.00	0.00	---	---	---	---	0.529
3.88	391	734.38	0.53 ic	0.53 ic	0.00	---	0.00	0.00	---	---	---	---	0.531
3.90	399	734.40	0.53 ic	0.53 ic	0.00	---	0.00	0.00	---	---	---	---	0.534
3.93	406	734.43	0.54 ic	0.54 ic	0.00	---	0.00	0.00	---	---	---	---	0.536
3.95	413	734.45	0.54 ic	0.54 ic	0.00	---	0.00	0.00	---	---	---	---	0.539
3.98	420	734.48	0.54 ic	0.54 ic	0.00	---	0.00	0.00	---	---	---	---	0.541
4.00	428	734.50	0.54 ic	0.54 ic	0.00	---	0.00	0.00	---	---	---	---	0.543
4.03	436	734.53	0.55 ic	0.55 ic	0.00	---	0.00	0.00	---	---	---	---	0.546
4.05	445	734.55	0.55 ic	0.55 ic	0.00	---	0.00	0.00	---	---	---	---	0.548
4.07	454	734.58	0.55 ic	0.55 ic	0.00	---	0.00	0.00	---	---	---	---	0.551
4.10	463	734.60	0.55 ic	0.55 ic	0.00	---	0.00	0.00	---	---	---	---	0.553
4.13	472	734.63	0.56 ic	0.56 ic	0.00	---	0.00	0.00	---	---	---	---	0.555

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
4.15	480	734.65	0.56 ic	0.56 ic	0.00	---	0.00	0.00	---	---	---	---	0.558
4.18	489	734.68	0.56 ic	0.56 ic	0.00	---	0.00	0.00	---	---	---	---	0.560
4.20	498	734.70	0.56 ic	0.56 ic	0.00	---	0.00	0.00	---	---	---	---	0.562
4.23	507	734.73	0.56 ic	0.56 ic	0.00	---	0.00	0.00	---	---	---	---	0.564
4.25	516	734.75	0.57 ic	0.57 ic	0.00	---	0.00	0.00	---	---	---	---	0.567
4.28	526	734.78	0.57 ic	0.57 ic	0.00	---	0.00	0.00	---	---	---	---	0.569
4.30	537	734.80	0.57 ic	0.57 ic	0.00	---	0.00	0.00	---	---	---	---	0.571
4.32	547	734.83	0.57 ic	0.57 ic	0.00	---	0.00	0.00	---	---	---	---	0.574
4.35	558	734.85	0.58 ic	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.576
4.38	568	734.88	0.58 ic	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.578
4.40	579	734.90	0.58 ic	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.580
4.43	589	734.93	0.58 ic	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.583
4.45	600	734.95	0.58 ic	0.58 ic	0.00	---	0.00	0.00	---	---	---	---	0.585
4.48	610	734.98	0.59 ic	0.59 ic	0.00	---	0.00	0.00	---	---	---	---	0.587
4.50	621	735.00	0.59 ic	0.59 ic	0.00	---	0.00	0.00	---	---	---	---	0.589
4.53	633	735.03	0.59 ic	0.59 ic	0.00	---	0.00	0.00	---	---	---	---	0.591
4.55	645	735.05	0.59 ic	0.59 ic	0.00	---	0.00	0.00	---	---	---	---	0.593
4.57	657	735.08	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.596
4.60	670	735.10	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.598
4.63	682	735.13	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.600
4.65	694	735.15	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.602
4.68	706	735.18	0.60 ic	0.60 ic	0.00	---	0.00	0.00	---	---	---	---	0.604
4.70	719	735.20	0.61 ic	0.61 ic	0.00	---	0.00	0.00	---	---	---	---	0.607
4.73	731	735.23	0.69 ic	0.61 ic	0.00	---	0.08	0.00	---	---	---	---	0.689
4.75	743	735.25	0.83 ic	0.61 ic	0.00	---	0.22	0.00	---	---	---	---	0.832
4.78	757	735.28	0.99 ic	0.58 ic	0.00	---	0.41	0.00	---	---	---	---	0.993
4.80	771	735.30	1.17 oc	0.54 ic	0.00	---	0.63	0.00	---	---	---	---	1.171
4.82	785	735.33	1.36 oc	0.47 ic	0.00	---	0.88	0.00	---	---	---	---	1.356
4.85	799	735.35	1.54 oc	0.38 ic	0.00	---	1.16	0.00	---	---	---	---	1.542
4.88	813	735.38	1.71 oc	0.25 ic	0.00	---	1.46	0.00	---	---	---	---	1.715
4.90	827	735.40	1.81 oc	0.12 ic	0.00	---	1.69 s	0.00	---	---	---	---	1.809
4.93	842	735.43	1.82 oc	0.10 ic	0.00	---	1.72 s	0.00	---	---	---	---	1.823
4.95	856	735.45	1.83 oc	0.09 ic	0.00	---	1.75 s	0.00	---	---	---	---	1.832
4.98	870	735.48	1.84 oc	0.07 ic	0.00	---	1.77 s	0.00	---	---	---	---	1.840
5.00	884	735.50	1.85 oc	0.07 ic	0.00	---	1.78 s	0.00	---	---	---	---	1.847

...End

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	2.20	0.00	3.30	4.25	5.77	6.80	7.95
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

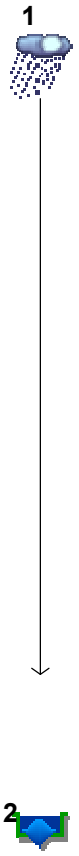
Hydraflow Table of Contents

2454-BF2-DET.gpw

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

Monday, 06 / 30 / 2025

Watershed Model Schematic



Legend

Hyd.	Origin	Description
1	Manual	PR-1,BF-2
2	Reservoir	BF-2 DETENTION

Hydrograph Return Period Recap

Hyd. No.	Hydrograph type (origin)	Inflow hyd(s)	Peak Outflow (cfs)								Hydrograph Description
			1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr	
1	Manual	------	-------	-------	-------	-------	-------	-------	-------	1.920	PR-1,BF-2
2	Reservoir	1	-------	-------	-------	-------	-------	-------	-------	0.561	BF-2 DETENTION

Hydrograph Summary Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2025

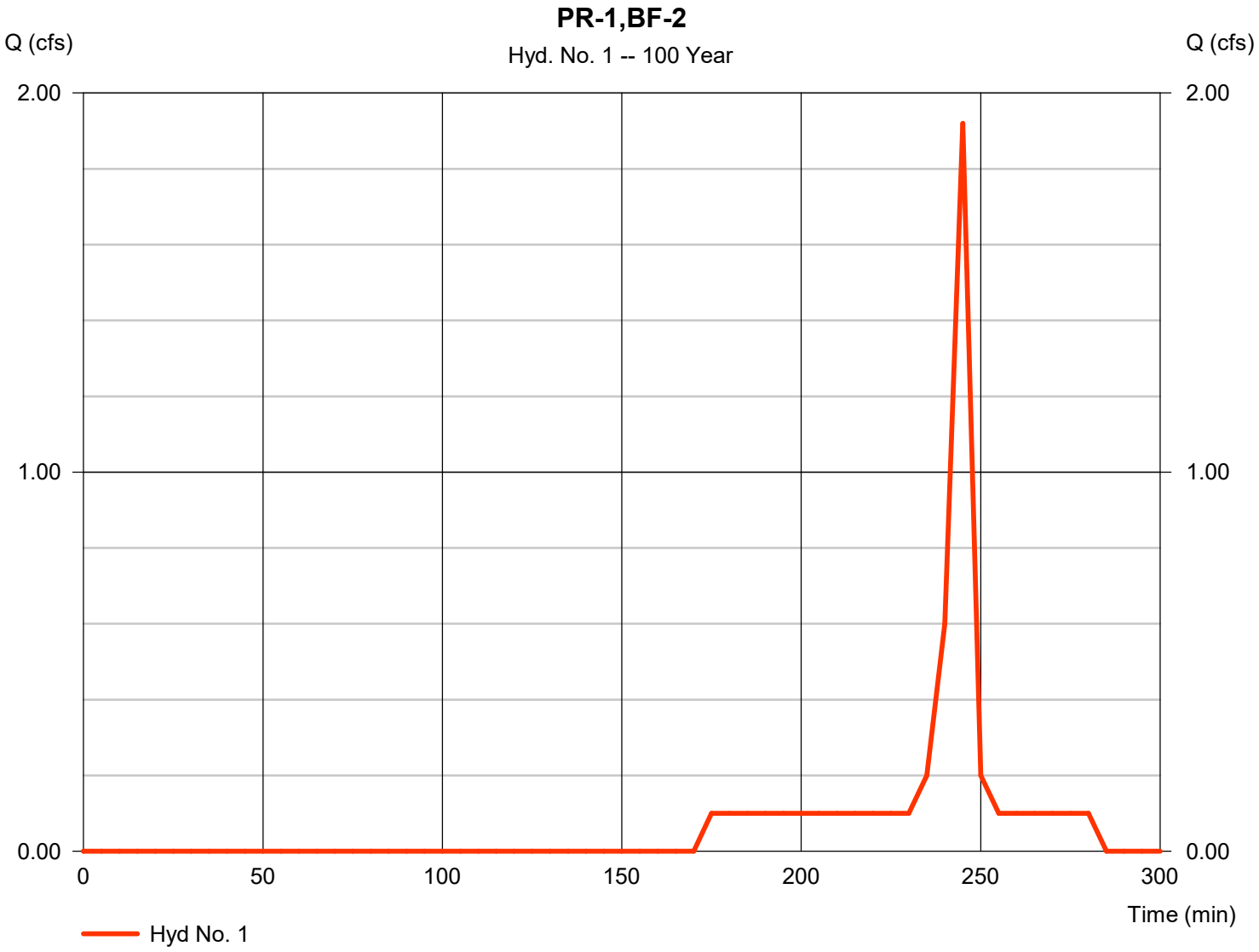
Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to Peak (min)	Hyd. volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Total strge used (cuft)	Hydrograph Description
1	Manual	1.920	5	245	1,416	------	------	------	PR-1,BF-2
2	Reservoir	0.561	5	250	1,323	1	679.51	620	BF-2 DETENTION

Hydrograph Report

Hyd. No. 1

PR-1,BF-2

Hydrograph type	= Manual	Peak discharge	= 1.920 cfs
Storm frequency	= 100 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 1,416 cuft



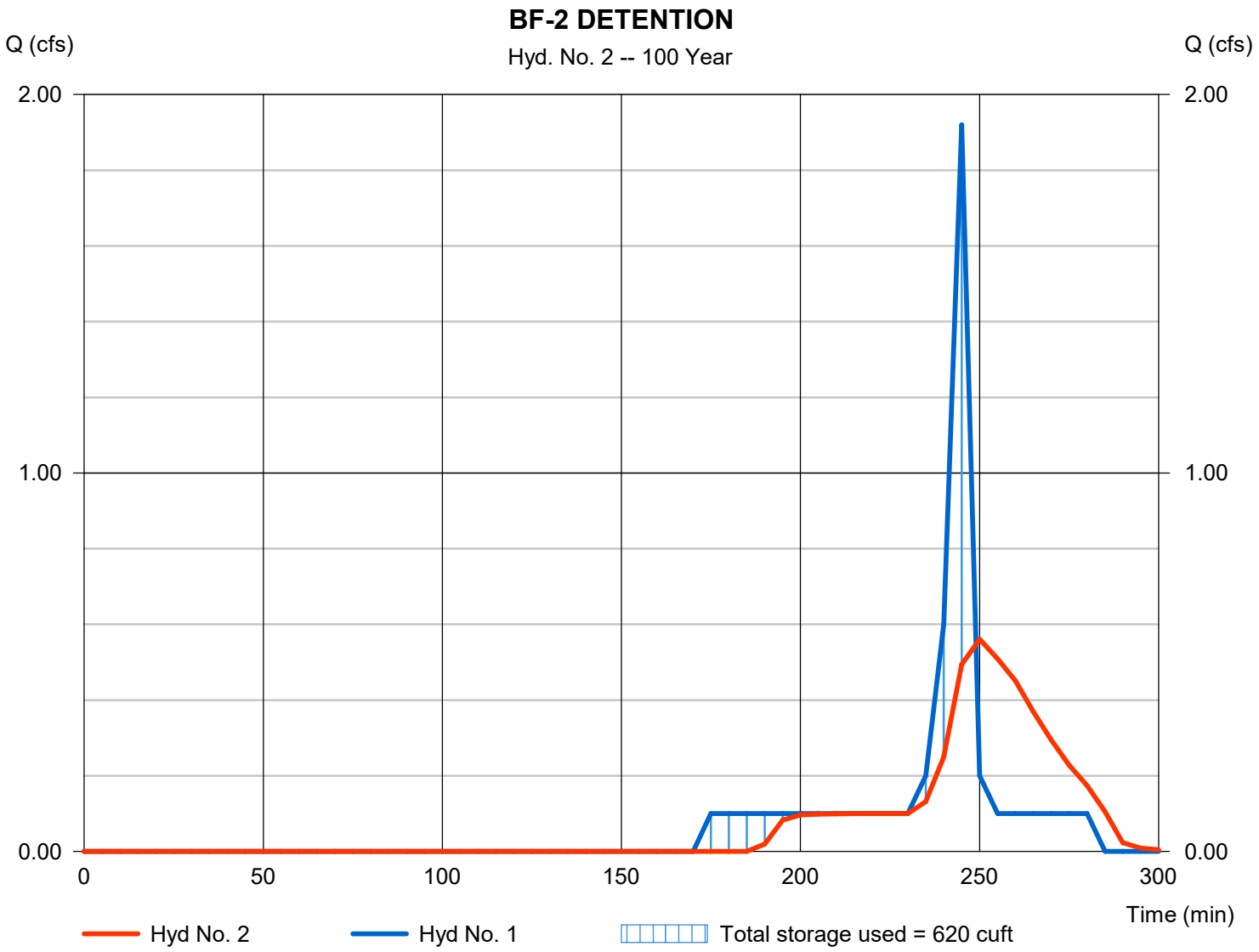
Hydrograph Report

Hyd. No. 2

BF-2 DETENTION

Hydrograph type	=	Reservoir	Peak discharge	=	0.561 cfs
Storm frequency	=	100 yrs	Time to peak	=	250 min
Time interval	=	5 min	Hyd. volume	=	1,323 cuft
Inflow hyd. No.	=	1 - PR-1,BF-2	Max. Elevation	=	679.51 ft
Reservoir name	=	BF-2	Max. Storage	=	620 cuft

Storage Indication method used.



Pond No. 1 - BF-2

Pond Data

Contours -User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 675.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	675.00	114	0	0
0.25	675.25	114	28	28
0.50	675.50	114	28	57
0.75	675.75	114	28	85
1.00	676.00	114	28	114
1.25	676.25	114	28	142
1.50	676.50	114	28	171
1.75	676.75	114	28	199
2.00	677.00	114	28	228
2.25	677.25	114	28	256
2.50	677.50	114	28	285
2.75	677.75	114	28	313
3.00	678.00	114	28	342
3.25	678.25	114	28	370
3.50	678.50	114	28	399
3.75	678.75	114	28	427
4.00	679.00	285	48	476
4.25	679.25	285	71	547
4.50	679.50	285	71	618
4.75	679.75	285	71	689
5.00	680.00	285	71	761

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	3.30	0.00	0.00
Span (in)	= 6.00	3.30	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 675.00	675.80	0.00	0.00
Length (ft)	= 7.00	1.00	0.00	0.00
Slope (%)	= 12.00	1.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 6.00	0.00	0.00	0.00
Crest El. (ft)	= 679.50	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	---	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)

TW Elev. (ft) = 0.00

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	675.00	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.03	3	675.03	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.05	6	675.05	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.08	9	675.08	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.10	11	675.10	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.13	14	675.13	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.15	17	675.15	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.17	20	675.18	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.20	23	675.20	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.22	26	675.23	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.25	28	675.25	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.28	31	675.28	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.30	34	675.30	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.32	37	675.33	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.35	40	675.35	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.38	43	675.38	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.40	46	675.40	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.43	48	675.43	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.45	51	675.45	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.48	54	675.48	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.50	57	675.50	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.52	60	675.53	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000

Continues on next page...

BF-2

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.55	63	675.55	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.57	66	675.58	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.60	68	675.60	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.62	71	675.63	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.65	74	675.65	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.67	77	675.68	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.70	80	675.70	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.72	83	675.73	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.75	85	675.75	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.77	88	675.78	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.80	91	675.80	0.00	0.00	---	---	0.00	---	---	---	---	---	0.000
0.82	94	675.83	0.00 ic	0.00 ic	---	---	0.00	---	---	---	---	---	0.002
0.85	97	675.85	0.01 ic	0.01 ic	---	---	0.00	---	---	---	---	---	0.006
0.87	100	675.88	0.01 ic	0.01 ic	---	---	0.00	---	---	---	---	---	0.012
0.90	103	675.90	0.02 ic	0.02 ic	---	---	0.00	---	---	---	---	---	0.021
0.92	105	675.93	0.03 ic	0.03 ic	---	---	0.00	---	---	---	---	---	0.032
0.95	108	675.95	0.04 ic	0.04 ic	---	---	0.00	---	---	---	---	---	0.044
0.97	111	675.98	0.06 ic	0.06 ic	---	---	0.00	---	---	---	---	---	0.057
1.00	114	676.00	0.07 ic	0.07 ic	---	---	0.00	---	---	---	---	---	0.071
1.02	117	676.03	0.08 ic	0.08 ic	---	---	0.00	---	---	---	---	---	0.084
1.05	120	676.05	0.10 ic	0.10 ic	---	---	0.00	---	---	---	---	---	0.097
1.08	123	676.08	0.11 ic	0.11 ic	---	---	0.00	---	---	---	---	---	0.106
1.10	125	676.10	0.12 ic	0.12 ic	---	---	0.00	---	---	---	---	---	0.115
1.13	128	676.13	0.13 ic	0.12 ic	---	---	0.00	---	---	---	---	---	0.124
1.15	131	676.15	0.13 ic	0.13 ic	---	---	0.00	---	---	---	---	---	0.132
1.17	134	676.18	0.14 ic	0.14 ic	---	---	0.00	---	---	---	---	---	0.139
1.20	137	676.20	0.15 ic	0.15 ic	---	---	0.00	---	---	---	---	---	0.147
1.23	140	676.23	0.16 ic	0.15 ic	---	---	0.00	---	---	---	---	---	0.153
1.25	142	676.25	0.16 ic	0.16 ic	---	---	0.00	---	---	---	---	---	0.160
1.27	145	676.28	0.17 ic	0.17 ic	---	---	0.00	---	---	---	---	---	0.166
1.30	148	676.30	0.18 ic	0.17 ic	---	---	0.00	---	---	---	---	---	0.172
1.33	151	676.33	0.18 ic	0.18 ic	---	---	0.00	---	---	---	---	---	0.178
1.35	154	676.35	0.18 ic	0.18 ic	---	---	0.00	---	---	---	---	---	0.184
1.38	157	676.38	0.19 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.189
1.40	160	676.40	0.19 ic	0.19 ic	---	---	0.00	---	---	---	---	---	0.194
1.42	162	676.43	0.20 ic	0.20 ic	---	---	0.00	---	---	---	---	---	0.200
1.45	165	676.45	0.20 ic	0.20 ic	---	---	0.00	---	---	---	---	---	0.205
1.48	168	676.48	0.21 ic	0.21 ic	---	---	0.00	---	---	---	---	---	0.210
1.50	171	676.50	0.21 ic	0.21 ic	---	---	0.00	---	---	---	---	---	0.214
1.52	174	676.53	0.22 ic	0.22 ic	---	---	0.00	---	---	---	---	---	0.219
1.55	177	676.55	0.22 ic	0.22 ic	---	---	0.00	---	---	---	---	---	0.224
1.58	180	676.58	0.23 ic	0.23 ic	---	---	0.00	---	---	---	---	---	0.228
1.60	182	676.60	0.23 ic	0.23 ic	---	---	0.00	---	---	---	---	---	0.233
1.63	185	676.63	0.24 ic	0.24 ic	---	---	0.00	---	---	---	---	---	0.237
1.65	188	676.65	0.24 ic	0.24 ic	---	---	0.00	---	---	---	---	---	0.241
1.67	191	676.68	0.25 ic	0.25 ic	---	---	0.00	---	---	---	---	---	0.246
1.70	194	676.70	0.25 ic	0.25 ic	---	---	0.00	---	---	---	---	---	0.250
1.73	197	676.73	0.25 ic	0.25 ic	---	---	0.00	---	---	---	---	---	0.254
1.75	199	676.75	0.26 ic	0.26 ic	---	---	0.00	---	---	---	---	---	0.258
1.77	202	676.78	0.26 ic	0.26 ic	---	---	0.00	---	---	---	---	---	0.262
1.80	205	676.80	0.27 ic	0.27 ic	---	---	0.00	---	---	---	---	---	0.266
1.83	208	676.83	0.27 ic	0.27 ic	---	---	0.00	---	---	---	---	---	0.269
1.85	211	676.85	0.27 ic	0.27 ic	---	---	0.00	---	---	---	---	---	0.273
1.88	214	676.88	0.28 ic	0.28 ic	---	---	0.00	---	---	---	---	---	0.277
1.90	217	676.90	0.28 ic	0.28 ic	---	---	0.00	---	---	---	---	---	0.281
1.92	219	676.93	0.28 ic	0.28 ic	---	---	0.00	---	---	---	---	---	0.284
1.95	222	676.95	0.29 ic	0.29 ic	---	---	0.00	---	---	---	---	---	0.288
1.98	225	676.98	0.29 ic	0.29 ic	---	---	0.00	---	---	---	---	---	0.291
2.00	228	677.00	0.30 ic	0.29 ic	---	---	0.00	---	---	---	---	---	0.295
2.03	231	677.03	0.30 ic	0.30 ic	---	---	0.00	---	---	---	---	---	0.298
2.05	234	677.05	0.30 ic	0.30 ic	---	---	0.00	---	---	---	---	---	0.302
2.08	237	677.08	0.31 ic	0.30 ic	---	---	0.00	---	---	---	---	---	0.305
2.10	239	677.10	0.31 ic	0.31 ic	---	---	0.00	---	---	---	---	---	0.308
2.13	242	677.13	0.31 ic	0.31 ic	---	---	0.00	---	---	---	---	---	0.312
2.15	245	677.15	0.32 ic	0.31 ic	---	---	0.00	---	---	---	---	---	0.315
2.18	248	677.18	0.32 ic	0.32 ic	---	---	0.00	---	---	---	---	---	0.318
2.20	251	677.20	0.32 ic	0.32 ic	---	---	0.00	---	---	---	---	---	0.321
2.23	254	677.23	0.33 ic	0.32 ic	---	---	0.00	---	---	---	---	---	0.324
2.25	256	677.25	0.33 ic	0.33 ic	---	---	0.00	---	---	---	---	---	0.328
2.28	259	677.28	0.33 ic	0.33 ic	---	---	0.00	---	---	---	---	---	0.331
2.30	262	677.30	0.34 ic	0.33 ic	---	---	0.00	---	---	---	---	---	0.334
2.33	265	677.33	0.34 ic	0.34 ic	---	---	0.00	---	---	---	---	---	0.337

Continues on next page...

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
2.35	268	677.35	0.34 ic	0.34 ic	---	---	0.00	---	---	---	---	---	0.340
2.38	271	677.38	0.34 ic	0.34 ic	---	---	0.00	---	---	---	---	---	0.343
2.40	274	677.40	0.35 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.346
2.43	276	677.43	0.35 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.349
2.45	279	677.45	0.35 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.352
2.48	282	677.48	0.36 ic	0.35 ic	---	---	0.00	---	---	---	---	---	0.355
2.50	285	677.50	0.36 ic	0.36 ic	---	---	0.00	---	---	---	---	---	0.357
2.53	288	677.53	0.36 ic	0.36 ic	---	---	0.00	---	---	---	---	---	0.360
2.55	291	677.55	0.37 ic	0.36 ic	---	---	0.00	---	---	---	---	---	0.363
2.58	294	677.58	0.37 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.366
2.60	296	677.60	0.37 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.369
2.63	299	677.63	0.37 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.371
2.65	302	677.65	0.37 ic	0.37 ic	---	---	0.00	---	---	---	---	---	0.374
2.68	305	677.68	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.377
2.70	308	677.70	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.380
2.73	311	677.73	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.382
2.75	313	677.75	0.38 ic	0.38 ic	---	---	0.00	---	---	---	---	---	0.385
2.78	316	677.78	0.39 ic	0.39 ic	---	---	0.00	---	---	---	---	---	0.388
2.80	319	677.80	0.39 ic	0.39 ic	---	---	0.00	---	---	---	---	---	0.390
2.83	322	677.83	0.39 ic	0.39 ic	---	---	0.00	---	---	---	---	---	0.393
2.85	325	677.85	0.40 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.395
2.88	328	677.88	0.40 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.398
2.90	331	677.90	0.40 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.401
2.93	333	677.93	0.40 ic	0.40 ic	---	---	0.00	---	---	---	---	---	0.403
2.95	336	677.95	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.406
2.98	339	677.98	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.408
3.00	342	678.00	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.411
3.03	345	678.03	0.41 ic	0.41 ic	---	---	0.00	---	---	---	---	---	0.413
3.05	348	678.05	0.42 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.416
3.08	351	678.08	0.42 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.418
3.10	353	678.10	0.42 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.421
3.13	356	678.13	0.42 ic	0.42 ic	---	---	0.00	---	---	---	---	---	0.423
3.15	359	678.15	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.425
3.18	362	678.18	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.428
3.20	365	678.20	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.430
3.23	368	678.23	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.433
3.25	370	678.25	0.43 ic	0.43 ic	---	---	0.00	---	---	---	---	---	0.435
3.28	373	678.28	0.44 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.437
3.30	376	678.30	0.44 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.440
3.33	379	678.33	0.44 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.442
3.35	382	678.35	0.45 ic	0.44 ic	---	---	0.00	---	---	---	---	---	0.444
3.38	385	678.38	0.45 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.446
3.40	388	678.40	0.45 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.449
3.43	390	678.43	0.45 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.451
3.45	393	678.45	0.45 ic	0.45 ic	---	---	0.00	---	---	---	---	---	0.453
3.48	396	678.48	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.456
3.50	399	678.50	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.458
3.53	402	678.53	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.460
3.55	405	678.55	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.462
3.58	408	678.58	0.46 ic	0.46 ic	---	---	0.00	---	---	---	---	---	0.464
3.60	410	678.60	0.47 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.467
3.63	413	678.63	0.47 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.469
3.65	416	678.65	0.47 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.471
3.68	419	678.68	0.47 ic	0.47 ic	---	---	0.00	---	---	---	---	---	0.473
3.70	422	678.70	0.48 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.475
3.73	425	678.73	0.48 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.477
3.75	427	678.75	0.48 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.480
3.78	432	678.78	0.48 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.482
3.80	437	678.80	0.48 ic	0.48 ic	---	---	0.00	---	---	---	---	---	0.484
3.83	442	678.83	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.486
3.85	447	678.85	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.488
3.88	452	678.88	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.490
3.90	456	678.90	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.492
3.93	461	678.93	0.49 ic	0.49 ic	---	---	0.00	---	---	---	---	---	0.494
3.95	466	678.95	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.496
3.98	471	678.98	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.498
4.00	476	679.00	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.500
4.03	483	679.03	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.502
4.05	490	679.05	0.50 ic	0.50 ic	---	---	0.00	---	---	---	---	---	0.504
4.07	497	679.08	0.51 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.507
4.10	504	679.10	0.51 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.509
4.13	511	679.13	0.51 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.511

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Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
4.15	518	679.15	0.51 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.513
4.18	526	679.18	0.51 ic	0.51 ic	---	---	0.00	---	---	---	---	---	0.515
4.20	533	679.20	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.517
4.23	540	679.23	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.518
4.25	547	679.25	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.520
4.28	554	679.28	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.522
4.30	561	679.30	0.52 ic	0.52 ic	---	---	0.00	---	---	---	---	---	0.524
4.32	568	679.33	0.53 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.526
4.35	575	679.35	0.53 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.528
4.38	583	679.38	0.53 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.530
4.40	590	679.40	0.53 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.532
4.43	597	679.43	0.53 ic	0.53 ic	---	---	0.00	---	---	---	---	---	0.534
4.45	604	679.45	0.54 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.536
4.48	611	679.48	0.54 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.538
4.50	618	679.50	0.54 ic	0.54 ic	---	---	0.00	---	---	---	---	---	0.540
4.53	625	679.53	0.62 ic	0.54 ic	---	---	0.08	---	---	---	---	---	0.621
4.55	632	679.55	0.77 ic	0.54 ic	---	---	0.22	---	---	---	---	---	0.767
4.57	640	679.58	0.93 ic	0.52 ic	---	---	0.41	---	---	---	---	---	0.934
4.60	647	679.60	1.12 ic	0.49 ic	---	---	0.63	---	---	---	---	---	1.123
4.63	654	679.63	1.33 ic	0.44 ic	---	---	0.88	---	---	---	---	---	1.328
4.65	661	679.65	1.54 ic	0.38 ic	---	---	1.16	---	---	---	---	---	1.540
4.68	668	679.68	1.75 ic	0.29 ic	---	---	1.46	---	---	---	---	---	1.750
4.70	675	679.70	1.94 ic	0.15 ic	---	---	1.79	---	---	---	---	---	1.935
4.73	682	679.73	1.97 ic	0.10 ic	---	---	1.87 s	---	---	---	---	---	1.971
4.75	689	679.75	1.99 ic	0.09 ic	---	---	1.90 s	---	---	---	---	---	1.985
4.78	697	679.78	2.00 ic	0.07 ic	---	---	1.92 s	---	---	---	---	---	1.995
4.80	704	679.80	2.00 ic	0.07 ic	---	---	1.94 s	---	---	---	---	---	2.004
4.82	711	679.83	2.01 ic	0.06 ic	---	---	1.95 s	---	---	---	---	---	2.012
4.85	718	679.85	2.02 ic	0.05 ic	---	---	1.96 s	---	---	---	---	---	2.018
4.88	725	679.88	2.03 ic	0.05 ic	---	---	1.98 s	---	---	---	---	---	2.025
4.90	732	679.90	2.03 ic	0.04 ic	---	---	1.99 s	---	---	---	---	---	2.030
4.93	739	679.93	2.04 ic	0.04 ic	---	---	2.00 s	---	---	---	---	---	2.039
4.95	746	679.95	2.05 ic	0.04 ic	---	---	2.01 s	---	---	---	---	---	2.043
4.98	754	679.98	2.05 ic	0.03 ic	---	---	2.01 s	---	---	---	---	---	2.046
5.00	761	680.00	2.06 ic	0.03 ic	---	---	2.02 s	---	---	---	---	---	2.056

...End

Hydraflow Rainfall Report

Return Period (Yrs)	Intensity-Duration-Frequency Equation Coefficients (FHA)			
	B	D	E	(N/A)
1	0.0000	0.0000	0.0000	--------
2	69.8703	13.1000	0.8658	--------
3	0.0000	0.0000	0.0000	--------
5	79.2597	14.6000	0.8369	--------
10	88.2351	15.5000	0.8279	--------
25	102.6072	16.5000	0.8217	--------
50	114.8193	17.2000	0.8199	--------
100	127.1596	17.8000	0.8186	--------

File name: SampleFHA.idf

Intensity = B / (Tc + D)^E

Return Period (Yrs)	Intensity Values (in/hr)											
	5 min	10	15	20	25	30	35	40	45	50	55	60
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	5.69	4.61	3.89	3.38	2.99	2.69	2.44	2.24	2.07	1.93	1.81	1.70
3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	6.57	5.43	4.65	4.08	3.65	3.30	3.02	2.79	2.59	2.42	2.27	2.15
10	7.24	6.04	5.21	4.59	4.12	3.74	3.43	3.17	2.95	2.77	2.60	2.46
25	8.25	6.95	6.03	5.34	4.80	4.38	4.02	3.73	3.48	3.26	3.07	2.91
50	9.04	7.65	6.66	5.92	5.34	4.87	4.49	4.16	3.88	3.65	3.44	3.25
100	9.83	8.36	7.30	6.50	5.87	5.36	4.94	4.59	4.29	4.03	3.80	3.60

Tc = time in minutes. Values may exceed 60.

Precip. file name: Sample.pcp

Storm Distribution	Rainfall Precipitation Table (in)							
	1-yr	2-yr	3-yr	5-yr	10-yr	25-yr	50-yr	100-yr
SCS 24-hour	0.00	2.20	0.00	3.30	4.25	5.77	6.80	7.95
SCS 6-Hr	0.00	1.80	0.00	0.00	2.60	0.00	0.00	4.00
Huff-1st	0.00	1.55	0.00	2.75	4.00	5.38	6.50	8.00
Huff-2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-4th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Huff-Indy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Custom	0.00	1.75	0.00	2.80	3.90	5.25	6.00	7.10

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1711

                              Analysis prepared by:

                             VAN RYN ENGINEERING INC
                          16766 BERNARDO CENTER DR. STE. 115
                                   VANRYNENG.COM


 ************************* DESCRIPTION OF STUDY *************************
* J2454 BASIN 1 PROPOSED DETAINED                                        *
*                                                                        *
*                                                                        *
 **************************************************************************

  FILE NAME: 2454.PR1
  TIME/DATE OF STUDY: 12:25 06/30/2025
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   6.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*

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

```
 FLOW PROCESS FROM NODE    101.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    46.00
 UPSTREAM ELEVATION(FEET) =    752.00
 DOWNSTREAM ELEVATION(FEET) =    735.00
 ELEVATION DIFFERENCE(FEET) =     17.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.250
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.25
 TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
 FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   735.00  DOWNSTREAM(FEET) =   734.00
 FLOW LENGTH(FEET) =   100.50   MANNING'S N =  0.013
 ASSUME FULL-FLOWING PIPELINE
 PIPE-FLOW VELOCITY(FEET/SEC.) =   2.85
 PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
 GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.25
 PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    4.84
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     146.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    103.00 TO NODE    103.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .5800
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.5432
 SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    2.16
 TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       2.41
 TC(MIN.) =    4.84

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

```
 FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =   7
----------------------------------------------------------------------------
 >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
 USER-SPECIFIED VALUES ARE AS FOLLOWS:
 TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) = 15.81
 TOTAL AREA(ACRES) =     0.28   TOTAL RUNOFF(CFS) =      0.67

****************************************************************************
 FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   730.65  DOWNSTREAM(FEET) =   730.00
 FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   4.0 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.81
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.67
 PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    5.09
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     173.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    730.00  DOWNSTREAM(FEET) =    691.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   159.00   CHANNEL SLOPE =  0.2453
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   1.500
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.67
 FLOW VELOCITY(FEET/SEC.) =   5.33   FLOW DEPTH(FEET) =   0.04
 TRAVEL TIME(MIN.) =   0.50   Tc(MIN.) =    5.59
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =     332.50 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  41
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   691.00  DOWNSTREAM(FEET) =   689.00
 FLOW LENGTH(FEET) =    56.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.60
 GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.67
```

```
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    5.76
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =     388.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 14.434
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.2759
  SUBAREA AREA(ACRES) =    0.42   SUBAREA RUNOFF(CFS) =    2.18
  TOTAL AREA(ACRES) =        0.7   TOTAL RUNOFF(CFS) =       2.79
  TC(MIN.) =    5.76

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    108.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    689.00  DOWNSTREAM(FEET) =    673.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    27.00   CHANNEL SLOPE =  0.5926
  CHANNEL BASE(FEET) =    4.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
  CHANNEL FLOW THRU SUBAREA(CFS) =       2.79
  FLOW VELOCITY(FEET/SEC.) =  11.64   FLOW DEPTH(FEET) =   0.06
  TRAVEL TIME(MIN.) =   0.04   Tc(MIN.) =    5.80
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    108.00 =     415.50 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    108.00 TO NODE    108.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    43.00
  UPSTREAM ELEVATION(FEET) =    731.00
  DOWNSTREAM ELEVATION(FEET) =    726.50
  ELEVATION DIFFERENCE(FEET) =      4.50
```

```
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.109
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    123.00 IS CODE =  61
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  726.50  DOWNSTREAM ELEVATION(FEET) =  679.25
  STREET LENGTH(FEET) =   231.00   CURB HEIGHT(INCHES) =  8.0
  STREET HALFWIDTH(FEET) = 10.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   1.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.010
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.010

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.010
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    2.00
    AVERAGE FLOW VELOCITY(FEET/SEC.) =   11.33
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    2.25
  STREET FLOW TRAVEL TIME(MIN.) =   0.34   Tc(MIN.) =    4.45
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .6800
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  SUBAREA AREA(ACRES) =    0.15      SUBAREA RUNOFF(CFS) =    1.64
  TOTAL AREA(ACRES) =        0.2        PEAK FLOW RATE(CFS) =       1.92

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.20   HALFSTREET FLOOD WIDTH(FEET) =   2.00
  FLOW VELOCITY(FEET/SEC.) = 11.33   DEPTH*VELOCITY(FT*FT/SEC.) =   2.25
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    123.00 =     274.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    124.00 IS CODE =  41
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   679.25  DOWNSTREAM(FEET) =   679.00
  FLOW LENGTH(FEET) =    27.00   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  21.95
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.92
  PIPE TRAVEL TIME(MIN.) =   0.02    Tc(MIN.) =    4.47
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    124.00 =     301.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    124.00 TO NODE    125.00 IS CODE =   7
----------------------------------------------------------------------------
  >>>>>USER SPECIFIED HYDROLOGY INFORMATION AT NODE<<<<<
============================================================================
  USER-SPECIFIED VALUES ARE AS FOLLOWS:
  TC(MIN) =   5.00   RAIN INTENSITY(INCH/HOUR) = 15.81
  TOTAL AREA(ACRES) =     0.20   TOTAL RUNOFF(CFS) =      0.56

****************************************************************************
  FLOW PROCESS FROM NODE    125.00 TO NODE    114.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   675.00  DOWNSTREAM(FEET) =   674.20
  FLOW LENGTH(FEET) =     6.75   MANNING'S N =  0.013
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   2.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.33
  GIVEN PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.56
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.01
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    114.00 =     307.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    114.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.01
  RAINFALL INTENSITY(INCH/HR) =  15.78
  TOTAL STREAM AREA(ACRES) =     0.20
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.56

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

```
  FLOW PROCESS FROM NODE    111.00 TO NODE    112.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    56.00
  UPSTREAM ELEVATION(FEET) =    735.00
  DOWNSTREAM ELEVATION(FEET) =    721.00
  ELEVATION DIFFERENCE(FEET) =     14.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.690
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.808
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.13
  TOTAL AREA(ACRES) =      0.02   TOTAL RUNOFF(CFS) =      0.13

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    113.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    721.00  DOWNSTREAM(FEET) =    684.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   183.00   CHANNEL SLOPE =  0.1995
  CHANNEL BASE(FEET) =    1.00   "Z" FACTOR =   1.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.427
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.32
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.06
  AVERAGE FLOW DEPTH(FEET) =   0.05   TRAVEL TIME(MIN.) =   0.50
  Tc(MIN.) =    5.19
  SUBAREA AREA(ACRES) =     0.07       SUBAREA RUNOFF(CFS) =    0.39
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   6.69
  LONGEST FLOWPATH FROM NODE    111.00 TO NODE    113.00 =     239.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    114.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
```

```
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.19
  RAINFALL INTENSITY(INCH/HR) =  15.43
  TOTAL STREAM AREA(ACRES) =     0.09
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.51

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.56     5.01       15.781          0.20
      2        0.51     5.19       15.427          0.09

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        1.06     5.01      15.781
      2        1.06     5.19      15.427

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       1.06   Tc(MIN.) =    5.19
  TOTAL AREA(ACRES) =        0.3
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    114.00 =     307.75 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    126.00 IS CODE =  41
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING USER-SPECIFIED PIPESIZE (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   674.20  DOWNSTREAM(FEET) =   673.40
  FLOW LENGTH(FEET) =     7.20   MANNING'S N =  0.013
  ASSUME FULL-FLOWING PIPELINE
  PIPE-FLOW VELOCITY(FEET/SEC.) =  12.15
  PIPE FLOW VELOCITY = (TOTAL FLOW)/(PIPE CROSS SECTION AREA)
  GIVEN PIPE DIAMETER(INCH) =   4.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    5.20
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    126.00 =     314.95 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    126.00 TO NODE    126.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
```

```
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        1.06     5.20      15.408        0.30
  LONGEST FLOWPATH FROM NODE    121.00 TO NODE    126.00 =     314.95 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        2.79     5.80      14.371        0.70
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    126.00 =     415.50 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       3.56       5.20       15.408
      2       3.78       5.80       14.371

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.78   Tc(MIN.) =    5.80
  TOTAL AREA(ACRES) =        1.0
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        1.0  TC(MIN.) =      5.80
  PEAK FLOW RATE(CFS)   =       3.78
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1711

                              Analysis prepared by:

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 ************************* DESCRIPTION OF STUDY *************************
* J2454 BASIN 2 PROPOSED                                                 *
*                                                                        *
*                                                                        *
 ************************************************************************

  FILE NAME: 2454.PR2
  TIME/DATE OF STUDY: 13:01 06/30/2025
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   6.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0312 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)
  *PIPE MAY BE SIZED TO HAVE A FLOW CAPACITY LESS THAN
   UPSTREAM TRIBUTARY PIPE.*

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

```
  FLOW PROCESS FROM NODE    101.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    67.00
  UPSTREAM ELEVATION(FEET) =    752.00
  DOWNSTREAM ELEVATION(FEET) =    735.00
  ELEVATION DIFFERENCE(FEET) =     17.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.129
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 15.550
  SUBAREA RUNOFF(CFS) =      0.16
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.16

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    735.00  DOWNSTREAM(FEET) =    678.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   193.00   CHANNEL SLOPE =  0.2953
  CHANNEL BASE(FEET) =  300.00   "Z" FACTOR =  50.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   1.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) = 10.549
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.76
  AVERAGE FLOW DEPTH(FEET) =   0.00   TRAVEL TIME(MIN.) =   4.23
  Tc(MIN.) =    9.36
  SUBAREA AREA(ACRES) =     0.47       SUBAREA RUNOFF(CFS) =    1.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.5         PEAK FLOW RATE(CFS) =       1.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.00   FLOW VELOCITY(FEET/SEC.) =   1.28
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    203.00 =     260.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        0.5  TC(MIN.) =      9.36
  PEAK FLOW RATE(CFS)   =       1.83
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```