MAJESTIC AIRWAY

PTS 632813

Preliminary Drainage Report

LA MEDIA ROAD AT AIRWAY ROAD
SAN DIEGO, CA 92154
APN: 646-121-35

DECEMBER 2022

Applicant:

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This Drainage Report has been prepared by Kimley-Horn and Associates, Inc. under the direct supervision of the following Registered Civil engineer. The undersigned attests to the technical data contained in this study, and to the qualifications of technical specialists providing engineering computations upon which the recommendations and conclusions are based.

Registered Civil Engineer

12.20.2022

Date

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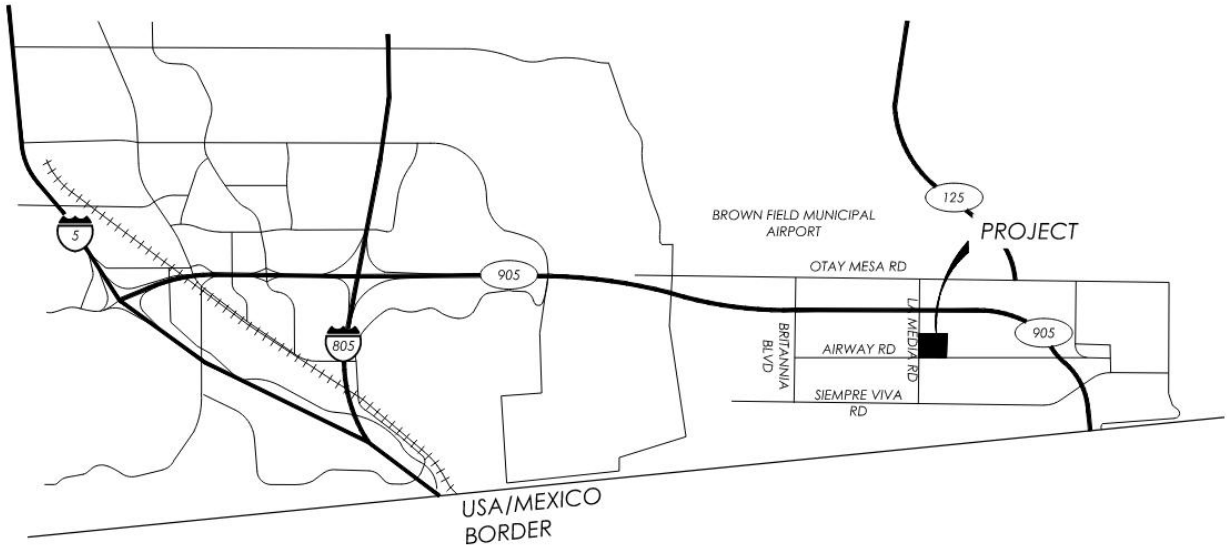
1 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Majestic Airway project consists of industrial distribution centers on an approximately 32.5-acre area located within the Otay Mesa community of San Diego, California. The 32.5-acre property is bounded by La Media Road to the west, CA Route 905 to the north, Airway Road to the south, and a developed industrial lot to the east, see **Figure 1-1** for the Vicinity Map. The property's Assessor Parcel Number is 646-121-35. The project includes the grading of the existing parcel for industrial distribution centers along with parking areas, loading docks, and driveways. The purpose of this report is to present the hydrology analysis and drainage calculations for the design of the Majestic Airway project.

Figure 1–1 Vicinity Map



VICINITY MAP
N.T.S.

2 PROJECT SETTING

2.1 TOPOGRAPHY

Topographic information for the project was obtained from a land survey by Kimley-Horn in August 2019 and aerial survey done by photo geodetic in September 2019. The project is located on the USGS Otay Mesa quadrangle map, see **Appendix A**. The project is located within the Tijuana Valley watershed with onsite slopes starting in the northeast corner (approximate elevation 482) flowing west towards La Media Rd (approximate elevation 473) where runoff enters the existing storm drain system by culverts under La Media Rd.

2.2 PRECIPITATION

Storm intensity values were taken from the County of San Diego Hydrology Manual, 2003. The design storm was the 50-year and 100-year rainfall event calculated from the County of San Diego Hydrology Manual Rainfall Isopluvials and Figure 3-1 (see **Appendix C**) and determined to be 2.1 inches for the 50-year 6-hour event and 2.3 for the 100-year 6-hour event.

2.3 SOIL TYPES

The condition and type of soil are major factors affecting infiltration and runoff. The Natural Resources Conservation Service (NRCS) has classified soils into four general categories for comparing infiltration and runoff rates. The categories are based on properties that influence runoff, such as water infiltration rate, texture, natural discharge and moisture condition. The runoff potential is based on the amount storm water runoff at the end of a long duration storm that occurs after the soil is saturated.

Soil types were determined using the United States Department of Agriculture (USDA) Web Soil Survey. The project site consists of a mix of type C and type D soils. Hydrologic soil group D soils have a very slow infiltration rate when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. See **Appendix B** for soils information.

2.4 LAND USE

The project site location is within the Otay Mesa community of San Diego, California. The zoning is Light Industrial (IL-3-1) for urbanized communities. The land use designation is Commercial Employment, Retail, and Services.

2.5 GROUNDWATER

Based on the Geotechnical Investigation dated March 18, 2020 by Geocon, Inc., groundwater was not encountered onsite. Groundwater elevations may fluctuate seasonally.

2.6 FEMA MAPPING

The project site is not located in a flood zone mapped by the FEMA Flood Insurance Rate Map (FIRM). See **Appendix G** for FEMA map.

2.7 CLEAN WATER ACT SECTION 404 PERMIT AND 401 CERTIFICATION

The physical alteration of water bodies, including wetlands and streams, are regulated by federal and state statues under Section 401 (Certification) and Section 404 (Permits) of the Federal Clean Water Act. This project does not propose any discharge of dredged and/or fill material within any Waters of the U.S., therefore, is not subject to the Clean Water Act Sections 404 Permit and 401 Certification.

3 HYDROLOGIC ANALYSIS

3.1 METHODOLOGY

The Modified Rational Method was used to analyze the hydrology for the project. This methodology is typically used for small basins less than 500 acres in size because a uniform rainfall distribution is assumed for the entire duration. Drainage calculations comply with the requirements outlined in the County of San Diego Hydrology Manual, 2003. The San Diego County Advanced Engineering Software (AES) computer program was used for the Modified Rational Method analysis to calculate peak flow for the 5, 10, 25, 50, and 100-year storm events under existing and proposed conditions. This program uses parameters from the County of San Diego Hydrology Manual to estimate times of concentration and peak flow rates.

3.1.1 GEOMETRY

Sub-basin boundaries, initial subareas, and flow paths were delineated for each sub-basin with AutoCAD Civil 3D software. These hydrologic parameters are shown for existing conditions and proposed conditions in **Exhibit A** and **Exhibit B**. Point elevations and surfaces within Civil 3D were also used to determine flow path slopes and estimate the shape of routing reaches. A summary of the existing condition and proposed condition inputs into the AES models are included in **Appendix A.** Topography for the project area was obtained from a land survey by Kimley-Horn in 2019 and is based on the mean sea level (NAVD 29).

3.1.2 INTENSITY AND TIME OF CONCENTRATION

Rainfall data for frequency events were taken from the County of San Diego Hydrology Manual Rainfall Isopluvials to determine the appropriate precipitation for the project site. This duration precipitation value was then inputted directly into AES for each frequency event. AES software was used to calculate the appropriate time of concentration for each sub-basin The AES software then calculates an intensity based on the calculated time of concentration.

3.1.3 RUNOFF COEFFICIENT AND LOSS RATES

AES software was used to calculate loss rates and subsequent runoff coefficients for each sub-basin based on land use type, and hydrologic soil group. The existing conditions land utilized for the model was undeveloped natural grass. The proposed conditions land use is general industrial, which is defined as 95% impervious and a runoff coefficient of 0.87. Hydrologic soil group D was used for the entire site.

3.2 EXISTING CONDITIONS

The project site overland flows from the northeast corner flowing west towards La Media Rd where runoff enters the existing storm drain system by culverts under La Media Rd.

Runoff coefficients for the existing site was based on the County of San Diego Hydrology Manual and is identified below in **Table 3-1** for undeveloped sites. See **Exhibit A** for **Existing Drainage Exhibit.** The hydrology model results are presented in **Appendix D.**

Table 3–1 Existing Conditions Hydrology

Basin ID	Runoff Coefficient	Area (acres)	Flow Rate (cfs)				
			5 Year	10 Year	25 Year	50 Year	100 Year
1	0.35	22.9	13.6	15.6	17.8	21.6	23.9
2	0.35	6.7	4.8	5.6	6.5	7.8	8.6
Total		29.6	18.4	21.2	24.3	29.4	32.5

3.3 PROPOSED CONDITIONS

Proposed hydrologic calculations have been prepared for the project. Tributary areas were delineated based on proposed grading for the project. The final development will be approximately 83% impervious area and 17% landscape. The San Diego County Advanced Engineering Software (AES) computer program was used for the Modified Rational Method analysis to calculate peak flow for the 5, 10, 25 50, and 100-year storm events under proposed conditions. Runoff generated from the site will be collected by onsite inlets, conveyed through an underground storm drain system, and discharge into onsite detention basins for treatment and detention. These basins will be designed to filter and treat the water quality storm event volume by means of biofiltration (standard and proprietary) as documented in the project specific SWQMP.

The project will have four discharge locations – one for each drainage area. There are two discharge points to the existing channel on the west side of the site, one to the existing public storm drain in Airway Road, and one to an existing curb inlet in Airway Road.

With the project site being 83% impervious the Runoff Coefficient used in the AES calculations was 0.87 which matches closely to the Table A-1 of the San Diego Drainage Design Manual Commercial land use with 80% impervious carrying a runoff coefficient of 0.85. See **Exhibit B** for **Proposed Drainage Exhibit.** The hydrology model results are presented in **Appendix E.**

4 HYDRAULIC ANALYSIS

4.1 METHODOLOGY

Drainage structures were designed for the Majestic Airway project according to the procedures and methodologies outlined in the County of San Diego Drainage Design Manual, 2005. The proposed drainage network is included on the **Proposed Drainage Exhibit**, **Exhibit B**.

4.1.1 STORM DRAIN DESIGN

The storm drain network pipe sizes were estimated for preliminary design utilizing the AES computer program for non-pressure pipe flow included in the **Proposed Condition Hydrology Calculations**, see **Appendix E**. The Modified Rational Method was used to calculate peak flow for the 50-year storm event.

4.1.2 CHANNEL HYDRAULICS

The open channel west of the project site will be the discharge location of Drainage Areas 1 and 2. Based on the Rick Engineering HEC-RAS model for the future open channel peak flow of 871 cfs, a new HEC-RAS model was designed to show the water surface elevation of the open channel, see **Appendix H** for results. The 100-year TW for the Channel is 476.0'. The project site is at the very downstream end of the East Watershed according to the Drainage Study for the Otay Mesa Community Plan Update. Thus, the 100-year peak flow in the open channel is unlikely to hit during the 100-year peak flow of the site. To analyze this difference, the dual analysis approach was used in the 2014 County of San Diego Hydraulic Design Manual, Section 3.3.5. It was determined that the ratio of the whole East Watershed to the project site is 150:1. According to Section 3.3.5, this would require an analysis of the 100-year onsite, using the Q25 TW elevation of the open channel, as well as the 25-year onsite, using the Q100 TW elevation of the open channel.

To find the TW elevation of the open channel in the 25-year storm, the ratio between the 100-year intensity and the 25-year intensity was calculated and applied to the channels 100-year flow, 871cfs. The 25-year peak flow was determined to be 682cfs. This 682 cfs was input into the HEC-RAS model to determine the TW elevation. The TW elevation for the 25-year peak storm is 475.6'. See **Appendix H** for the HEC-RAS print outs.

4.1.3 DETENTION BASIN CALCULATIONS

The development of this site results in an increase of peak discharge runoff. Four detention basins are proposed to mitigate peak flows by storing stormwater runoff and controlling the release of flow. The project is required to mitigate for downstream hydromodification and detain for the 50-year peak flow rate. The project specific Stormwater Quality Management Plan (SWQMP) determined the storage volume and outlet orifice required to mitigate for hydromodification. Orifice calculations were prepared to determine the size of the outlets to meet hydromodification requirements and are used in the flood routing for the peak storm events. See **Appendix F** for the outlet rating curves for each basin. See project specific SWQMP for hydromodification compliance documentation.

Per the City of San Diego memo to Industry in the early 1980's, the Otay Mesa drainage watersheds were required to detain developed flow to pre-existing conditions for the 5, 10, 25- and 50-year storm events with the 100-year storm passing undetained over the spillway. The Otay Mesa Community Plan Update

Drainage Study also provides this design criteria. This project adheres to those design criteria for detention basin sizing and detains the 100-year storm event as well as the other storm events.

To size the peak attenuation volume required, the Rational Method hydrology results were input into Rick Rat Hydrographs to develop a hydrograph. The proposed hydrograph was routed using Hydraflow Hydrographs Computer Software with the calculated orifice sizes and a riser structure to determine peak flow rates and maximum elevation of each basin. Detention routing starts at 6" above basin FG in order to comply with the conjunctive use requirements of the County of San Diego. The tailwater mentioned above, was included for the 50- and 100-year storm events for Basins 1 only as Basin 2 detention is higher than the TW elevation of the channel. See **Appendix F** for detention basin calculations and **Table 4-1** summarizing the basin routing results. The project peak flow rates are less than the pre-project flow rate for all storm events per the criteria above.

Table 4–1 Proposed Detention Basin Summary

					Maximum Water Surface Elevation			
Storm Event	Existing Runoff	Proposed Runoff	Proposed Released	Runoff Detained	Basin 1	Basin 2	Basin 3	Basin 4
(yr)	Q (cfs)	Q (cfs)	Q (cfs)	Q (cfs)	ft	ft	ft	ft
5	18.4	64.9	15.3	49.6	475.21	477.73	479.21	479.49
10	21.2	74.9	18.5	56.4	475.42	477.78	479.23	479.50
25	24.4	85.3	20.7	64.6	475.58**	477.84	479.26	479.52
50	29.4	100.6	22.9	77.7	476.03*	477.92	479.30	479.54
100	32.6	110.9	24.4	86.5	476.22*	477.97	479.33	479.56
Top of Basin					476.25	479.0	480.5	480.82
100 Year Freeboard (feet)					0.03	1.03	1.17	1.26
Basin Volume Provided (cubic feet)					85,517	46,636	26,924	11,218
*25-yr TW at 475.6' elevation condition applied to analysis								
**100-yr TW at 476' elevation condition applied to analysis								

Drawdown times for the detention basins are required to drawdown the surface ponding within 96 hours per section 6.3.7 Drawdown Time of the 2016 Storm Water Standards Part 1: BMP Design Manual for Permanent Site Design, Storm Water Treatment and Hydromodification Management. See **Table 4-2** Below for a summary of storm event drawdown times for the four basins. To be conservative, flows routed through the overflow inlet and upper orifice openings were ignored; only the flow exiting through the hydromodification orifice was accounted for. These drawdown times represent the duration it takes to drain the surface storage area after the end of the storm event for each basin and are supported by the hydrographs and hydraflow results in **Appendix F**.

Table 4–2 Proposed Detention Basin Drawdown Summary

	Basin 1		Basin 2		Basin 3		Basin 4	
Storm Event	Max WSEL	Drawdown Time	Max WSEL	Drawdown Time	Max WSEL	Drawdown Time	Max WSEL	Drawdown Time
(yr)	ft	hrs	ft	hrs	ft	hrs	ft	hrs
5	475.21	28.67	477.73	13.93	479.21	17.33	479.49	12.74
10	475.42	30.08	477.78	14.98	479.23	18.07	479.5	13.11
25	475.58	31.30	477.84	16.19	479.26	18.71	479.52	13.46
50	476.03	33.89	477.92	17.84	479.3	19.79	479.54	13.97
100	476.22	35.11	477.97	18.31	479.33	20.79	479.56	14.30

4.1.4 INLET DESIGN

Inlet design will be provided during final design.

5 WATER QUALITY

5.1 POST CONSTRUCTION BMP

A project specific Storm Water Quality Management Plan (SWQMP) has been prepared. Biofiltration areas are proposed throughout the project to provide stormwater treatment for the pollutants discharged from the proposed improvements. Biofiltration areas (standard and proprietary) were incorporated into the project where it was practical. These biofiltration areas are a mitigation measure for stormwater runoff treatment. Biofiltration calculations are provided in the project specific SWQMP.

5.2 EROSION AND SEDIMENTATION

The proposed commercial site will be approximately 83% impervious with landscaped slopes and parkway landscaped areas. Graded and disturbed areas will be re-vegetated and landscaped to minimize erosion. The post construction site will have minimal risks of erosion occurring given proper plant establishment and transport of sediments downstream will be significantly reduced by means of pretreatment and onsite biofiltration basins. It will be critical to maintain construction site BMP's throughout the construction duration.

6 DRAINAGE IMPROVEMENTS

This drainage study was prepared to document the storm drain design for Majestic Airway. The project includes the construction of three industrial buildings, associated truck docks, parking, and utilities. The drainage improvements throughout the project consist of installing inlets, storm drain facilities, biofiltration basins (standard and proprietary), and an underground stormwater detention tank.

The proposed drainage improvements are designed to mitigate flood and water quality impacts such that no adjacent properties will be negatively impacted from runoff generated by the development of this project. This Drainage Study documents that this project does not create any negative drainage impacts to any adjacent properties.

APPENDICES

APPENDIX A

USGS MAP

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map US Topo

OTAY MESA QUADRANGLE
CALIFORNIA-BAJA CALIFORNIA NORTE
7.5-MINUTE SERIES

Project Location

Produced by the United States Geological Survey

North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and
1 000-meter grid: Universal Transverse Mercator, Zone 11S
10 000-foot ticks: California Coordinate System of 1983 (zone 6)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, May 2012
Roads..... HERE, ©2013 - 2014
Names.....GNIS, 2015
Hydrography.....National Hydrography Dataset, 2012
Contours.....National Elevation Dataset, 2012
Boundaries.....Multiple sources; see metadata file 1972 - 2015
Public Land Survey System.....BLM, 2011

UTM GRID AND 2015 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

U.S. National Grid
100,000-m Square ID
NS / NR
Grid Zone Designation 11S

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.18

QUADRANGLE LOCATION

ADJOINING QUADRANGLES
1 National City
2 Jamul Mountains
3 Dulzura
4 Imperial Beach
5 Otay Mountain
6
7
8

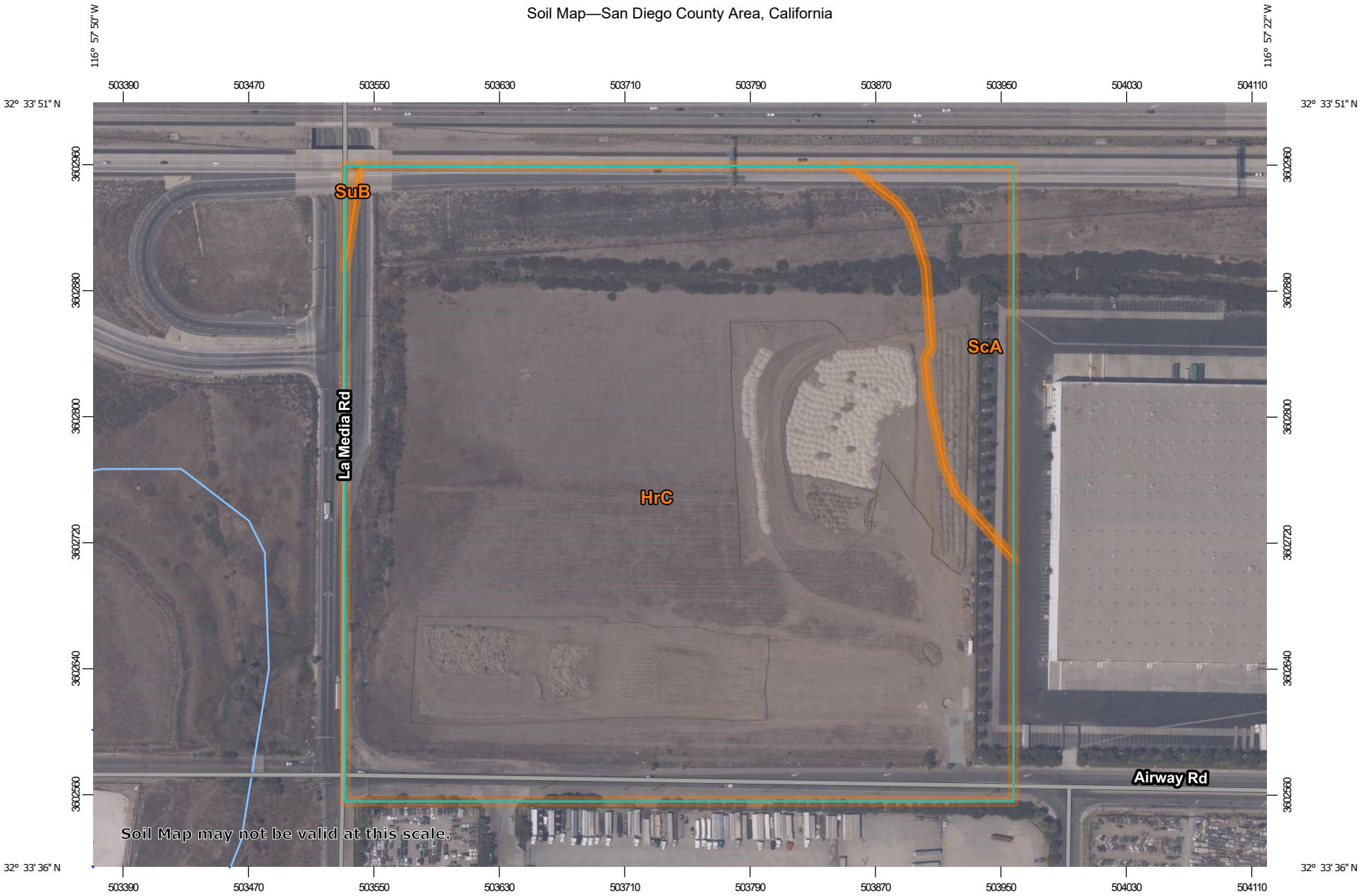
ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

OTAY MESA, CA-BCN
2015

NSN 7643016357281
NGA REF NO. USGSX24K33589

APPENDIX B

SOIL INFORMATION



Map Scale: 1:3,420 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 18, 2018—Aug 22, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
HrC	Huerhuero loam, 2 to 9 percent slopes	39.4	92.4%
ScA	Salinas clay, 0 to 2 percent slopes	3.2	7.4%
SuB	Stockpen gravelly clay loam, 2 to 5 percent slopes	0.1	0.2%
Totals for Area of Interest		**42.7**	**100.0%**

San Diego County Area, California

HrC—Huerhuero loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hbcm
Elevation: 1,100 feet
Mean annual precipitation: 12 to 20 inches
Mean annual air temperature: 57 degrees F
Frost-free period: 260 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Huerhuero and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Huerhuero

Setting

Landform: Marine terraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Calcareous alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 12 inches: loam
H2 - 12 to 55 inches: clay loam, clay
H2 - 12 to 55 inches: stratified sand to sandy loam
H3 - 55 to 72 inches:

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum: 25.0
Available water capacity: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: D

Ecological site: R019XD061CA
Hydric soil rating: No

Minor Components

Stockpen
Percent of map unit: 5 percent
Hydric soil rating: No

Las flores
Percent of map unit: 5 percent
Hydric soil rating: No

Olivenhain
Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, ponded
Percent of map unit: 2 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

San Diego County Area, California

ScA—Salinas clay, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hbgh
Elevation: 50 to 300 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 300 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Salinas and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salinas

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Base slope, rise
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Alluvium derived from mixed sources

Typical profile

H1 - 0 to 22 inches: clay
H2 - 22 to 46 inches: clay loam, clay
H2 - 22 to 46 inches: loam, clay loam
H3 - 46 to 64 inches:
H3 - 46 to 64 inches:

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water capacity: Very high (about 16.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s

Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Diablo
Percent of map unit: 5 percent
Hydric soil rating: No

Tujunga
Percent of map unit: 5 percent
Hydric soil rating: No

Huerhuero
Percent of map unit: 5 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 15, May 27, 2020

APPENDIX C

HYDROLOGY MANUAL EXCERPTS

Note that the Initial Time of Concentration should be reflective of the general land-use at the upstream end of a drainage basin. A single lot with an area of two or less acres does not have a significant effect where the drainage basin area is 20 to 600 acres.

Table 3-2 provides limits of the length (Maximum Length (L_M)) of sheet flow to be used in hydrology studies. Initial T_i values based on average C values for the Land Use Element are also included. These values can be used in planning and design applications as described below. Exceptions may be approved by the "Regulating Agency" when submitted with a detailed study.

Table 3-2

MAXIMUM OVERLAND FLOW LENGTH (L_M) & INITIAL TIME OF CONCENTRATION (T_i)

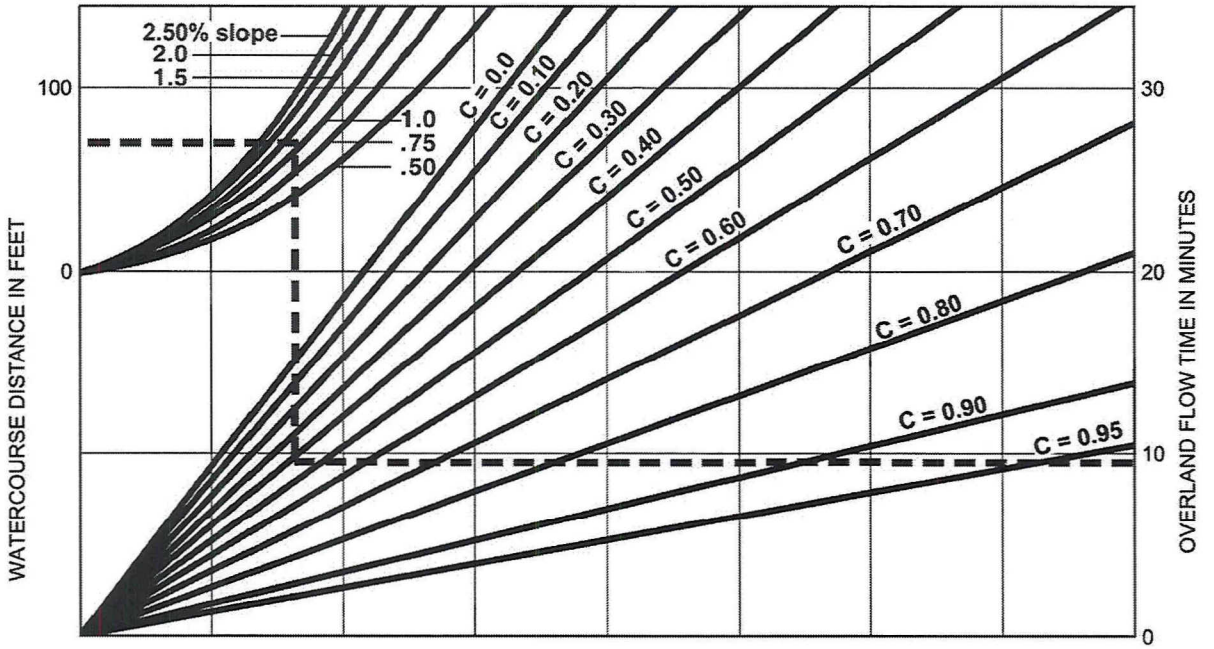
Element*	DU/ Acre	.5%		1%		2%		3%		5%		10%	
		L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i	L_M	T_i
Natural		50	13.2	70	12.5	85	10.9	100	10.3	100	8.7	100	6.9
LDR	1	50	12.2	70	11.5	85	10.0	100	9.5	100	8.0	100	6.4
LDR	2	50	11.3	70	10.5	85	9.2	100	8.8	100	7.4	100	5.8
LDR	2.9	50	10.7	70	10.0	85	8.8	95	8.1	100	7.0	100	5.6
MDR	4.3	50	10.2	70	9.6	80	8.1	95	7.8	100	6.7	100	5.3
MDR	7.3	50	9.2	65	8.4	80	7.4	95	7.0	100	6.0	100	4.8
MDR	10.9	50	8.7	65	7.9	80	6.9	90	6.4	100	5.7	100	4.5
MDR	14.5	50	8.2	65	7.4	80	6.5	90	6.0	100	5.4	100	4.3
HDR	24	50	6.7	65	6.1	75	5.1	90	4.9	95	4.3	100	3.5
HDR	43	50	5.3	65	4.7	75	4.0	85	3.8	95	3.4	100	2.7
N. Com		50	5.3	60	4.5	75	4.0	85	3.8	95	3.4	100	2.7
G. Com		50	4.7	60	4.1	75	3.6	85	3.4	90	2.9	100	2.4
O.P./Com		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
Limited I.		50	4.2	60	3.7	70	3.1	80	2.9	90	2.6	100	2.2
General I.		50	3.7	60	3.2	70	2.7	80	2.6	90	2.3	100	1.9

*See Table 3-1 for more detailed description

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

Land Use		Runoff Coefficient "C"				
			Soil Type			
NRCS Elements	County Elements	% IMPER.	A	B	C	D
Undisturbed Natural Terrain (Natural)	Permanent Open Space	0*	0.20	0.25	0.30	0.35
Low Density Residential (LDR)	Residential, 1.0 DU/A or less	10	0.27	0.32	0.36	0.41
Low Density Residential (LDR)	Residential, 2.0 DU/A or less	20	0.34	0.38	0.42	0.46
Low Density Residential (LDR)	Residential, 2.9 DU/A or less	25	0.38	0.41	0.45	0.49
Medium Density Residential (MDR)	Residential, 4.3 DU/A or less	30	0.41	0.45	0.48	0.52
Medium Density Residential (MDR)	Residential, 7.3 DU/A or less	40	0.48	0.51	0.54	0.57
Medium Density Residential (MDR)	Residential, 10.9 DU/A or less	45	0.52	0.54	0.57	0.60
Medium Density Residential (MDR)	Residential, 14.5 DU/A or less	50	0.55	0.58	0.60	0.63
High Density Residential (HDR)	Residential, 24.0 DU/A or less	65	0.66	0.67	0.69	0.71
High Density Residential (HDR)	Residential, 43.0 DU/A or less	80	0.76	0.77	0.78	0.79
Commercial/Industrial (N. Com)	Neighborhood Commercial	80	0.76	0.77	0.78	0.79
Commercial/Industrial (G. Com)	General Commercial	85	0.80	0.80	0.81	0.82
Commercial/Industrial (O.P. Com)	Office Professional/Commercial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (Limited I.)	Limited Industrial	90	0.83	0.84	0.84	0.85
Commercial/Industrial (General I.)	General Industrial	95	0.87	0.87	0.87	0.87

*The values associated with 0% impervious may be used for direct calculation of the runoff coefficient as described in Section 3.1.2 (representing the pervious runoff coefficient, Cp, for the soil type), or for areas that will remain undisturbed in perpetuity. Justification must be given that the area will remain natural forever (e.g., the area is located in Cleveland National Forest).
DU/A = dwelling units per acre
NRCS = National Resources Conservation Service



EXAMPLE:
Given: Watercourse Distance (D) = 70 Feet
Slope (s) = 1.3%
Runoff Coefficient (C) = 0.41
Overland Flow Time (T) = 9.5 Minutes

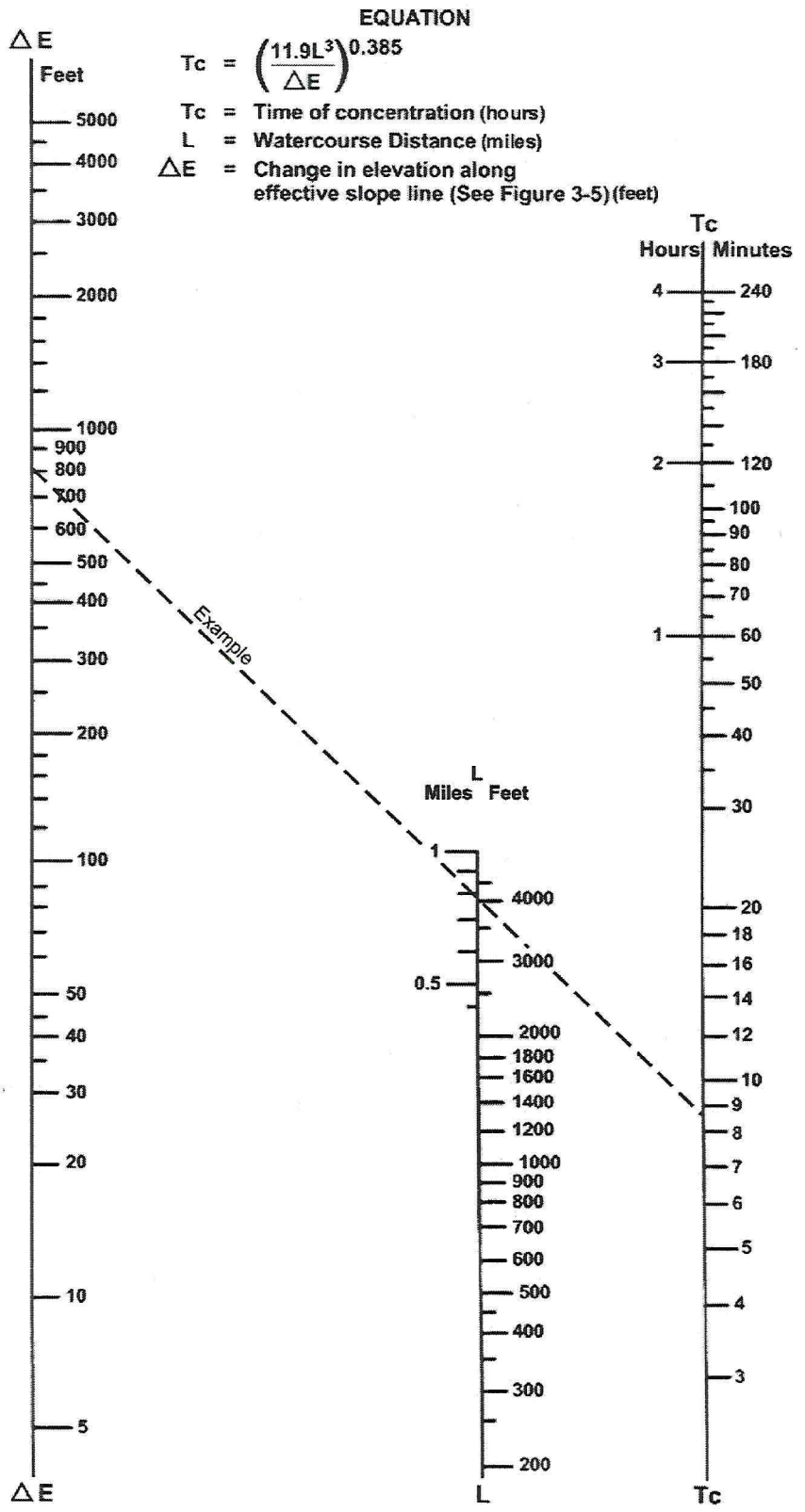
$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

OURCE: Airport Drainage, Federal Aviation Administration, 1965

FIGURE

Rational Formula - Overland Time of Flow Nomograph

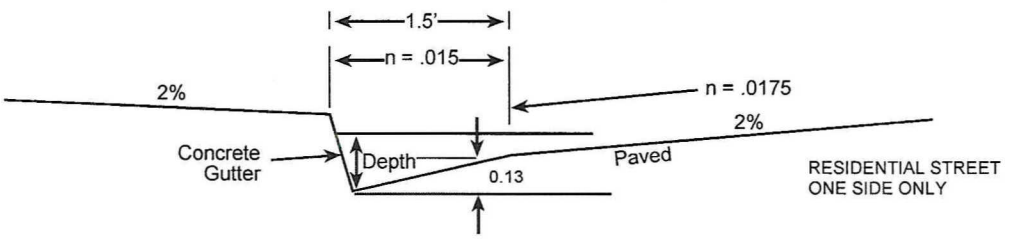
3-3

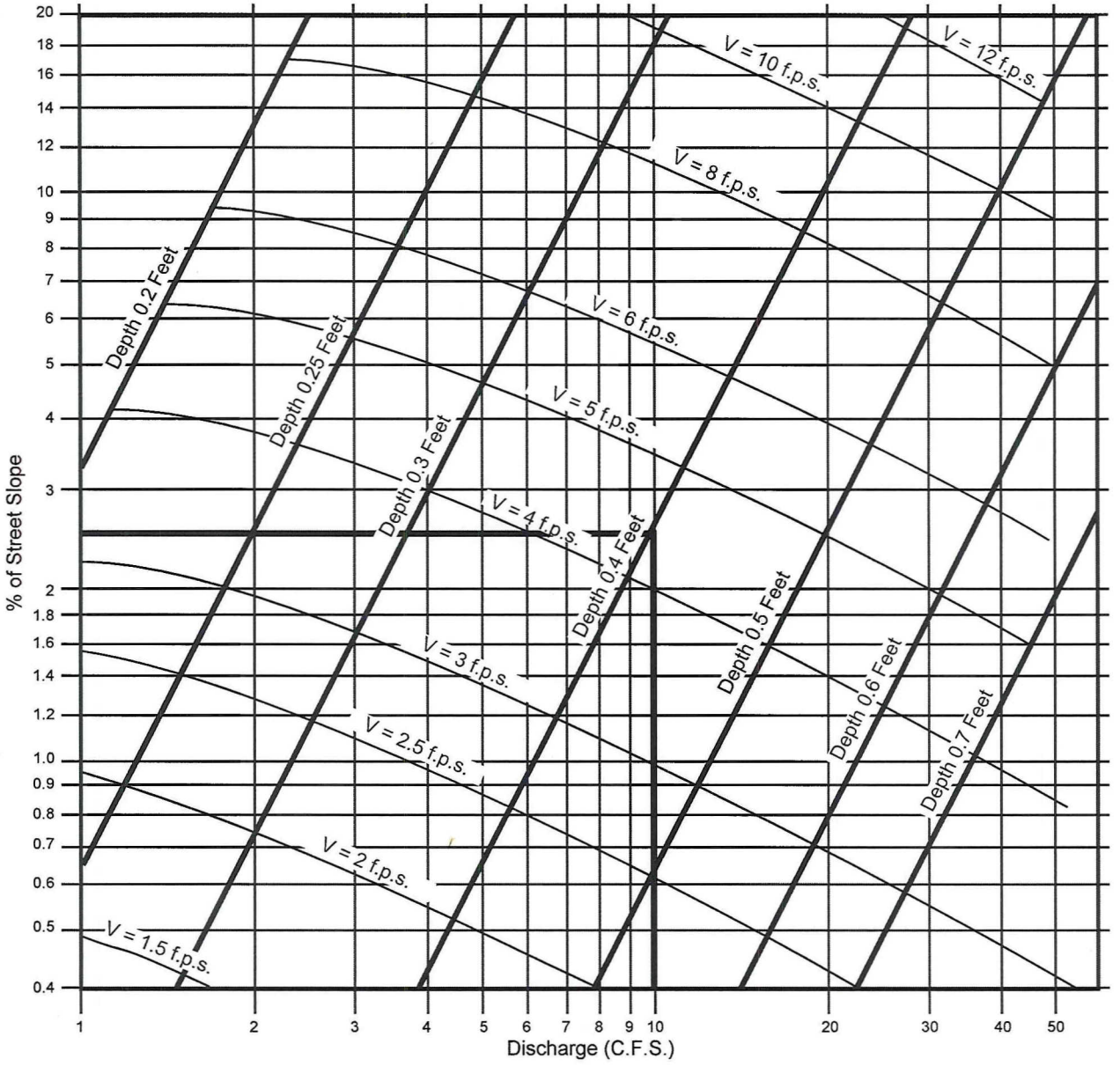


SOURCE: California Division of Highways (1941) and Kirpich (1940)

FIGURE 3-4

Nomograph for Determination of
Time of Concentration (Tc) or Travel Time (Tt) for Natural Watersheds





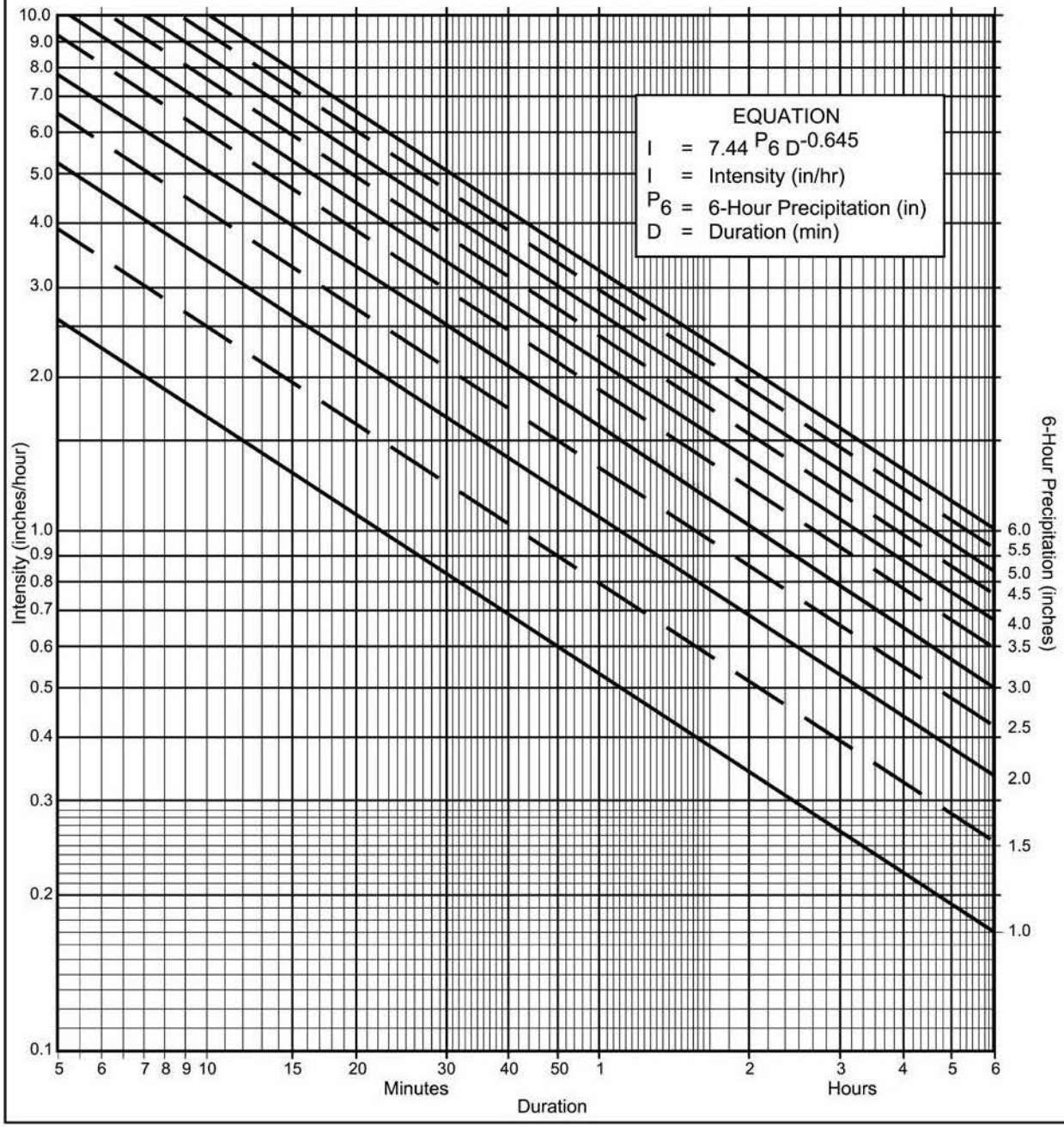
EXAMPLE:
Given: Q = 10 S = 2.5%
Chart gives: Depth = 0.4, Velocity = 4.4 f.p.s.

SOURCE: San Diego County Department of Special District Services Design Manual

FIGURE

Gutter and Roadway Discharge - Velocity Chart

3-6



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency 50 year

(b) P_6 = 2.1 in., P_{24} = 4.5, $\frac{P_6}{P_{24}}$ = 47 %(2)

(c) Adjusted P_6(2) = 2.1 in.

(d) t_x = _____ min.

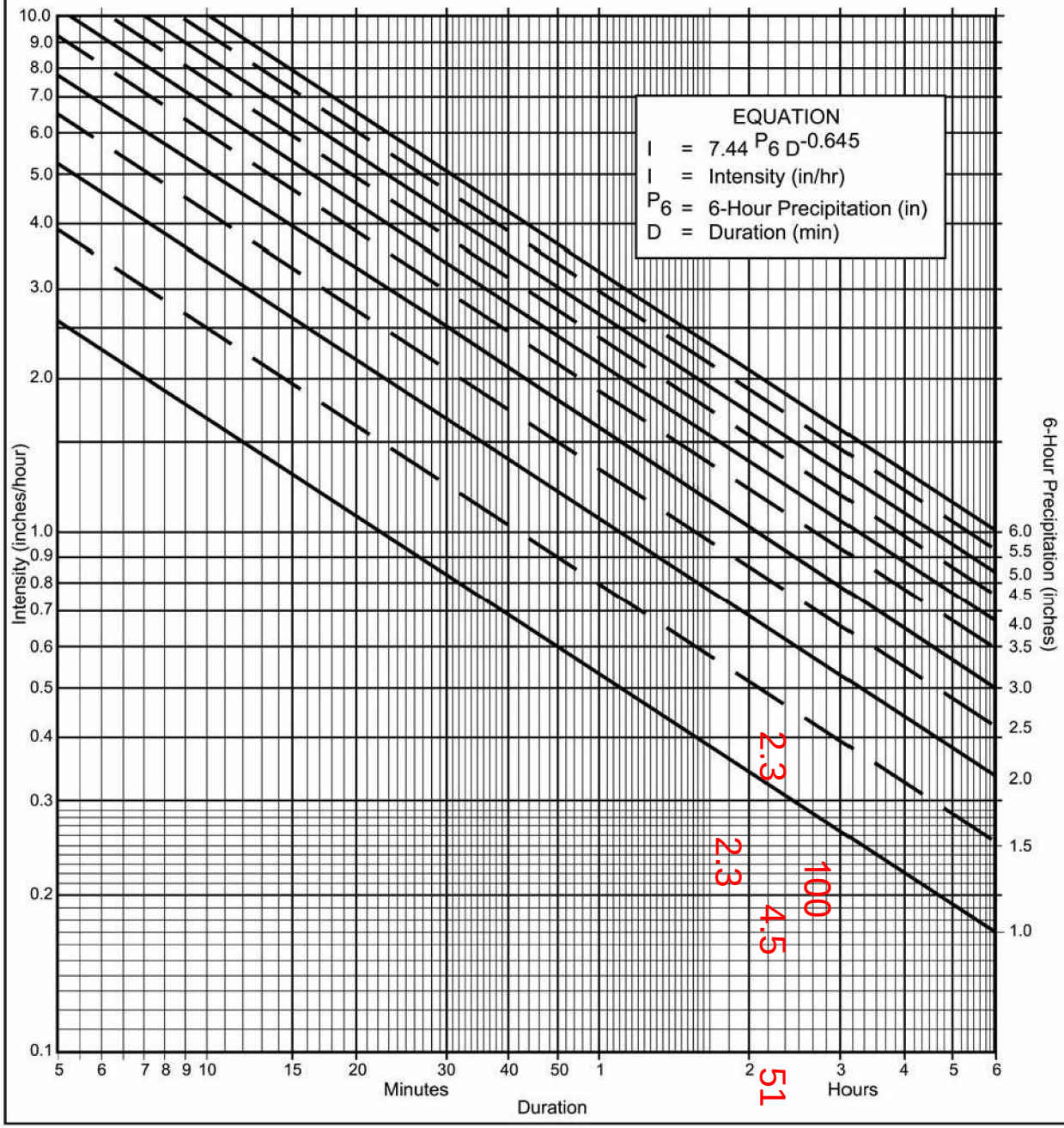
(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1



Directions for Application:

(1) From precipitation maps determine 6 hr and 24 hr amounts for the selected frequency. These maps are included in the County Hydrology Manual (10, 50, and 100 yr maps included in the Design and Procedure Manual).

(2) Adjust 6 hr precipitation (if necessary) so that it is within the range of 45% to 65% of the 24 hr precipitation (not applicaple to Desert).

(3) Plot 6 hr precipitation on the right side of the chart.

(4) Draw a line through the point parallel to the plotted lines.

(5) This line is the intensity-duration curve for the location being analyzed.

Application Form:

(a) Selected frequency _____ year

(b) P_6 = _____ in., P_{24} = _____, $\frac{P_6}{P_{24}}$ = _____ %(2)

(c) Adjusted P_6(2) = _____ in.

(d) t_x = _____ min.

(e) I = _____ in./hr.

Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

P6	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Duration	I	I	I	I	I	I	I	I	I	I	I
5	2.63	3.95	5.27	6.59	7.90	9.22	10.54	11.86	13.17	14.49	15.81
7	2.12	3.18	4.24	5.30	6.36	7.42	8.48	9.54	10.60	11.66	12.72
10	1.68	2.53	3.37	4.21	5.05	5.90	6.74	7.58	8.42	9.27	10.11
15	1.30	1.95	2.59	3.24	3.89	4.54	5.19	5.84	6.49	7.13	7.78
20	1.08	1.62	2.15	2.69	3.23	3.77	4.31	4.85	5.39	5.93	6.46
25	0.93	1.40	1.87	2.33	2.80	3.27	3.73	4.20	4.67	5.13	5.60
30	0.83	1.24	1.66	2.07	2.49	2.90	3.32	3.73	4.15	4.56	4.98
40	0.69	1.03	1.38	1.72	2.07	2.41	2.76	3.10	3.45	3.79	4.13
50	0.60	0.90	1.19	1.49	1.79	2.09	2.39	2.69	2.98	3.28	3.58
60	0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.18
90	0.41	0.61	0.82	1.02	1.23	1.43	1.63	1.84	2.04	2.25	2.45
120	0.34	0.51	0.68	0.85	1.02	1.19	1.36	1.53	1.70	1.87	2.04
150	0.29	0.44	0.59	0.73	0.88	1.03	1.18	1.32	1.47	1.62	1.76
180	0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.18	1.31	1.44	1.57
240	0.22	0.33	0.43	0.54	0.65	0.76	0.87	0.98	1.08	1.19	1.30
300	0.19	0.28	0.38	0.47	0.56	0.66	0.75	0.85	0.94	1.03	1.13
360	0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.75	0.84	0.92	1.00

Intensity-Duration Design Chart - Template

FIGURE 3-1

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 6 Hours

Isopluvial (inches)

P6 = 2.1 INCHES

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

PROJECT LOCATION

OCEANSIDE
VISTA
CARLSBAD
ESCONDIDO
ENCINITAS
SOLANA BEACH
DEL MAR
POWAY
S.D. COUNTY
SANTEE
SAN DIEGO
EL CAJON
LA MESA
LEMON GROVE
CORONADO
SD
CHULA VISTA
IMPERIAL BEACH

117°30' 117°15' 117°00' 116°45' 116°30' 116°15'
33°30' 33°15' 33°00' 32°45' 32°30'

DPW GIS
Department of Public Works
Geographic Information Services

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3 0 3 Miles

County of San Diego Hydrology Manual

Rainfall Isopluvials

50 Year Rainfall Event - 24 Hours

Isopluvial (inches)

P24 = 4.5 INCHES

Orange County

Riverside County

Imperial County

Pacific Ocean

Mexico

PROJECT LOCATION

OCEANSIDE

VISTA

CARLSBAD

ESCONDIDO

ENCINITAS

SOLANA BEACH

DEL MAR

POWAY

S.D. COUNTY

SANTEE

SAN DIEGO

EL CAJON

LA MESA

LEMON GROVE

CORONADO

SD

CHULA VISTA

IMPERIAL BEACH

33°30'

33°15'

33°00'

32°45'

32°30'

117°30'

117°15'

117°00'

116°45'

116°30'

116°15'

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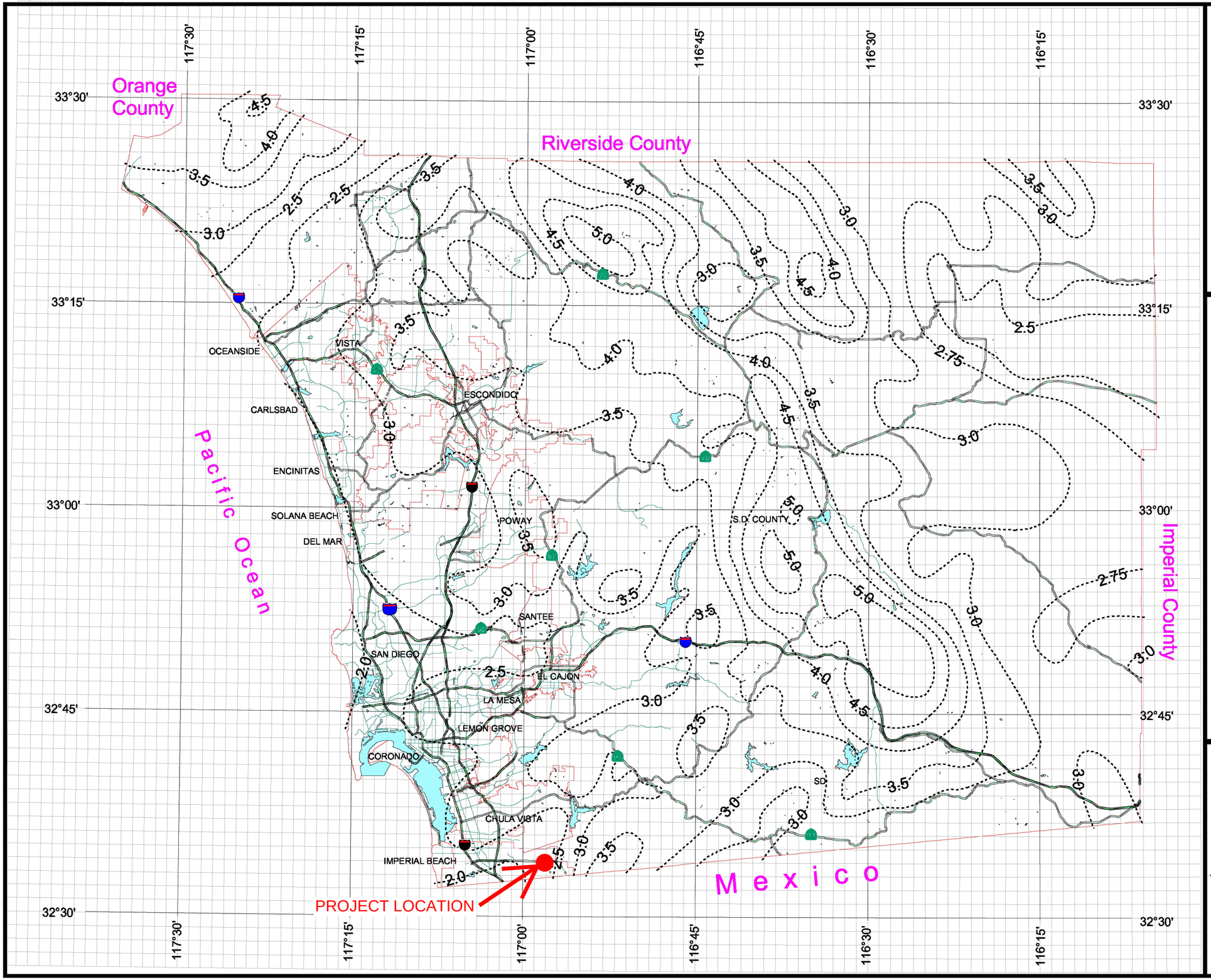
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

Isopluvial (inches)

P6 = 2.3 INCHES



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N
W E
S

3 0 3 Miles

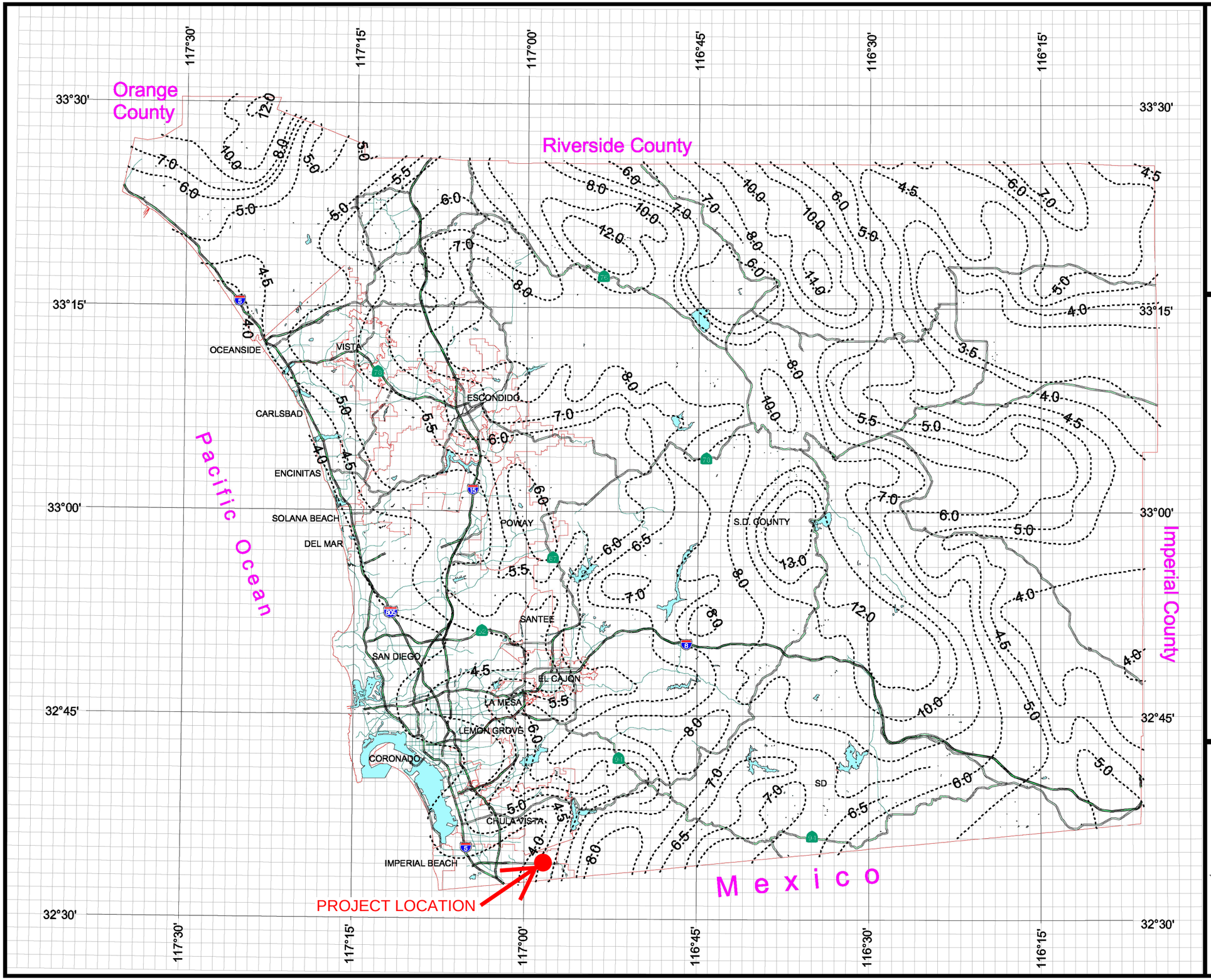
County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

P24 = 4.5 INCHES



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N W E S

3 0 3 Miles

APPENDIX D

EXISTING CONDITION HYDROLOGY CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
         (c) Copyright 1982-2011 Advanced Engineering Software (aes)
             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                         Kimley-Horn and Associates, Inc.
                                765 The City Drive
                                    Suite 200
                                 Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* EXISTING 5YR RATIONAL METHOD                                           *
* APRIL 2021 ELL                                                         *
 **************************************************************************

  FILE NAME: AIR5E.DAT
  TIME/DATE OF STUDY: 14:45 04/14/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.60
  DOWNSTREAM ELEVATION(FEET) =    482.10
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.890
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.000
  SUBAREA RUNOFF(CFS) =      0.18
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.18

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.10  DOWNSTREAM(FEET) =    473.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1817.00   CHANNEL SLOPE =  0.0048
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  0.988
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.81
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.96
  AVERAGE FLOW DEPTH(FEET) =   0.29   TRAVEL TIME(MIN.) =  31.64
  Tc(MIN.) =   38.53
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   13.54
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      13.60

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.36   FLOW VELOCITY(FEET/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    482.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.22
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
  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) =    482.60  DOWNSTREAM(FEET) =    473.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1278.00   CHANNEL SLOPE =  0.0068
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.198
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.84
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =  25.46
  Tc(MIN.) =   28.58
  SUBAREA AREA(ACRES) =     6.62       SUBAREA RUNOFF(CFS) =    4.76
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        6.7         PEAK FLOW RATE(CFS) =       4.83

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.23   FLOW VELOCITY(FEET/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1333.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     28.58
  PEAK FLOW RATE(CFS)   =       4.83
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
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              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                          Kimley-Horn and Associates, Inc.
                                 765 The City Drive
                                     Suite 200
                                  Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                         *
* EXISTING 10YR RATIONAL METHOD                                           *
* APRIL 2021 ELL                                                          *
 **************************************************************************

  FILE NAME: AIR10E.DAT
  TIME/DATE OF STUDY: 15:15 04/14/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.60
  DOWNSTREAM ELEVATION(FEET) =    482.10
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.890
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.428
  SUBAREA RUNOFF(CFS) =      0.21
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.21

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.10  DOWNSTREAM(FEET) =    473.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1817.00   CHANNEL SLOPE =  0.0048
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.135
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.08
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.97
  AVERAGE FLOW DEPTH(FEET) =   0.31   TRAVEL TIME(MIN.) =  31.33
  Tc(MIN.) =   38.22
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   15.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      15.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.38   FLOW VELOCITY(FEET/SEC.) =   1.11
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    482.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  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) =    482.60  DOWNSTREAM(FEET) =    473.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1278.00   CHANNEL SLOPE =  0.0068
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.393
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.86
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =  24.73
  Tc(MIN.) =   27.84
  SUBAREA AREA(ACRES) =     6.62       SUBAREA RUNOFF(CFS) =    5.53
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        6.7         PEAK FLOW RATE(CFS) =       5.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.24   FLOW VELOCITY(FEET/SEC.) =   0.99
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1333.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     27.84
  PEAK FLOW RATE(CFS)   =       5.62
============================================================================
============================================================================
  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 1982-2011 Advanced Engineering Software (aes)
             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                         Kimley-Horn and Associates, Inc.
                                765 The City Drive
                                    Suite 200
                                 Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* EXISTING 25YR RATIONAL METHOD                                          *
* APRIL 2021 ELL                                                         *
 **************************************************************************

  FILE NAME: AIR25E.DAT
  TIME/DATE OF STUDY: 15:18 04/14/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.60
  DOWNSTREAM ELEVATION(FEET) =    482.10
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.890
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.857
  SUBAREA RUNOFF(CFS) =      0.23
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.23

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.10  DOWNSTREAM(FEET) =    473.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1817.00   CHANNEL SLOPE =  0.0048
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.297
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.99
  AVERAGE FLOW DEPTH(FEET) =   0.32   TRAVEL TIME(MIN.) =  30.44
  Tc(MIN.) =   37.33
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   17.76
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      17.84

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.39   FLOW VELOCITY(FEET/SEC.) =   1.16
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    482.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.28
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.28

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    203.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.60  DOWNSTREAM(FEET) =    473.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1278.00   CHANNEL SLOPE =  0.0068
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.618
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.93
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.91
  AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =  23.38
  Tc(MIN.) =   26.50
  SUBAREA AREA(ACRES) =     6.62       SUBAREA RUNOFF(CFS) =    6.42
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        6.7         PEAK FLOW RATE(CFS) =       6.52

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.25   FLOW VELOCITY(FEET/SEC.) =   1.02
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1333.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     26.50
  PEAK FLOW RATE(CFS)   =       6.52
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                          2003,1985,1981 HYDROLOGY MANUAL
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             Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                         Kimley-Horn and Associates, Inc.
                                765 The City Drive
                                    Suite 200
                                 Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* EXISTING 50YR RATIONAL METHOD                                          *
* APRIL 2021 ELL                                                         *
 **************************************************************************

  FILE NAME: AIR50E.DAT
  TIME/DATE OF STUDY: 15:19 04/14/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.60
  DOWNSTREAM ELEVATION(FEET) =    482.10
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.890
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.499
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.27

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.10  DOWNSTREAM(FEET) =    473.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1817.00   CHANNEL SLOPE =  0.0048
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.573
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.30
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.07
  AVERAGE FLOW DEPTH(FEET) =   0.34   TRAVEL TIME(MIN.) =  28.25
  Tc(MIN.) =   35.14
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   21.55
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      21.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.42   FLOW VELOCITY(FEET/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    482.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  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) =    482.60  DOWNSTREAM(FEET) =    473.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1278.00   CHANNEL SLOPE =  0.0068
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.924
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.94
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =  22.61
  Tc(MIN.) =   25.72
  SUBAREA AREA(ACRES) =     6.62       SUBAREA RUNOFF(CFS) =    7.64
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        6.7         PEAK FLOW RATE(CFS) =       7.76

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   1.08
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1333.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        6.7  TC(MIN.) =     25.72
  PEAK FLOW RATE(CFS)   =       7.76
============================================================================
============================================================================
  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 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                          Kimley-Horn and Associates, Inc.
                                 765 The City Drive
                                     Suite 200
                                  Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* EXISTING 100YR RATIONAL METHOD                                         *
* APRIL 2021 ELL                                                         *
 **************************************************************************

  FILE NAME: AIR100E.DAT
  TIME/DATE OF STUDY: 15:20 04/14/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.60
  DOWNSTREAM ELEVATION(FEET) =    482.10
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.890
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.928
  SUBAREA RUNOFF(CFS) =      0.30
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.30

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    482.10  DOWNSTREAM(FEET) =    473.40
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1817.00   CHANNEL SLOPE =  0.0048
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50

        ==>>WARNING: FLOW IN CHANNEL EXCEEDS CHANNEL
            CAPACITY( NORMAL DEPTH EQUAL TO SPECIFIED MAXIMUM
            ALLOWABLE DEPTH).
            AS AN APPROXIMATION, FLOWDEPTH IS SET AT MAXIMUM
            ALLOWABLE DEPTH AND IS USED FOR TRAVELTIME CALCULATIONS.

   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  1.740
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      13.68
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.09
  AVERAGE FLOW DEPTH(FEET) =   0.36   TRAVEL TIME(MIN.) =  27.73
  Tc(MIN.) =   34.62
  SUBAREA AREA(ACRES) =    22.83       SUBAREA RUNOFF(CFS) =   23.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =       22.9         PEAK FLOW RATE(CFS) =      23.93

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.44   FLOW VELOCITY(FEET/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =    1872.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  RESIDENTIAL (10.9 DU/AC OR LESS) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  88
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    488.00
  DOWNSTREAM ELEVATION(FEET) =    482.60
  ELEVATION DIFFERENCE(FEET) =      5.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.117
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.36
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.36

****************************************************************************
  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) =    482.60  DOWNSTREAM(FEET) =    473.90
  CHANNEL LENGTH THRU SUBAREA(FEET) =  1278.00   CHANNEL SLOPE =  0.0068
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.140
  STREETS & ROADS (DIRT) RUNOFF COEFFICIENT = .6000
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  89
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.15
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.97
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =  22.00
  Tc(MIN.) =   25.11
  SUBAREA AREA(ACRES) =     6.62       SUBAREA RUNOFF(CFS) =    8.50
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.600
  TOTAL AREA(ACRES) =        6.7         PEAK FLOW RATE(CFS) =       8.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   1.12
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    203.00 =    1333.00 FEET.
```

```
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =         6.7  TC(MIN.) =     25.11
  PEAK FLOW RATE(CFS)   =        8.63
================================================================================
================================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX E

PROPOSED CONDITION HYDROLOGY CALCULATIONS

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                            Analysis prepared by:

                        Kimley-Horn and Associates, Inc.
                               765 The City Drive
                                   Suite 200
                                Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* PROPOSED 5YR RATIONAL METHOD                                           *
* AUGUST 2021 ELL                                                        *
 ************************************************************************

  FILE NAME: AIR5P.DAT
  TIME/DATE OF STUDY: 13:51 08/05/2021
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =   5.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.400
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    485.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   361.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.976
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.72
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.26
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   4.78
  Tc(MIN.) =    6.97
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    2.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.00

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   1.50
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     416.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.20
  FLOW LENGTH(FEET) =   327.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.30
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.00
  PIPE TRAVEL TIME(MIN.) =   1.27    Tc(MIN.) =    8.24
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.672
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    3.16
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       5.86
  TC(MIN.) =    8.24

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.20  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.88
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.86
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    8.92
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.540
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.89   SUBAREA RUNOFF(CFS) =    1.97
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =       7.53
  TC(MIN.) =    8.92

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  14.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.91
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.53
  PIPE TRAVEL TIME(MIN.) =   0.58    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.439
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    1.61
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =       8.85
  TC(MIN.) =    9.49

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.40  DOWNSTREAM(FEET) =   477.10
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.71
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.85
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.65
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.65
  RAINFALL INTENSITY(INCH/HR) =   2.41
  TOTAL STREAM AREA(ACRES) =     4.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.85

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.80
  DOWNSTREAM ELEVATION(FEET) =    481.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.108
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    481.10  DOWNSTREAM(FEET) =    476.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =    3.32
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    1.44
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       1.77

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.27
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    107.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.32
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.77

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.10
  DOWNSTREAM ELEVATION(FEET) =    482.20
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.031
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    107.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  482.20  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 47.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  42.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.50
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.27
    HALFSTREET FLOOD WIDTH(FEET) =    7.17
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.37
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.64
  STREET FLOW TRAVEL TIME(MIN.) =   3.47   Tc(MIN.) =    5.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.469
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    2.35
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       2.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   9.31
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   0.84
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    107.00 =     549.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.50
  RAINFALL INTENSITY(INCH/HR) =   3.47
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.66

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        8.85     9.65        2.414          4.17
      2        1.77     3.32        3.689          0.55
      3        2.66     5.50        3.469          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        6.41     3.32       3.689
      2        9.36     5.50       3.469
      3       11.85     9.65       2.414

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.85   Tc(MIN.) =    9.65
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.40
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.710
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.60  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    36.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.39
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.49
  Tc(MIN.) =    3.20
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.13
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.34
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =      91.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.45
  PIPE TRAVEL TIME(MIN.) =   1.02    Tc(MIN.) =    4.22
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    404.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.22
  TC(MIN.) =    4.22

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.31
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.22
  PIPE TRAVEL TIME(MIN.) =   0.70    Tc(MIN.) =    4.92
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.92
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.22

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.20
  DOWNSTREAM ELEVATION(FEET) =    486.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.606
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0130
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.05
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.36
  Tc(MIN.) =    2.97
```

```
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.06
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    503.00 =      78.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.90  DOWNSTREAM(FEET) =   479.50
  FLOW LENGTH(FEET) =   191.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.34
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.39
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    3.92
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    504.00 =     269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.67
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.06
  TC(MIN.) =    3.92

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.50  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.38
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.06
  PIPE TRAVEL TIME(MIN.) =   0.51    Tc(MIN.) =    4.43
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    405.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.43
  RAINFALL INTENSITY(INCH/HR) =   3.69
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.06

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

```
     1        1.22     4.92        3.689          0.38
     2        1.06     4.43        3.689          0.33

  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        2.16     4.43       3.689
     2        2.28     4.92       3.689

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.28   Tc(MIN.) =    4.92
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.90  DOWNSTREAM(FEET) =   474.40
  FLOW LENGTH(FEET) =   564.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.61
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.28
  PIPE TRAVEL TIME(MIN.) =   2.04    Tc(MIN.) =    6.97
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    406.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.979
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    6.53   SUBAREA RUNOFF(CFS) =   16.92
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      18.76
  TC(MIN.) =    6.97

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.40  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.02
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.76
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    7.06
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 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.) =    7.06
  RAINFALL INTENSITY(INCH/HR) =   2.95
  TOTAL STREAM AREA(ACRES) =     7.24
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.76

****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.00
  DOWNSTREAM ELEVATION(FEET) =    485.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    485.50  DOWNSTREAM(FEET) =    478.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.097
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       9.41
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.35
  AVERAGE FLOW DEPTH(FEET) =   0.20   TRAVEL TIME(MIN.) =   4.36
  Tc(MIN.) =    6.56
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   18.05
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      18.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.26   FLOW VELOCITY(FEET/SEC.) =   2.81
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    603.00 =     669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.30  DOWNSTREAM(FEET) =   474.10
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.14
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.32
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.68
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    407.00 =     714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.68
  RAINFALL INTENSITY(INCH/HR) =   3.06
```

```
  TOTAL STREAM AREA(ACRES) =     6.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.32

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.76     7.06        2.953          7.24
      2       18.32     6.68        3.060          6.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       36.43     6.68       3.060
      2       36.44     7.06       2.953

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      36.44   Tc(MIN.) =    7.06
  TOTAL AREA(ACRES) =       14.0
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.0907
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.28
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.28
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   0.38
  Tc(MIN.) =    2.58
  SUBAREA AREA(ACRES) =     3.09       SUBAREA RUNOFF(CFS) =    9.92
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =      10.24

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   5.12
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =     152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.50
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.32

********************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
--------------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
     5 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.689
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.35
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.87
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   2.77
  Tc(MIN.) =    4.96
  SUBAREA AREA(ACRES) =     1.89       SUBAREA RUNOFF(CFS) =    6.07
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       6.39

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   2.16
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =     366.00 FEET.
================================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      4.96
  PEAK FLOW RATE(CFS)   =       6.39
================================================================================
================================================================================
  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 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                            Analysis prepared by:

                        Kimley-Horn and Associates, Inc.
                               765 The City Drive
                                   Suite 200
                                Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* PROPOSED 10YR RATIONAL METHOD                                          *
* AUGUST 2021 ELL                                                        *
 ************************************************************************

  FILE NAME: AIR10P.DAT
  TIME/DATE OF STUDY: 13:53 08/05/2021
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  10.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.600
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    485.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   361.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.421
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.28
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   4.71
  Tc(MIN.) =    6.91
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    3.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       3.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   1.56
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     416.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.20
  FLOW LENGTH(FEET) =   327.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.45
  PIPE TRAVEL TIME(MIN.) =   1.23    Tc(MIN.) =    8.14
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.078
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    3.64
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       6.75
  TC(MIN.) =    8.14

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.20  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  12.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.01
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.75
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    8.80
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.928
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.89   SUBAREA RUNOFF(CFS) =    2.27
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =       8.69
  TC(MIN.) =    8.80

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.24
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.69
  PIPE TRAVEL TIME(MIN.) =   0.54    Tc(MIN.) =    9.34
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.817
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    1.86
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      10.22
  TC(MIN.) =    9.34

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.40  DOWNSTREAM(FEET) =   477.10
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.88
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.22
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =    9.49
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.49
  RAINFALL INTENSITY(INCH/HR) =   2.79
  TOTAL STREAM AREA(ACRES) =     4.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.22

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.80
  DOWNSTREAM ELEVATION(FEET) =    481.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.108
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    481.10  DOWNSTREAM(FEET) =    476.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.19
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.92
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.23
  Tc(MIN.) =    3.34
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    1.65
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.02

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.29
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    107.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.34
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.02

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.10
  DOWNSTREAM ELEVATION(FEET) =    482.20
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.031
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    107.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  482.20  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 47.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  42.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.73
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.28
    HALFSTREET FLOOD WIDTH(FEET) =    7.67
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.45
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.69
  STREET FLOW TRAVEL TIME(MIN.) =   3.36   Tc(MIN.) =    5.39
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.017
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    2.73
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.08

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.33   HALFSTREET FLOOD WIDTH(FEET) =   9.96
  FLOW VELOCITY(FEET/SEC.) =  2.77   DEPTH*VELOCITY(FT*FT/SEC.) =   0.90
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    107.00 =     549.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.39
  RAINFALL INTENSITY(INCH/HR) =   4.02
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.08

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       10.22     9.49        2.789          4.17
      2        2.02     3.34        4.216          0.55
      3        3.08     5.39        4.017          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.52     3.34       4.216
      2       10.80     5.39       4.017
      3       13.69     9.49       2.789

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      13.69   Tc(MIN.) =    9.49
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.40
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.710
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.60  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    36.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.44
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.31
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.46
  Tc(MIN.) =    3.17
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.15
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.51

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.27
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =      91.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.51
  PIPE TRAVEL TIME(MIN.) =   0.98    Tc(MIN.) =    4.15
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    404.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.88
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.39
  TC(MIN.) =    4.15

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.42
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.39
  PIPE TRAVEL TIME(MIN.) =   0.68    Tc(MIN.) =    4.83
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.83
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.39

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.20
  DOWNSTREAM ELEVATION(FEET) =    486.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.606
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0130
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.40
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.20
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.32
  Tc(MIN.) =    2.92
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.07
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.44

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.06   FLOW VELOCITY(FEET/SEC.) =   1.09
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    503.00 =      78.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.90  DOWNSTREAM(FEET) =   479.50
  FLOW LENGTH(FEET) =   191.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.47
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.44
  PIPE TRAVEL TIME(MIN.) =   0.92    Tc(MIN.) =    3.84
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    504.00 =     269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.77
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.21
  TC(MIN.) =    3.84

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.50  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.50
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.21
  PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    4.33
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    405.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.33
  RAINFALL INTENSITY(INCH/HR) =   4.22
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.21

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.39     4.83        4.216          0.38
```

```
     2        1.21     4.33        4.216          0.33

  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        2.46     4.33       4.216
      2        2.60     4.83       4.216

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.60   Tc(MIN.) =    4.83
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.90  DOWNSTREAM(FEET) =   474.40
  FLOW LENGTH(FEET) =   564.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.73
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.60
  PIPE TRAVEL TIME(MIN.) =   1.99    Tc(MIN.) =    6.81
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    406.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.452
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    6.53   SUBAREA RUNOFF(CFS) =   19.61
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      21.75
  TC(MIN.) =    6.81

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.40  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  19.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.17
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.75
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.91
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 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.) =    6.91
  RAINFALL INTENSITY(INCH/HR) =   3.42
  TOTAL STREAM AREA(ACRES) =     7.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.75
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.00
  DOWNSTREAM ELEVATION(FEET) =    485.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    485.50  DOWNSTREAM(FEET) =    478.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.631
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      10.96
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.49
  AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   4.10
  Tc(MIN.) =    6.30
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   21.17
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      21.48

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   2.82
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    603.00 =     669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.30  DOWNSTREAM(FEET) =   474.10
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.25
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.48
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    6.42
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    407.00 =     714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.42
  RAINFALL INTENSITY(INCH/HR) =   3.59
  TOTAL STREAM AREA(ACRES) =     6.80
```

```
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     21.48

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       21.75     6.91        3.423          7.24
      2       21.48     6.42        3.587          6.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       42.23     6.42       3.587
      2       42.24     6.91       3.423

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      42.24   Tc(MIN.) =    6.91
  TOTAL AREA(ACRES) =       14.0
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.0907
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.43
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.37
  Tc(MIN.) =    2.56
  SUBAREA AREA(ACRES) =     3.09       SUBAREA RUNOFF(CFS) =   11.33
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =      11.70

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.15   FLOW VELOCITY(FEET/SEC.) =   5.27
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =     152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

```
================================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.50
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.37
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.37

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    10 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.216
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.92
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   2.70
  Tc(MIN.) =    4.90
  SUBAREA AREA(ACRES) =     1.89       SUBAREA RUNOFF(CFS) =    6.93
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       7.30

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.13
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =     366.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      4.90
  PEAK FLOW RATE(CFS)   =       7.30
================================================================================
================================================================================
  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 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

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                                 765 The City Drive
                                     Suite 200
                                  Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* PROPOSED 25YR RATIONAL METHOD                                          *
* AUGUST 2021 ELL                                                        *
 **************************************************************************

  FILE NAME: AIR25P.DAT
  TIME/DATE OF STUDY: 13:56 08/05/2021
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  25.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   1.800
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
==========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

**************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
--------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    485.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   361.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.051
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.29
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.44
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   4.19
  Tc(MIN.) =    6.38
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    3.74
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       4.09

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   1.55
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     416.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.20
  FLOW LENGTH(FEET) =   327.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.59
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.09
  PIPE TRAVEL TIME(MIN.) =   1.19    Tc(MIN.) =    7.57
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.629
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    4.29
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       7.96
  TC(MIN.) =    7.57

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.20  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.30
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.96
  PIPE TRAVEL TIME(MIN.) =   0.62    Tc(MIN.) =    8.19
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.448
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.89   SUBAREA RUNOFF(CFS) =    2.67
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      10.23
  TC(MIN.) =    8.19

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.39
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.23
  PIPE TRAVEL TIME(MIN.) =   0.53    Tc(MIN.) =    8.72
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.313
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    2.19
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      12.02
  TC(MIN.) =    8.72

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.40  DOWNSTREAM(FEET) =   477.10
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.01
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      12.02
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.86
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.86
  RAINFALL INTENSITY(INCH/HR) =   3.28
  TOTAL STREAM AREA(ACRES) =     4.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     12.02

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.80
  DOWNSTREAM ELEVATION(FEET) =    481.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.108
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    481.10  DOWNSTREAM(FEET) =    476.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.34
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.06
  AVERAGE FLOW DEPTH(FEET) =   0.08   TRAVEL TIME(MIN.) =   1.15
  Tc(MIN.) =    3.26
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    1.86
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.27

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.47
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    107.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.26
  RAINFALL INTENSITY(INCH/HR) =   4.74
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.27

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.10
  DOWNSTREAM ELEVATION(FEET) =    482.20
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.031
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    107.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  482.20  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 47.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  42.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.97
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.29
    HALFSTREET FLOOD WIDTH(FEET) =    8.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.51
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   3.28   Tc(MIN.) =    5.31
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.561
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.10
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       3.49

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.34   HALFSTREET FLOOD WIDTH(FEET) =  10.54
  FLOW VELOCITY(FEET/SEC.) =  2.84   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    107.00 =     549.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.31
  RAINFALL INTENSITY(INCH/HR) =   4.56
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.49

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       12.02     8.86        3.278          4.17
      2        2.27     3.26        4.743          0.55
      3        3.49     5.31        4.561          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        8.82     3.26       4.743
      2       12.88     5.31       4.561
      3       16.10     8.86       3.278

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.10   Tc(MIN.) =    8.86
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.40
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.710
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.60  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    36.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.22
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.49
  Tc(MIN.) =    3.20
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.17
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.35
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =      91.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.63
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.58
  PIPE TRAVEL TIME(MIN.) =   0.95    Tc(MIN.) =    4.15
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    404.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    0.99
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.57
  TC(MIN.) =    4.15

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.52
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.57
  PIPE TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    4.81
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.81
  RAINFALL INTENSITY(INCH/HR) =   4.74
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.57

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.20
  DOWNSTREAM ELEVATION(FEET) =    486.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.606
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0130
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.45
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.12
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    2.95
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.08
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.50

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.15
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    503.00 =      78.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.90  DOWNSTREAM(FEET) =   479.50
  FLOW LENGTH(FEET) =   191.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   2.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.50
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =    3.83
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    504.00 =     269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    0.87
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.36
  TC(MIN.) =    3.83

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.50  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   5.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.61
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.36
  PIPE TRAVEL TIME(MIN.) =   0.48    Tc(MIN.) =    4.31
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    405.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.31
  RAINFALL INTENSITY(INCH/HR) =   4.74
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.36

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.57     4.81        4.743          0.38
      2        1.36     4.31        4.743          0.33
```

```
  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        2.77     4.31       4.743
      2        2.93     4.81       4.743

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.93   Tc(MIN.) =    4.81
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.90  DOWNSTREAM(FEET) =   474.40
  FLOW LENGTH(FEET) =   564.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.83
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.93
  PIPE TRAVEL TIME(MIN.) =   1.95    Tc(MIN.) =    6.76
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    406.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.905
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    6.53   SUBAREA RUNOFF(CFS) =   22.18
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      24.60
  TC(MIN.) =    6.76

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.40  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  18.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.61
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.60
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.85
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 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.) =    6.85
  RAINFALL INTENSITY(INCH/HR) =   3.87
  TOTAL STREAM AREA(ACRES) =     7.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.60
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.00
  DOWNSTREAM ELEVATION(FEET) =    485.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    485.50  DOWNSTREAM(FEET) =    478.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.112
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      12.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.53
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   4.04
  Tc(MIN.) =    6.24
  SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   23.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      24.32

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.29   FLOW VELOCITY(FEET/SEC.) =   2.98
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    603.00 =     669.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    603.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.30  DOWNSTREAM(FEET) =   474.10
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  21.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.59
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.32
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.35
  LONGEST FLOWPATH FROM NODE    601.00 TO NODE    407.00 =     714.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    6.35
  RAINFALL INTENSITY(INCH/HR) =   4.06
  TOTAL STREAM AREA(ACRES) =     6.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     24.32
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       24.60     6.85        3.873          7.24
      2       24.32     6.35        4.064          6.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       47.76     6.35       4.064
      2       47.77     6.85       3.873

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      47.77   Tc(MIN.) =    6.85
  TOTAL AREA(ACRES) =       14.0
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.0907
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.82
  AVERAGE FLOW DEPTH(FEET) =   0.12   TRAVEL TIME(MIN.) =   0.34
  Tc(MIN.) =    2.53
  SUBAREA AREA(ACRES) =     3.09       SUBAREA RUNOFF(CFS) =   12.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =      13.16

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   5.50
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =     152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.50
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.41
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.41

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    25 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.743
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.31
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.94
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   2.67
  Tc(MIN.) =    4.87
  SUBAREA AREA(ACRES) =     1.89       SUBAREA RUNOFF(CFS) =    7.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       8.21

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.19   FLOW VELOCITY(FEET/SEC.) =   2.21
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =     366.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      4.87
  PEAK FLOW RATE(CFS)   =       8.21
============================================================================
============================================================================
  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 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                              Analysis prepared by:

                          Kimley-Horn and Associates, Inc.
                                 765 The City Drive
                                     Suite 200
                                  Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                         *
* PROPOSED 50YR RATIONAL METHOD                                           *
* AUGUST 2021 ELL                                                         *
 *************************************************************************

  FILE NAME: AIR50P.DAT
  TIME/DATE OF STUDY: 13:58 08/05/2021
-----------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-----------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) =  50.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.100
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
=============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

*****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
-----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    485.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   361.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.664
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.39
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   4.32
  Tc(MIN.) =    6.52
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    4.30
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       4.71

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   1.63
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     416.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.20
  FLOW LENGTH(FEET) =   327.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  11.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.68
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       4.71
  PIPE TRAVEL TIME(MIN.) =   1.16    Tc(MIN.) =    7.68
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.195
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    4.96
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =       9.20
  TC(MIN.) =    7.68

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.20  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.46
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.20
  PIPE TRAVEL TIME(MIN.) =   0.60    Tc(MIN.) =    8.28
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.995
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.89   SUBAREA RUNOFF(CFS) =    3.09
  TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      11.85
  TC(MIN.) =    8.28

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   477.40
  FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.68
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.85
  PIPE TRAVEL TIME(MIN.) =   0.50    Tc(MIN.) =    8.78
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1111.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.847
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    2.54
  TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      13.96
  TC(MIN.) =    8.78

****************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   477.40  DOWNSTREAM(FEET) =   477.10
  FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.37
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.96
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.92
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.92
  RAINFALL INTENSITY(INCH/HR) =   3.81
  TOTAL STREAM AREA(ACRES) =     4.17
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.96

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.80
  DOWNSTREAM ELEVATION(FEET) =    481.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.108
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    481.10  DOWNSTREAM(FEET) =    476.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.56
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.10
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.13
  Tc(MIN.) =    3.24
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    2.17
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.65

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   2.47
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    107.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.24
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.65

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.10
  DOWNSTREAM ELEVATION(FEET) =    482.20
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.031
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    107.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  482.20  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 47.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  42.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.31
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.30
    HALFSTREET FLOOD WIDTH(FEET) =    8.81
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.58
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.78
  STREET FLOW TRAVEL TIME(MIN.) =   3.19   Tc(MIN.) =    5.22
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.381
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    3.65
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       4.12

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.35   HALFSTREET FLOOD WIDTH(FEET) =  11.28
  FLOW VELOCITY(FEET/SEC.) =  2.96   DEPTH*VELOCITY(FT*FT/SEC.) =   1.04
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    107.00 =     549.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.22
  RAINFALL INTENSITY(INCH/HR) =   5.38
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.12

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.96     8.92        3.809          4.17
      2        2.65     3.24        5.533          0.55
      3        4.12     5.22        5.381          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       10.26     3.24       5.533
      2       14.86     5.22       5.381
      3       18.70     8.92       3.809

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.70   Tc(MIN.) =    8.92
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.40
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.710
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.60  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    36.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.35
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.45
  Tc(MIN.) =    3.16
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.19
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.67

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.33
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =      91.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.82
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.67
  PIPE TRAVEL TIME(MIN.) =   0.90    Tc(MIN.) =    4.06
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    404.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    1.16
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       1.83
  TC(MIN.) =    4.06

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.65
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.83
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =    4.70
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.70
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.83

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.20
  DOWNSTREAM ELEVATION(FEET) =    486.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.606
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0130
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.53
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.24
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.31
  Tc(MIN.) =    2.92
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.10
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.14
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    503.00 =      78.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.90  DOWNSTREAM(FEET) =   479.50
  FLOW LENGTH(FEET) =   191.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.58
  PIPE TRAVEL TIME(MIN.) =   0.85    Tc(MIN.) =    3.76
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    504.00 =     269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    1.01
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.59
  TC(MIN.) =    3.76

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.50  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.75
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.59
  PIPE TRAVEL TIME(MIN.) =   0.46    Tc(MIN.) =    4.22
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    405.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.22
  RAINFALL INTENSITY(INCH/HR) =   5.53
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.59

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        1.83     4.70        5.533          0.38
      2        1.59     4.22        5.533          0.33
```

```
  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        3.23     4.22       5.533
      2        3.42     4.70       5.533

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.42   Tc(MIN.) =    4.70
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.90  DOWNSTREAM(FEET) =   474.40
  FLOW LENGTH(FEET) =   564.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.10
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.42
  PIPE TRAVEL TIME(MIN.) =   1.84    Tc(MIN.) =    6.54
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    406.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.654
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    6.53   SUBAREA RUNOFF(CFS) =   26.44
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      29.31
  TC(MIN.) =    6.54

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.40  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  21.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   8.82
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      29.31
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    6.62
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 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.) =    6.62
  RAINFALL INTENSITY(INCH/HR) =   4.62
  TOTAL STREAM AREA(ACRES) =     7.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     29.31
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
 UPSTREAM ELEVATION(FEET) =    487.00
 DOWNSTREAM ELEVATION(FEET) =    485.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.48
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    485.50  DOWNSTREAM(FEET) =    478.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0119
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.864
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      14.85
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.62
 AVERAGE FLOW DEPTH(FEET) =   0.24   TRAVEL TIME(MIN.) =   3.91
 Tc(MIN.) =    6.11
 SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   28.35
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      28.78

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   3.06
 LONGEST FLOWPATH FROM NODE    601.00 TO NODE    603.00 =     669.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.30  DOWNSTREAM(FEET) =   474.10
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  30.0 INCH PIPE IS  24.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.70
 ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      28.78
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.22
 LONGEST FLOWPATH FROM NODE    601.00 TO NODE    407.00 =     714.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.22
 RAINFALL INTENSITY(INCH/HR) =   4.81
 TOTAL STREAM AREA(ACRES) =     6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     28.78
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       29.31     6.62        4.615          7.24
      2       28.78     6.22        4.807          6.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       56.92     6.22       4.807
      2       56.94     6.62       4.615

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      56.94   Tc(MIN.) =    6.62
  TOTAL AREA(ACRES) =       14.0
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.0907
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.92
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.97
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.33
  Tc(MIN.) =    2.52
  SUBAREA AREA(ACRES) =     3.09       SUBAREA RUNOFF(CFS) =   14.87
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =      15.36

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.16   FLOW VELOCITY(FEET/SEC.) =   5.70
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =     152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.50
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.48
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.48

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
    50 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.533
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.03
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.05
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.53
  Tc(MIN.) =    4.72
  SUBAREA AREA(ACRES) =     1.89       SUBAREA RUNOFF(CFS) =    9.10
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =       9.58

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.20   FLOW VELOCITY(FEET/SEC.) =   2.34
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =     366.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      4.72
  PEAK FLOW RATE(CFS)   =       9.58
============================================================================
============================================================================
  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 1982-2011 Advanced Engineering Software (aes)
              Ver. 18.0 Release Date: 07/01/2011  License ID 1499

                            Analysis prepared by:

                        Kimley-Horn and Associates, Inc.
                               765 The City Drive
                                   Suite 200
                                Orange, CA 92868

 ************************** DESCRIPTION OF STUDY **************************
* MAJESTIC AIRWAY                                                        *
* PROPOSED 100YR RATIONAL METHOD                                         *
* AUGUST 2021 ELL                                                        *
 ************************************************************************

  FILE NAME: AIR100P.DAT
  TIME/DATE OF STUDY: 14:00 08/05/2021
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.300
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  12.00
  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   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint = 10.0 (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<<<<<
========================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    103.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
```

```
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    485.10
  CHANNEL LENGTH THRU SUBAREA(FEET) =   361.00   CHANNEL SLOPE =  0.0075
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.238
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.95
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.48
  AVERAGE FLOW DEPTH(FEET) =   0.14   TRAVEL TIME(MIN.) =   4.07
  Tc(MIN.) =    6.27
  SUBAREA AREA(ACRES) =     1.06       SUBAREA RUNOFF(CFS) =    4.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       5.29

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.18   FLOW VELOCITY(FEET/SEC.) =   1.68
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    103.00 =     416.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    104.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.00  DOWNSTREAM(FEET) =   479.20
  FLOW LENGTH(FEET) =   327.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.95
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       5.29
  PIPE TRAVEL TIME(MIN.) =   1.10    Tc(MIN.) =    7.37
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    104.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    104.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.718
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    1.36   SUBAREA RUNOFF(CFS) =    5.58
  TOTAL AREA(ACRES) =        2.5   TOTAL RUNOFF(CFS) =      10.34
  TC(MIN.) =    7.37

****************************************************************************
  FLOW PROCESS FROM NODE    104.00 TO NODE    105.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.20  DOWNSTREAM(FEET) =   478.20
  FLOW LENGTH(FEET) =   198.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.57
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      10.34
  PIPE TRAVEL TIME(MIN.) =   0.59    Tc(MIN.) =    7.96
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    105.00 =     941.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.489
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.89   SUBAREA RUNOFF(CFS) =    3.48
 TOTAL AREA(ACRES) =        3.4   TOTAL RUNOFF(CFS) =      13.32
 TC(MIN.) =    7.96

****************************************************************************
 FLOW PROCESS FROM NODE    105.00 TO NODE    106.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   478.20  DOWNSTREAM(FEET) =   477.40
 FLOW LENGTH(FEET) =   170.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.81
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      13.32
 PIPE TRAVEL TIME(MIN.) =   0.49    Tc(MIN.) =    8.45
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    106.00 =    1111.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    106.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.320
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
 SUBAREA AREA(ACRES) =    0.76   SUBAREA RUNOFF(CFS) =    2.86
 TOTAL AREA(ACRES) =        4.2   TOTAL RUNOFF(CFS) =      15.67
 TC(MIN.) =    8.45

****************************************************************************
 FLOW PROCESS FROM NODE    106.00 TO NODE    107.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   477.40  DOWNSTREAM(FEET) =   477.10
 FLOW LENGTH(FEET) =    52.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.2 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.50
 ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      15.67
 PIPE TRAVEL TIME(MIN.) =   0.13    Tc(MIN.) =    8.58
 LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  3
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    8.58
 RAINFALL INTENSITY(INCH/HR) =   4.28
 TOTAL STREAM AREA(ACRES) =     4.17
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.67

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    202.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
```

```
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    482.80
  DOWNSTREAM ELEVATION(FEET) =    481.10
  ELEVATION DIFFERENCE(FEET) =      1.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.108
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    107.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    481.10  DOWNSTREAM(FEET) =    476.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   142.00   CHANNEL SLOPE =  0.0324
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.20
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   1.08
  Tc(MIN.) =    3.18
  SUBAREA AREA(ACRES) =     0.45       SUBAREA RUNOFF(CFS) =    2.37
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.6         PEAK FLOW RATE(CFS) =       2.90

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.11   FLOW VELOCITY(FEET/SEC.) =   2.44
  LONGEST FLOWPATH FROM NODE    201.00 TO NODE    107.00 =     197.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.18
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.55
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.90

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    302.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.10
  DOWNSTREAM ELEVATION(FEET) =    482.20
  ELEVATION DIFFERENCE(FEET) =      1.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.031
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    107.00 IS CODE =  61
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STANDARD CURB SECTION USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  482.20  DOWNSTREAM ELEVATION(FEET) =  476.50
  STREET LENGTH(FEET) =   494.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 47.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  42.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0130
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.55
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.31
    HALFSTREET FLOOD WIDTH(FEET) =    9.14
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.68
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.83
  STREET FLOW TRAVEL TIME(MIN.) =   3.08   Tc(MIN.) =    5.11
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.976
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  SUBAREA AREA(ACRES) =    0.78      SUBAREA RUNOFF(CFS) =    4.06
  TOTAL AREA(ACRES) =        0.9        PEAK FLOW RATE(CFS) =       4.58

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.36   HALFSTREET FLOOD WIDTH(FEET) =  11.77
  FLOW VELOCITY(FEET/SEC.) =  3.04   DEPTH*VELOCITY(FT*FT/SEC.) =   1.10
  LONGEST FLOWPATH FROM NODE    301.00 TO NODE    107.00 =     549.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    107.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  3
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  3 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.11
  RAINFALL INTENSITY(INCH/HR) =   5.98
  TOTAL STREAM AREA(ACRES) =     0.88
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.58

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.67     8.58        4.276          4.17
      2        2.90     3.18        6.060          0.55
      3        4.58     5.11        5.976          0.88

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       11.56     3.18       6.060
      2       16.76     5.11       5.976
      3       20.99     8.58       4.276

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.99   Tc(MIN.) =    8.58
  TOTAL AREA(ACRES) =        5.6
  LONGEST FLOWPATH FROM NODE    101.00 TO NODE    107.00 =    1163.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    401.00 TO NODE    402.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.40
  DOWNSTREAM ELEVATION(FEET) =    486.60
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.710
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    402.00 TO NODE    403.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.60  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    36.00   CHANNEL SLOPE =  0.0167
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.63
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.48
  Tc(MIN.) =    3.19
  SUBAREA AREA(ACRES) =     0.04       SUBAREA RUNOFF(CFS) =    0.21
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.74

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.38
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    403.00 =      91.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    403.00 TO NODE    404.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   482.00  DOWNSTREAM(FEET) =   479.60
  FLOW LENGTH(FEET) =   207.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.91
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.74
  PIPE TRAVEL TIME(MIN.) =   0.88    Tc(MIN.) =    4.07
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    404.00 =     298.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    404.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
```

```
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.24   SUBAREA RUNOFF(CFS) =    1.27
  TOTAL AREA(ACRES) =        0.4   TOTAL RUNOFF(CFS) =       2.00
  TC(MIN.) =    4.07

****************************************************************************
  FLOW PROCESS FROM NODE    404.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.60  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   140.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.72
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.00
  PIPE TRAVEL TIME(MIN.) =   0.63    Tc(MIN.) =    4.70
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.70
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.38
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.00

****************************************************************************
  FLOW PROCESS FROM NODE    501.00 TO NODE    502.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    487.20
  DOWNSTREAM ELEVATION(FEET) =    486.30
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.606
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    502.00 TO NODE    503.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    486.30  DOWNSTREAM(FEET) =    486.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    23.00   CHANNEL SLOPE =  0.0130
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.58
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.15
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   0.33
  Tc(MIN.) =    2.94
  SUBAREA AREA(ACRES) =     0.02       SUBAREA RUNOFF(CFS) =    0.11
```

```
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.1         PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   1.25
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    503.00 =      78.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    503.00 TO NODE    504.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   481.90  DOWNSTREAM(FEET) =   479.50
  FLOW LENGTH(FEET) =   191.00   MANNING'S N =  0.012
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 12.000
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   3.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.86
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.63
  PIPE TRAVEL TIME(MIN.) =   0.83    Tc(MIN.) =    3.77
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    504.00 =     269.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    504.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    0.21   SUBAREA RUNOFF(CFS) =    1.11
  TOTAL AREA(ACRES) =        0.3   TOTAL RUNOFF(CFS) =       1.74
  TC(MIN.) =    3.77

****************************************************************************
  FLOW PROCESS FROM NODE    504.00 TO NODE    405.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   479.50  DOWNSTREAM(FEET) =   478.90
  FLOW LENGTH(FEET) =   103.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.83
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.74
  PIPE TRAVEL TIME(MIN.) =   0.45    Tc(MIN.) =    4.21
  LONGEST FLOWPATH FROM NODE    501.00 TO NODE    405.00 =     372.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    405.00 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.) =    4.21
  RAINFALL INTENSITY(INCH/HR) =   6.06
  TOTAL STREAM AREA(ACRES) =     0.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.74

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        2.00     4.70        6.060          0.38
      2        1.74     4.21        6.060          0.33
```

```
  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        3.54     4.21       6.060
      2        3.74     4.70       6.060

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       3.74   Tc(MIN.) =    4.70
  TOTAL AREA(ACRES) =        0.7
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    405.00 =     438.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    405.00 TO NODE    406.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   478.90  DOWNSTREAM(FEET) =   474.40
  FLOW LENGTH(FEET) =   564.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  15.0 INCH PIPE IS   8.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.22
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.74
  PIPE TRAVEL TIME(MIN.) =   1.80    Tc(MIN.) =    6.50
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    406.00 =    1002.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    406.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.116
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.8700
  SUBAREA AREA(ACRES) =    6.53   SUBAREA RUNOFF(CFS) =   29.06
  TOTAL AREA(ACRES) =        7.2   TOTAL RUNOFF(CFS) =      32.22
  TC(MIN.) =    6.50

****************************************************************************
  FLOW PROCESS FROM NODE    406.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   474.40  DOWNSTREAM(FEET) =   474.00
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.22
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      32.22
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.58
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 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.) =    6.58
  RAINFALL INTENSITY(INCH/HR) =   5.07
  TOTAL STREAM AREA(ACRES) =     7.24
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     32.22
```

```
****************************************************************************
 FLOW PROCESS FROM NODE    601.00 TO NODE    602.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
 UPSTREAM ELEVATION(FEET) =    487.00
 DOWNSTREAM ELEVATION(FEET) =    485.50
 ELEVATION DIFFERENCE(FEET) =      1.50
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.53
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
 FLOW PROCESS FROM NODE    602.00 TO NODE    603.00 IS CODE =  51
----------------------------------------------------------------------------
 >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    485.50  DOWNSTREAM(FEET) =    478.20
 CHANNEL LENGTH THRU SUBAREA(FEET) =   614.00   CHANNEL SLOPE =  0.0119
 CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
 MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.382
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
 SOIL CLASSIFICATION IS "D"
 S.C.S. CURVE NUMBER (AMC II) =  97
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      16.46
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.68
 AVERAGE FLOW DEPTH(FEET) =   0.25   TRAVEL TIME(MIN.) =   3.81
 Tc(MIN.) =    6.01
 SUBAREA AREA(ACRES) =     6.70       SUBAREA RUNOFF(CFS) =   31.37
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
 TOTAL AREA(ACRES) =        6.8         PEAK FLOW RATE(CFS) =      31.84

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   3.19
 LONGEST FLOWPATH FROM NODE    601.00 TO NODE    603.00 =     669.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    603.00 TO NODE    407.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   474.30  DOWNSTREAM(FEET) =   474.10
 FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.012
 DEPTH OF FLOW IN  33.0 INCH PIPE IS  23.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   7.04
 ESTIMATED PIPE DIAMETER(INCH) =  33.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =      31.84
 PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    6.12
 LONGEST FLOWPATH FROM NODE    601.00 TO NODE    407.00 =     714.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    407.00 TO NODE    407.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    6.12
 RAINFALL INTENSITY(INCH/HR) =   5.32
 TOTAL STREAM AREA(ACRES) =     6.80
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     31.84
```

```
  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       32.22     6.58        5.075          7.24
      2       31.84     6.12        5.321          6.80

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       62.57     6.12       5.321
      2       62.59     6.58       5.075

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      62.59   Tc(MIN.) =    6.58
  TOTAL AREA(ACRES) =       14.0
  LONGEST FLOWPATH FROM NODE    401.00 TO NODE    407.00 =    1047.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    701.00 TO NODE    702.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    489.30
  DOWNSTREAM ELEVATION(FEET) =    487.80
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    702.00 TO NODE    703.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    487.80  DOWNSTREAM(FEET) =    479.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    97.00   CHANNEL SLOPE =  0.0907
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.67
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.84
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   0.33
  Tc(MIN.) =    2.53
  SUBAREA AREA(ACRES) =     3.09       SUBAREA RUNOFF(CFS) =   16.29
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        3.2         PEAK FLOW RATE(CFS) =      16.82

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   5.83
  LONGEST FLOWPATH FROM NODE    701.00 TO NODE    703.00 =     152.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    801.00 TO NODE    802.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    55.00
  UPSTREAM ELEVATION(FEET) =    484.50
  DOWNSTREAM ELEVATION(FEET) =    483.00
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.198
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.53
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.53

****************************************************************************
  FLOW PROCESS FROM NODE    802.00 TO NODE    803.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    483.00  DOWNSTREAM(FEET) =    479.30
  CHANNEL LENGTH THRU SUBAREA(FEET) =   311.00   CHANNEL SLOPE =  0.0119
  CHANNEL BASE(FEET) =    0.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =   0.50
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.060
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .8700
  SOIL CLASSIFICATION IS "D"
  S.C.S. CURVE NUMBER (AMC II) =  97
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.51
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.04
  AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   2.54
  Tc(MIN.) =    4.73
  SUBAREA AREA(ACRES) =     1.89       SUBAREA RUNOFF(CFS) =    9.96
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        2.0         PEAK FLOW RATE(CFS) =      10.49

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.21   FLOW VELOCITY(FEET/SEC.) =   2.39
  LONGEST FLOWPATH FROM NODE    801.00 TO NODE    803.00 =     366.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        2.0  TC(MIN.) =      4.73
  PEAK FLOW RATE(CFS)   =      10.49
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

APPENDIX F

DETENTION BASINS CALCULATIONS

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA1 5YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 14 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 36.4 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	1
10	1
15	1
20	1.1
25	1.1
30	1.1
35	1.1
40	1.1
45	1.1
50	1.2
55	1.2
60	1.2
65	1.2
70	1.2
75	1.3
80	1.3
85	1.3
90	1.3
95	1.4
100	1.4
105	1.4
110	1.5
115	1.5
120	1.5
125	1.6
130	1.6
135	1.7
140	1.7
145	1.8
150	1.8
155	1.9
160	2
165	2.1
170	2.1
175	2.3
180	2.3
185	2.5
190	2.6
195	2.8
200	3
205	3.3
210	3.5
215	4
220	4.4
225	5.3
230	6.1
235	8.9
240	21.1
245	36.4
250	7.1
255	4.8
260	3.7
265	3.1
270	2.7
275	2.4
280	2.2
285	2
290	1.9
295	1.8
300	1.7
305	1.6
310	1.5
315	1.4
320	1.4
325	1.3
330	1.3
335	1.2
340	1.2
345	1.1
350	1.1
355	1.1
360	1

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA1 10YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 14 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 42.2 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	1.2
10	1.2
15	1.2
20	1.2
25	1.2
30	1.2
35	1.3
40	1.3
45	1.3
50	1.3
55	1.4
60	1.4
65	1.4
70	1.4
75	1.5
80	1.5
85	1.5
90	1.5
95	1.6
100	1.6
105	1.6
110	1.7
115	1.7
120	1.8
125	1.8
130	1.9
135	1.9
140	2
145	2.1
150	2.1
155	2.2
160	2.3
165	2.4
170	2.4
175	2.6
180	2.7
185	2.9
190	3
195	3.2
200	3.4
205	3.8
210	4
215	4.6
220	5
225	6.1
230	6.9
235	10.2
240	23.5
245	42.2
250	8.2
255	5.5
260	4.3
265	3.6
270	3.1
275	2.8
280	2.5
285	2.3
290	2.1
295	2
300	1.9
305	1.8
310	1.7
315	1.6
320	1.6
325	1.5
330	1.4
335	1.4
340	1.3
345	1.3
350	1.3
355	1.2
360	1.2

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA1 25YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 14 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 47.8 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	1.3
10	1.3
15	1.3
20	1.4
25	1.4
30	1.4
35	1.4
40	1.4
45	1.5
50	1.5
55	1.5
60	1.5
65	1.6
70	1.6
75	1.6
80	1.7
85	1.7
90	1.7
95	1.8
100	1.8
105	1.9
110	1.9
115	1.9
120	2
125	2.1
130	2.1
135	2.2
140	2.2
145	2.3
150	2.4
155	2.5
160	2.5
165	2.7
170	2.8
175	2.9
180	3
185	3.2
190	3.4
195	3.7
200	3.8
205	4.2
210	4.5
215	5.2
220	5.6
225	6.8
230	7.8
235	11.4
240	26.1
245	47.8
250	9.2
255	6.1
260	4.8
265	4
270	3.5
275	3.1
280	2.8
285	2.6
290	2.4
295	2.3
300	2.1
305	2
310	1.9
315	1.8
320	1.7
325	1.7
330	1.6
335	1.6
340	1.5
345	1.5
350	1.4
355	1.4
360	1.3

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA1 50YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 14 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 56.9 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	1.5
10	1.5
15	1.6
20	1.6
25	1.6
30	1.6
35	1.7
40	1.7
45	1.7
50	1.7
55	1.8
60	1.8
65	1.8
70	1.9
75	1.9
80	1.9
85	2
90	2
95	2.1
100	2.1
105	2.2
110	2.2
115	2.3
120	2.3
125	2.4
130	2.4
135	2.5
140	2.6
145	2.7
150	2.8
155	2.9
160	3
165	3.1
170	3.2
175	3.4
180	3.5
185	3.8
190	3.9
195	4.3
200	4.5
205	5
210	5.3
215	6
220	6.5
225	8
230	9.1
235	13.3
240	29.3
245	56.9
250	10.7
255	7.2
260	5.6
265	4.7
270	4.1
275	3.6
280	3.3
285	3
290	2.8
295	2.6
300	2.5
305	2.4
310	2.2
315	2.1
320	2
325	2
330	1.9
335	1.8
340	1.8
345	1.7
350	1.6
355	1.6
360	1.6

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA1 100YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 14 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 62.6 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	1.7
10	1.7
15	1.7
20	1.7
25	1.8
30	1.8
35	1.8
40	1.8
45	1.9
50	1.9
55	1.9
60	2
65	2
70	2
75	2.1
80	2.1
85	2.2
90	2.2
95	2.3
100	2.3
105	2.4
110	2.4
115	2.5
120	2.5
125	2.6
130	2.7
135	2.8
140	2.8
145	3
150	3
155	3.2
160	3.2
165	3.4
170	3.5
175	3.7
180	3.9
185	4.1
190	4.3
195	4.7
200	4.9
205	5.4
210	5.8
215	6.6
220	7.1
225	8.7
230	10
235	14.6
240	31.8
245	62.6
250	11.7
255	7.8
260	6.1
265	5.1
270	4.5
275	4
280	3.6
285	3.3
290	3.1
295	2.9
300	2.7
305	2.6
310	2.4
315	2.3
320	2.2
325	2.1
330	2.1
335	2
340	1.9
345	1.9
350	1.8
355	1.7
360	1.7

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA2 5YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 5.6 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 11.9 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.4
TIME (MIN) = 10	DISCHARGE (CFS) = 0.4
TIME (MIN) = 15	DISCHARGE (CFS) = 0.4
TIME (MIN) = 20	DISCHARGE (CFS) = 0.4
TIME (MIN) = 25	DISCHARGE (CFS) = 0.4
TIME (MIN) = 30	DISCHARGE (CFS) = 0.4
TIME (MIN) = 35	DISCHARGE (CFS) = 0.4
TIME (MIN) = 40	DISCHARGE (CFS) = 0.4
TIME (MIN) = 45	DISCHARGE (CFS) = 0.5
TIME (MIN) = 50	DISCHARGE (CFS) = 0.5
TIME (MIN) = 55	DISCHARGE (CFS) = 0.5
TIME (MIN) = 60	DISCHARGE (CFS) = 0.5
TIME (MIN) = 65	DISCHARGE (CFS) = 0.5
TIME (MIN) = 70	DISCHARGE (CFS) = 0.5
TIME (MIN) = 75	DISCHARGE (CFS) = 0.5
TIME (MIN) = 80	DISCHARGE (CFS) = 0.5
TIME (MIN) = 85	DISCHARGE (CFS) = 0.5
TIME (MIN) = 90	DISCHARGE (CFS) = 0.5
TIME (MIN) = 95	DISCHARGE (CFS) = 0.6
TIME (MIN) = 100	DISCHARGE (CFS) = 0.6
TIME (MIN) = 105	DISCHARGE (CFS) = 0.6
TIME (MIN) = 110	DISCHARGE (CFS) = 0.6
TIME (MIN) = 115	DISCHARGE (CFS) = 0.6
TIME (MIN) = 120	DISCHARGE (CFS) = 0.6
TIME (MIN) = 125	DISCHARGE (CFS) = 0.6
TIME (MIN) = 130	DISCHARGE (CFS) = 0.7
TIME (MIN) = 135	DISCHARGE (CFS) = 0.7
TIME (MIN) = 140	DISCHARGE (CFS) = 0.7
TIME (MIN) = 145	DISCHARGE (CFS) = 0.7
TIME (MIN) = 150	DISCHARGE (CFS) = 0.7
TIME (MIN) = 155	DISCHARGE (CFS) = 0.8
TIME (MIN) = 160	DISCHARGE (CFS) = 0.8
TIME (MIN) = 165	DISCHARGE (CFS) = 0.8
TIME (MIN) = 170	DISCHARGE (CFS) = 0.9
TIME (MIN) = 175	DISCHARGE (CFS) = 0.9
TIME (MIN) = 180	DISCHARGE (CFS) = 0.9
TIME (MIN) = 185	DISCHARGE (CFS) = 1
TIME (MIN) = 190	DISCHARGE (CFS) = 1
TIME (MIN) = 195	DISCHARGE (CFS) = 1.1
TIME (MIN) = 200	DISCHARGE (CFS) = 1.2
TIME (MIN) = 205	DISCHARGE (CFS) = 1.3
TIME (MIN) = 210	DISCHARGE (CFS) = 1.4
TIME (MIN) = 215	DISCHARGE (CFS) = 1.6
TIME (MIN) = 220	DISCHARGE (CFS) = 1.7
TIME (MIN) = 225	DISCHARGE (CFS) = 2.1
TIME (MIN) = 230	DISCHARGE (CFS) = 2.4
TIME (MIN) = 235	DISCHARGE (CFS) = 3.6
TIME (MIN) = 240	DISCHARGE (CFS) = 11.1
TIME (MIN) = 245	DISCHARGE (CFS) = 11.9
TIME (MIN) = 250	DISCHARGE (CFS) = 2.9
TIME (MIN) = 255	DISCHARGE (CFS) = 1.9
TIME (MIN) = 260	DISCHARGE (CFS) = 1.5
TIME (MIN) = 265	DISCHARGE (CFS) = 1.3
TIME (MIN) = 270	DISCHARGE (CFS) = 1.1
TIME (MIN) = 275	DISCHARGE (CFS) = 1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.9
TIME (MIN) = 285	DISCHARGE (CFS) = 0.8
TIME (MIN) = 290	DISCHARGE (CFS) = 0.8
TIME (MIN) = 295	DISCHARGE (CFS) = 0.7
TIME (MIN) = 300	DISCHARGE (CFS) = 0.7
TIME (MIN) = 305	DISCHARGE (CFS) = 0.6
TIME (MIN) = 310	DISCHARGE (CFS) = 0.6
TIME (MIN) = 315	DISCHARGE (CFS) = 0.6
TIME (MIN) = 320	DISCHARGE (CFS) = 0.5
TIME (MIN) = 325	DISCHARGE (CFS) = 0.5
TIME (MIN) = 330	DISCHARGE (CFS) = 0.5
TIME (MIN) = 335	DISCHARGE (CFS) = 0.5
TIME (MIN) = 340	DISCHARGE (CFS) = 0.5
TIME (MIN) = 345	DISCHARGE (CFS) = 0.5
TIME (MIN) = 350	DISCHARGE (CFS) = 0.4
TIME (MIN) = 355	DISCHARGE (CFS) = 0.4
TIME (MIN) = 360	DISCHARGE (CFS) = 0.4

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA2 10YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 5.6 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 13.7 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.5
10	0.5
15	0.5
20	0.5
25	0.5
30	0.5
35	0.5
40	0.5
45	0.5
50	0.5
55	0.5
60	0.5
65	0.6
70	0.6
75	0.6
80	0.6
85	0.6
90	0.6
95	0.6
100	0.6
105	0.7
110	0.7
115	0.7
120	0.7
125	0.7
130	0.7
135	0.8
140	0.8
145	0.8
150	0.8
155	0.9
160	0.9
165	1
170	1
175	1
180	1.1
185	1.2
190	1.2
195	1.3
200	1.4
205	1.5
210	1.6
215	1.8
220	2
225	2.4
230	2.8
235	4.1
240	12.6
245	13.7
250	3.3
255	2.2
260	1.7
265	1.4
270	1.2
275	1.1
280	1
285	0.9
290	0.9
295	0.8
300	0.8
305	0.7
310	0.7
315	0.6
320	0.6
325	0.6
330	0.6
335	0.6
340	0.5
345	0.5
350	0.5
355	0.5
360	0.5

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA2 25YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 5.6 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 16.1 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.5
10	0.5
15	0.5
20	0.5
25	0.6
30	0.6
35	0.6
40	0.6
45	0.6
50	0.6
55	0.6
60	0.6
65	0.6
70	0.6
75	0.7
80	0.7
85	0.7
90	0.7
95	0.7
100	0.7
105	0.7
110	0.8
115	0.8
120	0.8
125	0.8
130	0.8
135	0.9
140	0.9
145	0.9
150	0.9
155	1
160	1
165	1.1
170	1.1
175	1.2
180	1.2
185	1.3
190	1.3
195	1.5
200	1.5
205	1.7
210	1.8
215	2.1
220	2.2
225	2.7
230	3.1
235	4.6
240	13.5
245	16.1
250	3.7
255	2.5
260	1.9
265	1.6
270	1.4
275	1.2
280	1.1
285	1
290	1
295	0.9
300	0.9
305	0.8
310	0.8
315	0.7
320	0.7
325	0.7
330	0.6
335	0.6
340	0.6
345	0.6
350	0.6
355	0.5
360	0.5

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA2 50YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 5.6 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 18.7 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.6
10	0.6
15	0.6
20	0.6
25	0.6
30	0.7
35	0.7
40	0.7
45	0.7
50	0.7
55	0.7
60	0.7
65	0.7
70	0.7
75	0.8
80	0.8
85	0.8
90	0.8
95	0.8
100	0.8
105	0.9
110	0.9
115	0.9
120	0.9
125	1
130	1
135	1
140	1
145	1.1
150	1.1
155	1.2
160	1.2
165	1.2
170	1.3
175	1.4
180	1.4
185	1.5
190	1.6
195	1.7
200	1.8
205	2
210	2.1
215	2.4
220	2.6
225	3.2
230	3.6
235	5.3
240	15.8
245	18.7
250	4.3
255	2.9
260	2.2
265	1.9
270	1.6
275	1.5
280	1.3
285	1.2
290	1.1
295	1.1
300	1
305	0.9
310	0.9
315	0.9
320	0.8
325	0.8
330	0.8
335	0.7
340	0.7
345	0.7
350	0.7
355	0.6
360	0.6

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA2 100YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 5.6 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 21 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.7
10	0.7
15	0.7
20	0.7
25	0.7
30	0.7
35	0.7
40	0.7
45	0.8
50	0.8
55	0.8
60	0.8
65	0.8
70	0.8
75	0.8
80	0.8
85	0.9
90	0.9
95	0.9
100	0.9
105	0.9
110	1
115	1
120	1
125	1
130	1.1
135	1.1
140	1.1
145	1.2
150	1.2
155	1.3
160	1.3
165	1.4
170	1.4
175	1.5
180	1.5
185	1.7
190	1.7
195	1.9
200	2
205	2.2
210	2.3
215	2.6
220	2.9
225	3.5
230	4
235	5.8
240	16.8
245	21
250	4.7
255	3.1
260	2.5
265	2.1
270	1.8
275	1.6
280	1.4
285	1.3
290	1.2
295	1.2
300	1.1
305	1
310	1
315	0.9
320	0.9
325	0.9
330	0.8
335	0.8
340	0.8
345	0.7
350	0.7
355	0.7
360	0.7

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA3 5YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 3.2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 10.2 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.2
TIME (MIN) = 10	DISCHARGE (CFS) = 0.2
TIME (MIN) = 15	DISCHARGE (CFS) = 0.2
TIME (MIN) = 20	DISCHARGE (CFS) = 0.2
TIME (MIN) = 25	DISCHARGE (CFS) = 0.2
TIME (MIN) = 30	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 45	DISCHARGE (CFS) = 0.3
TIME (MIN) = 50	DISCHARGE (CFS) = 0.3
TIME (MIN) = 55	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 65	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 75	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 85	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.3
TIME (MIN) = 95	DISCHARGE (CFS) = 0.3
TIME (MIN) = 100	DISCHARGE (CFS) = 0.3
TIME (MIN) = 105	DISCHARGE (CFS) = 0.3
TIME (MIN) = 110	DISCHARGE (CFS) = 0.3
TIME (MIN) = 115	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 125	DISCHARGE (CFS) = 0.4
TIME (MIN) = 130	DISCHARGE (CFS) = 0.4
TIME (MIN) = 135	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 145	DISCHARGE (CFS) = 0.4
TIME (MIN) = 150	DISCHARGE (CFS) = 0.4
TIME (MIN) = 155	DISCHARGE (CFS) = 0.4
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 165	DISCHARGE (CFS) = 0.5
TIME (MIN) = 170	DISCHARGE (CFS) = 0.5
TIME (MIN) = 175	DISCHARGE (CFS) = 0.5
TIME (MIN) = 180	DISCHARGE (CFS) = 0.5
TIME (MIN) = 185	DISCHARGE (CFS) = 0.6
TIME (MIN) = 190	DISCHARGE (CFS) = 0.6
TIME (MIN) = 195	DISCHARGE (CFS) = 0.6
TIME (MIN) = 200	DISCHARGE (CFS) = 0.7
TIME (MIN) = 205	DISCHARGE (CFS) = 0.8
TIME (MIN) = 210	DISCHARGE (CFS) = 0.8
TIME (MIN) = 215	DISCHARGE (CFS) = 0.9
TIME (MIN) = 220	DISCHARGE (CFS) = 1
TIME (MIN) = 225	DISCHARGE (CFS) = 1.2
TIME (MIN) = 230	DISCHARGE (CFS) = 1.4
TIME (MIN) = 235	DISCHARGE (CFS) = 2
TIME (MIN) = 240	DISCHARGE (CFS) = 2.9
TIME (MIN) = 245	DISCHARGE (CFS) = 10.2
TIME (MIN) = 250	DISCHARGE (CFS) = 1.6
TIME (MIN) = 255	DISCHARGE (CFS) = 1.1
TIME (MIN) = 260	DISCHARGE (CFS) = 0.9
TIME (MIN) = 265	DISCHARGE (CFS) = 0.7
TIME (MIN) = 270	DISCHARGE (CFS) = 0.6
TIME (MIN) = 275	DISCHARGE (CFS) = 0.6
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 285	DISCHARGE (CFS) = 0.5
TIME (MIN) = 290	DISCHARGE (CFS) = 0.4
TIME (MIN) = 295	DISCHARGE (CFS) = 0.4
TIME (MIN) = 300	DISCHARGE (CFS) = 0.4
TIME (MIN) = 305	DISCHARGE (CFS) = 0.4
TIME (MIN) = 310	DISCHARGE (CFS) = 0.3
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 320	DISCHARGE (CFS) = 0.3
TIME (MIN) = 325	DISCHARGE (CFS) = 0.3
TIME (MIN) = 330	DISCHARGE (CFS) = 0.3
TIME (MIN) = 335	DISCHARGE (CFS) = 0.3
TIME (MIN) = 340	DISCHARGE (CFS) = 0.3
TIME (MIN) = 345	DISCHARGE (CFS) = 0.3
TIME (MIN) = 350	DISCHARGE (CFS) = 0.3
TIME (MIN) = 355	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA3 10YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 3.2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 11.7 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.3
TIME (MIN) = 10	DISCHARGE (CFS) = 0.3
TIME (MIN) = 15	DISCHARGE (CFS) = 0.3
TIME (MIN) = 20	DISCHARGE (CFS) = 0.3
TIME (MIN) = 25	DISCHARGE (CFS) = 0.3
TIME (MIN) = 30	DISCHARGE (CFS) = 0.3
TIME (MIN) = 35	DISCHARGE (CFS) = 0.3
TIME (MIN) = 40	DISCHARGE (CFS) = 0.3
TIME (MIN) = 45	DISCHARGE (CFS) = 0.3
TIME (MIN) = 50	DISCHARGE (CFS) = 0.3
TIME (MIN) = 55	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 65	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 75	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 85	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.4
TIME (MIN) = 95	DISCHARGE (CFS) = 0.4
TIME (MIN) = 100	DISCHARGE (CFS) = 0.4
TIME (MIN) = 105	DISCHARGE (CFS) = 0.4
TIME (MIN) = 110	DISCHARGE (CFS) = 0.4
TIME (MIN) = 115	DISCHARGE (CFS) = 0.4
TIME (MIN) = 120	DISCHARGE (CFS) = 0.4
TIME (MIN) = 125	DISCHARGE (CFS) = 0.4
TIME (MIN) = 130	DISCHARGE (CFS) = 0.4
TIME (MIN) = 135	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.5
TIME (MIN) = 145	DISCHARGE (CFS) = 0.5
TIME (MIN) = 150	DISCHARGE (CFS) = 0.5
TIME (MIN) = 155	DISCHARGE (CFS) = 0.5
TIME (MIN) = 160	DISCHARGE (CFS) = 0.5
TIME (MIN) = 165	DISCHARGE (CFS) = 0.5
TIME (MIN) = 170	DISCHARGE (CFS) = 0.6
TIME (MIN) = 175	DISCHARGE (CFS) = 0.6
TIME (MIN) = 180	DISCHARGE (CFS) = 0.6
TIME (MIN) = 185	DISCHARGE (CFS) = 0.7
TIME (MIN) = 190	DISCHARGE (CFS) = 0.7
TIME (MIN) = 195	DISCHARGE (CFS) = 0.7
TIME (MIN) = 200	DISCHARGE (CFS) = 0.8
TIME (MIN) = 205	DISCHARGE (CFS) = 0.9
TIME (MIN) = 210	DISCHARGE (CFS) = 0.9
TIME (MIN) = 215	DISCHARGE (CFS) = 1
TIME (MIN) = 220	DISCHARGE (CFS) = 1.1
TIME (MIN) = 225	DISCHARGE (CFS) = 1.4
TIME (MIN) = 230	DISCHARGE (CFS) = 1.6
TIME (MIN) = 235	DISCHARGE (CFS) = 2.3
TIME (MIN) = 240	DISCHARGE (CFS) = 3.3
TIME (MIN) = 245	DISCHARGE (CFS) = 11.7
TIME (MIN) = 250	DISCHARGE (CFS) = 1.9
TIME (MIN) = 255	DISCHARGE (CFS) = 1.2
TIME (MIN) = 260	DISCHARGE (CFS) = 1
TIME (MIN) = 265	DISCHARGE (CFS) = 0.8
TIME (MIN) = 270	DISCHARGE (CFS) = 0.7
TIME (MIN) = 275	DISCHARGE (CFS) = 0.6
TIME (MIN) = 280	DISCHARGE (CFS) = 0.6
TIME (MIN) = 285	DISCHARGE (CFS) = 0.5
TIME (MIN) = 290	DISCHARGE (CFS) = 0.5
TIME (MIN) = 295	DISCHARGE (CFS) = 0.5
TIME (MIN) = 300	DISCHARGE (CFS) = 0.4
TIME (MIN) = 305	DISCHARGE (CFS) = 0.4
TIME (MIN) = 310	DISCHARGE (CFS) = 0.4
TIME (MIN) = 315	DISCHARGE (CFS) = 0.4
TIME (MIN) = 320	DISCHARGE (CFS) = 0.4
TIME (MIN) = 325	DISCHARGE (CFS) = 0.3
TIME (MIN) = 330	DISCHARGE (CFS) = 0.3
TIME (MIN) = 335	DISCHARGE (CFS) = 0.3
TIME (MIN) = 340	DISCHARGE (CFS) = 0.3
TIME (MIN) = 345	DISCHARGE (CFS) = 0.3
TIME (MIN) = 350	DISCHARGE (CFS) = 0.3
TIME (MIN) = 355	DISCHARGE (CFS) = 0.3
TIME (MIN) = 360	DISCHARGE (CFS) = 0.3

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA3 25YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 3.2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 13.2 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.3
10	0.3
15	0.3
20	0.3
25	0.3
30	0.3
35	0.3
40	0.3
45	0.3
50	0.3
55	0.3
60	0.4
65	0.4
70	0.4
75	0.4
80	0.4
85	0.4
90	0.4
95	0.4
100	0.4
105	0.4
110	0.4
115	0.4
120	0.5
125	0.5
130	0.5
135	0.5
140	0.5
145	0.5
150	0.5
155	0.6
160	0.6
165	0.6
170	0.6
175	0.7
180	0.7
185	0.7
190	0.8
195	0.8
200	0.9
205	1
210	1
215	1.2
220	1.3
225	1.6
230	1.8
235	2.6
240	3.7
245	13.2
250	2.1
255	1.4
260	1.1
265	0.9
270	0.8
275	0.7
280	0.6
285	0.6
290	0.6
295	0.5
300	0.5
305	0.5
310	0.4
315	0.4
320	0.4
325	0.4
330	0.4
335	0.4
340	0.3
345	0.3
350	0.3
355	0.3
360	0.3

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA3 50YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 3.2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 15.4 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.3
10	0.4
15	0.4
20	0.4
25	0.4
30	0.4
35	0.4
40	0.4
45	0.4
50	0.4
55	0.4
60	0.4
65	0.4
70	0.4
75	0.4
80	0.4
85	0.5
90	0.5
95	0.5
100	0.5
105	0.5
110	0.5
115	0.5
120	0.5
125	0.5
130	0.6
135	0.6
140	0.6
145	0.6
150	0.6
155	0.7
160	0.7
165	0.7
170	0.7
175	0.8
180	0.8
185	0.9
190	0.9
195	1
200	1
205	1.1
210	1.2
215	1.4
220	1.5
225	1.8
230	2.1
235	3.1
240	4.3
245	15.4
250	2.4
255	1.6
260	1.3
265	1.1
270	0.9
275	0.8
280	0.8
285	0.7
290	0.6
295	0.6
300	0.6
305	0.5
310	0.5
315	0.5
320	0.5
325	0.4
330	0.4
335	0.4
340	0.4
345	0.4
350	0.4
355	0.4
360	0.4

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA3 100YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 3.2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 16.8 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.4
10	0.4
15	0.4
20	0.4
25	0.4
30	0.4
35	0.4
40	0.4
45	0.4
50	0.4
55	0.4
60	0.4
65	0.5
70	0.5
75	0.5
80	0.5
85	0.5
90	0.5
95	0.5
100	0.5
105	0.5
110	0.6
115	0.6
120	0.6
125	0.6
130	0.6
135	0.6
140	0.6
145	0.7
150	0.7
155	0.7
160	0.7
165	0.8
170	0.8
175	0.9
180	0.9
185	0.9
190	1
195	1.1
200	1.1
205	1.2
210	1.3
215	1.5
220	1.6
225	2
230	2.3
235	3.3
240	4.8
245	16.8
250	2.7
255	1.8
260	1.4
265	1.2
270	1
275	0.9
280	0.8
285	0.8
290	0.7
295	0.7
300	0.6
305	0.6
310	0.6
315	0.5
320	0.5
325	0.5
330	0.5
335	0.5
340	0.4
345	0.4
350	0.4
355	0.4
360	0.4

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA4 5YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.4 INCHES
BASIN AREA 2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 6.4 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.1
TIME (MIN) = 10	DISCHARGE (CFS) = 0.1
TIME (MIN) = 15	DISCHARGE (CFS) = 0.1
TIME (MIN) = 20	DISCHARGE (CFS) = 0.2
TIME (MIN) = 25	DISCHARGE (CFS) = 0.2
TIME (MIN) = 30	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 45	DISCHARGE (CFS) = 0.2
TIME (MIN) = 50	DISCHARGE (CFS) = 0.2
TIME (MIN) = 55	DISCHARGE (CFS) = 0.2
TIME (MIN) = 60	DISCHARGE (CFS) = 0.2
TIME (MIN) = 65	DISCHARGE (CFS) = 0.2
TIME (MIN) = 70	DISCHARGE (CFS) = 0.2
TIME (MIN) = 75	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.2
TIME (MIN) = 85	DISCHARGE (CFS) = 0.2
TIME (MIN) = 90	DISCHARGE (CFS) = 0.2
TIME (MIN) = 95	DISCHARGE (CFS) = 0.2
TIME (MIN) = 100	DISCHARGE (CFS) = 0.2
TIME (MIN) = 105	DISCHARGE (CFS) = 0.2
TIME (MIN) = 110	DISCHARGE (CFS) = 0.2
TIME (MIN) = 115	DISCHARGE (CFS) = 0.2
TIME (MIN) = 120	DISCHARGE (CFS) = 0.2
TIME (MIN) = 125	DISCHARGE (CFS) = 0.2
TIME (MIN) = 130	DISCHARGE (CFS) = 0.2
TIME (MIN) = 135	DISCHARGE (CFS) = 0.2
TIME (MIN) = 140	DISCHARGE (CFS) = 0.2
TIME (MIN) = 145	DISCHARGE (CFS) = 0.3
TIME (MIN) = 150	DISCHARGE (CFS) = 0.3
TIME (MIN) = 155	DISCHARGE (CFS) = 0.3
TIME (MIN) = 160	DISCHARGE (CFS) = 0.3
TIME (MIN) = 165	DISCHARGE (CFS) = 0.3
TIME (MIN) = 170	DISCHARGE (CFS) = 0.3
TIME (MIN) = 175	DISCHARGE (CFS) = 0.3
TIME (MIN) = 180	DISCHARGE (CFS) = 0.3
TIME (MIN) = 185	DISCHARGE (CFS) = 0.4
TIME (MIN) = 190	DISCHARGE (CFS) = 0.4
TIME (MIN) = 195	DISCHARGE (CFS) = 0.4
TIME (MIN) = 200	DISCHARGE (CFS) = 0.4
TIME (MIN) = 205	DISCHARGE (CFS) = 0.5
TIME (MIN) = 210	DISCHARGE (CFS) = 0.5
TIME (MIN) = 215	DISCHARGE (CFS) = 0.6
TIME (MIN) = 220	DISCHARGE (CFS) = 0.6
TIME (MIN) = 225	DISCHARGE (CFS) = 0.8
TIME (MIN) = 230	DISCHARGE (CFS) = 0.9
TIME (MIN) = 235	DISCHARGE (CFS) = 1.3
TIME (MIN) = 240	DISCHARGE (CFS) = 1.8
TIME (MIN) = 245	DISCHARGE (CFS) = 6.4
TIME (MIN) = 250	DISCHARGE (CFS) = 1
TIME (MIN) = 255	DISCHARGE (CFS) = 0.7
TIME (MIN) = 260	DISCHARGE (CFS) = 0.5
TIME (MIN) = 265	DISCHARGE (CFS) = 0.4
TIME (MIN) = 270	DISCHARGE (CFS) = 0.4
TIME (MIN) = 275	DISCHARGE (CFS) = 0.3
TIME (MIN) = 280	DISCHARGE (CFS) = 0.3
TIME (MIN) = 285	DISCHARGE (CFS) = 0.3
TIME (MIN) = 290	DISCHARGE (CFS) = 0.3
TIME (MIN) = 295	DISCHARGE (CFS) = 0.3
TIME (MIN) = 300	DISCHARGE (CFS) = 0.2
TIME (MIN) = 305	DISCHARGE (CFS) = 0.2
TIME (MIN) = 310	DISCHARGE (CFS) = 0.2
TIME (MIN) = 315	DISCHARGE (CFS) = 0.2
TIME (MIN) = 320	DISCHARGE (CFS) = 0.2
TIME (MIN) = 325	DISCHARGE (CFS) = 0.2
TIME (MIN) = 330	DISCHARGE (CFS) = 0.2
TIME (MIN) = 335	DISCHARGE (CFS) = 0.2
TIME (MIN) = 340	DISCHARGE (CFS) = 0.2
TIME (MIN) = 345	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 355	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA4 10YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.6 INCHES
BASIN AREA 2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 7.3 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.2
10	0.2
15	0.2
20	0.2
25	0.2
30	0.2
35	0.2
40	0.2
45	0.2
50	0.2
55	0.2
60	0.2
65	0.2
70	0.2
75	0.2
80	0.2
85	0.2
90	0.2
95	0.2
100	0.2
105	0.2
110	0.2
115	0.2
120	0.3
125	0.3
130	0.3
135	0.3
140	0.3
145	0.3
150	0.3
155	0.3
160	0.3
165	0.3
170	0.3
175	0.4
180	0.4
185	0.4
190	0.4
195	0.5
200	0.5
205	0.5
210	0.6
215	0.7
220	0.7
225	0.9
230	1
235	1.5
240	2.1
245	7.3
250	1.2
255	0.8
260	0.6
265	0.5
270	0.4
275	0.4
280	0.4
285	0.3
290	0.3
295	0.3
300	0.3
305	0.3
310	0.2
315	0.2
320	0.2
325	0.2
330	0.2
335	0.2
340	0.2
345	0.2
350	0.2
355	0.2
360	0.2

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA4 25YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 1.8 INCHES
BASIN AREA 2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 8.2 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.2
TIME (MIN) = 10	DISCHARGE (CFS) = 0.2
TIME (MIN) = 15	DISCHARGE (CFS) = 0.2
TIME (MIN) = 20	DISCHARGE (CFS) = 0.2
TIME (MIN) = 25	DISCHARGE (CFS) = 0.2
TIME (MIN) = 30	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 45	DISCHARGE (CFS) = 0.2
TIME (MIN) = 50	DISCHARGE (CFS) = 0.2
TIME (MIN) = 55	DISCHARGE (CFS) = 0.2
TIME (MIN) = 60	DISCHARGE (CFS) = 0.2
TIME (MIN) = 65	DISCHARGE (CFS) = 0.2
TIME (MIN) = 70	DISCHARGE (CFS) = 0.2
TIME (MIN) = 75	DISCHARGE (CFS) = 0.2
TIME (MIN) = 80	DISCHARGE (CFS) = 0.2
TIME (MIN) = 85	DISCHARGE (CFS) = 0.2
TIME (MIN) = 90	DISCHARGE (CFS) = 0.2
TIME (MIN) = 95	DISCHARGE (CFS) = 0.3
TIME (MIN) = 100	DISCHARGE (CFS) = 0.3
TIME (MIN) = 105	DISCHARGE (CFS) = 0.3
TIME (MIN) = 110	DISCHARGE (CFS) = 0.3
TIME (MIN) = 115	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.3
TIME (MIN) = 125	DISCHARGE (CFS) = 0.3
TIME (MIN) = 130	DISCHARGE (CFS) = 0.3
TIME (MIN) = 135	DISCHARGE (CFS) = 0.3
TIME (MIN) = 140	DISCHARGE (CFS) = 0.3
TIME (MIN) = 145	DISCHARGE (CFS) = 0.3
TIME (MIN) = 150	DISCHARGE (CFS) = 0.3
TIME (MIN) = 155	DISCHARGE (CFS) = 0.4
TIME (MIN) = 160	DISCHARGE (CFS) = 0.4
TIME (MIN) = 165	DISCHARGE (CFS) = 0.4
TIME (MIN) = 170	DISCHARGE (CFS) = 0.4
TIME (MIN) = 175	DISCHARGE (CFS) = 0.4
TIME (MIN) = 180	DISCHARGE (CFS) = 0.4
TIME (MIN) = 185	DISCHARGE (CFS) = 0.5
TIME (MIN) = 190	DISCHARGE (CFS) = 0.5
TIME (MIN) = 195	DISCHARGE (CFS) = 0.5
TIME (MIN) = 200	DISCHARGE (CFS) = 0.5
TIME (MIN) = 205	DISCHARGE (CFS) = 0.6
TIME (MIN) = 210	DISCHARGE (CFS) = 0.6
TIME (MIN) = 215	DISCHARGE (CFS) = 0.7
TIME (MIN) = 220	DISCHARGE (CFS) = 0.8
TIME (MIN) = 225	DISCHARGE (CFS) = 1
TIME (MIN) = 230	DISCHARGE (CFS) = 1.1
TIME (MIN) = 235	DISCHARGE (CFS) = 1.6
TIME (MIN) = 240	DISCHARGE (CFS) = 2.4
TIME (MIN) = 245	DISCHARGE (CFS) = 8.2
TIME (MIN) = 250	DISCHARGE (CFS) = 1.3
TIME (MIN) = 255	DISCHARGE (CFS) = 0.9
TIME (MIN) = 260	DISCHARGE (CFS) = 0.7
TIME (MIN) = 265	DISCHARGE (CFS) = 0.6
TIME (MIN) = 270	DISCHARGE (CFS) = 0.5
TIME (MIN) = 275	DISCHARGE (CFS) = 0.4
TIME (MIN) = 280	DISCHARGE (CFS) = 0.4
TIME (MIN) = 285	DISCHARGE (CFS) = 0.4
TIME (MIN) = 290	DISCHARGE (CFS) = 0.3
TIME (MIN) = 295	DISCHARGE (CFS) = 0.3
TIME (MIN) = 300	DISCHARGE (CFS) = 0.3
TIME (MIN) = 305	DISCHARGE (CFS) = 0.3
TIME (MIN) = 310	DISCHARGE (CFS) = 0.3
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 320	DISCHARGE (CFS) = 0.2
TIME (MIN) = 325	DISCHARGE (CFS) = 0.2
TIME (MIN) = 330	DISCHARGE (CFS) = 0.2
TIME (MIN) = 335	DISCHARGE (CFS) = 0.2
TIME (MIN) = 340	DISCHARGE (CFS) = 0.2
TIME (MIN) = 345	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 355	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA4 50YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.1 INCHES
BASIN AREA 2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 9.6 CFS

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0.2
TIME (MIN) = 10	DISCHARGE (CFS) = 0.2
TIME (MIN) = 15	DISCHARGE (CFS) = 0.2
TIME (MIN) = 20	DISCHARGE (CFS) = 0.2
TIME (MIN) = 25	DISCHARGE (CFS) = 0.2
TIME (MIN) = 30	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 40	DISCHARGE (CFS) = 0.2
TIME (MIN) = 45	DISCHARGE (CFS) = 0.2
TIME (MIN) = 50	DISCHARGE (CFS) = 0.2
TIME (MIN) = 55	DISCHARGE (CFS) = 0.3
TIME (MIN) = 60	DISCHARGE (CFS) = 0.3
TIME (MIN) = 65	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 75	DISCHARGE (CFS) = 0.3
TIME (MIN) = 80	DISCHARGE (CFS) = 0.3
TIME (MIN) = 85	DISCHARGE (CFS) = 0.3
TIME (MIN) = 90	DISCHARGE (CFS) = 0.3
TIME (MIN) = 95	DISCHARGE (CFS) = 0.3
TIME (MIN) = 100	DISCHARGE (CFS) = 0.3
TIME (MIN) = 105	DISCHARGE (CFS) = 0.3
TIME (MIN) = 110	DISCHARGE (CFS) = 0.3
TIME (MIN) = 115	DISCHARGE (CFS) = 0.3
TIME (MIN) = 120	DISCHARGE (CFS) = 0.3
TIME (MIN) = 125	DISCHARGE (CFS) = 0.3
TIME (MIN) = 130	DISCHARGE (CFS) = 0.3
TIME (MIN) = 135	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 145	DISCHARGE (CFS) = 0.4
TIME (MIN) = 150	DISCHARGE (CFS) = 0.4
TIME (MIN) = 155	DISCHARGE (CFS) = 0.4
TIME (MIN) = 160	DISCHARGE (CFS) = 0.4
TIME (MIN) = 165	DISCHARGE (CFS) = 0.4
TIME (MIN) = 170	DISCHARGE (CFS) = 0.5
TIME (MIN) = 175	DISCHARGE (CFS) = 0.5
TIME (MIN) = 180	DISCHARGE (CFS) = 0.5
TIME (MIN) = 185	DISCHARGE (CFS) = 0.5
TIME (MIN) = 190	DISCHARGE (CFS) = 0.6
TIME (MIN) = 195	DISCHARGE (CFS) = 0.6
TIME (MIN) = 200	DISCHARGE (CFS) = 0.6
TIME (MIN) = 205	DISCHARGE (CFS) = 0.7
TIME (MIN) = 210	DISCHARGE (CFS) = 0.8
TIME (MIN) = 215	DISCHARGE (CFS) = 0.9
TIME (MIN) = 220	DISCHARGE (CFS) = 0.9
TIME (MIN) = 225	DISCHARGE (CFS) = 1.1
TIME (MIN) = 230	DISCHARGE (CFS) = 1.3
TIME (MIN) = 235	DISCHARGE (CFS) = 1.9
TIME (MIN) = 240	DISCHARGE (CFS) = 2.7
TIME (MIN) = 245	DISCHARGE (CFS) = 9.6
TIME (MIN) = 250	DISCHARGE (CFS) = 1.5
TIME (MIN) = 255	DISCHARGE (CFS) = 1
TIME (MIN) = 260	DISCHARGE (CFS) = 0.8
TIME (MIN) = 265	DISCHARGE (CFS) = 0.7
TIME (MIN) = 270	DISCHARGE (CFS) = 0.6
TIME (MIN) = 275	DISCHARGE (CFS) = 0.5
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 285	DISCHARGE (CFS) = 0.4
TIME (MIN) = 290	DISCHARGE (CFS) = 0.4
TIME (MIN) = 295	DISCHARGE (CFS) = 0.4
TIME (MIN) = 300	DISCHARGE (CFS) = 0.4
TIME (MIN) = 305	DISCHARGE (CFS) = 0.3
TIME (MIN) = 310	DISCHARGE (CFS) = 0.3
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 320	DISCHARGE (CFS) = 0.3
TIME (MIN) = 325	DISCHARGE (CFS) = 0.3
TIME (MIN) = 330	DISCHARGE (CFS) = 0.3
TIME (MIN) = 335	DISCHARGE (CFS) = 0.3
TIME (MIN) = 340	DISCHARGE (CFS) = 0.3
TIME (MIN) = 345	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 355	DISCHARGE (CFS) = 0.2
TIME (MIN) = 360	DISCHARGE (CFS) = 0.2

RATIONAL METHOD HYDROGRAPH PROGRAM

DMA4 100YR HYDROGRAPH

RUN DATE 8/5/2021
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.3 INCHES
BASIN AREA 2 ACRES
RUNOFF COEFFICIENT 0.87
PEAK DISCHARGE 10.5 CFS

TIME (MIN) =	DISCHARGE (CFS) =
0	0
5	0.2
10	0.2
15	0.2
20	0.2
25	0.3
30	0.3
35	0.3
40	0.3
45	0.3
50	0.3
55	0.3
60	0.3
65	0.3
70	0.3
75	0.3
80	0.3
85	0.3
90	0.3
95	0.3
100	0.3
105	0.3
110	0.3
115	0.4
120	0.4
125	0.4
130	0.4
135	0.4
140	0.4
145	0.4
150	0.4
155	0.5
160	0.5
165	0.5
170	0.5
175	0.5
180	0.6
185	0.6
190	0.6
195	0.7
200	0.7
205	0.8
210	0.8
215	0.9
220	1
225	1.2
230	1.4
235	2.1
240	3
245	10.5
250	1.7
255	1.1
260	0.9
265	0.7
270	0.6
275	0.6
280	0.5
285	0.5
290	0.4
295	0.4
300	0.4
305	0.4
310	0.3
315	0.3
320	0.3
325	0.3
330	0.3
335	0.3
340	0.3
345	0.3
350	0.3
355	0.2
360	0.2

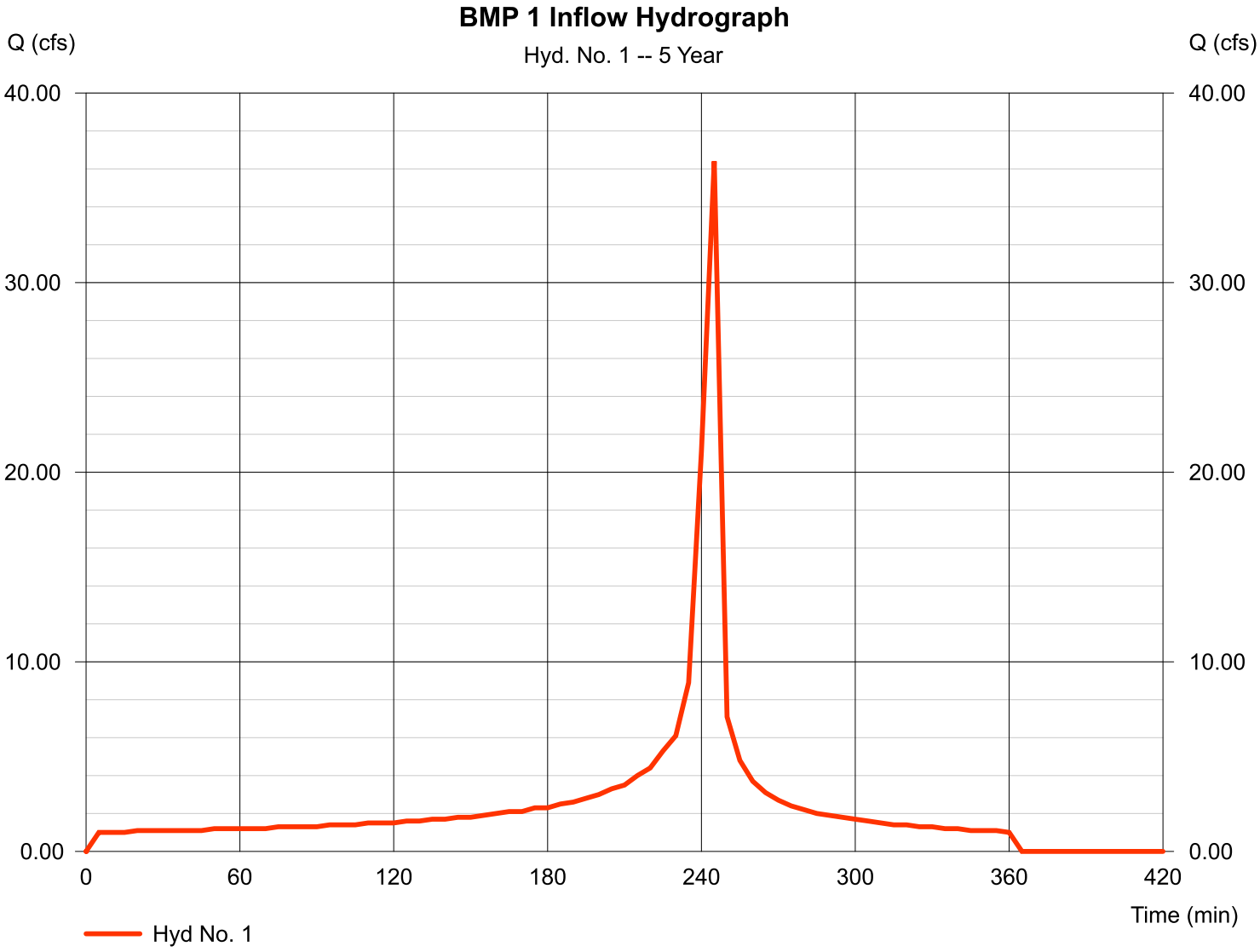
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 12 / 7 / 2022

Hyd. No. 1

BMP 1 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 36.40 cfs
Storm frequency	= 5 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 61,470 cuft



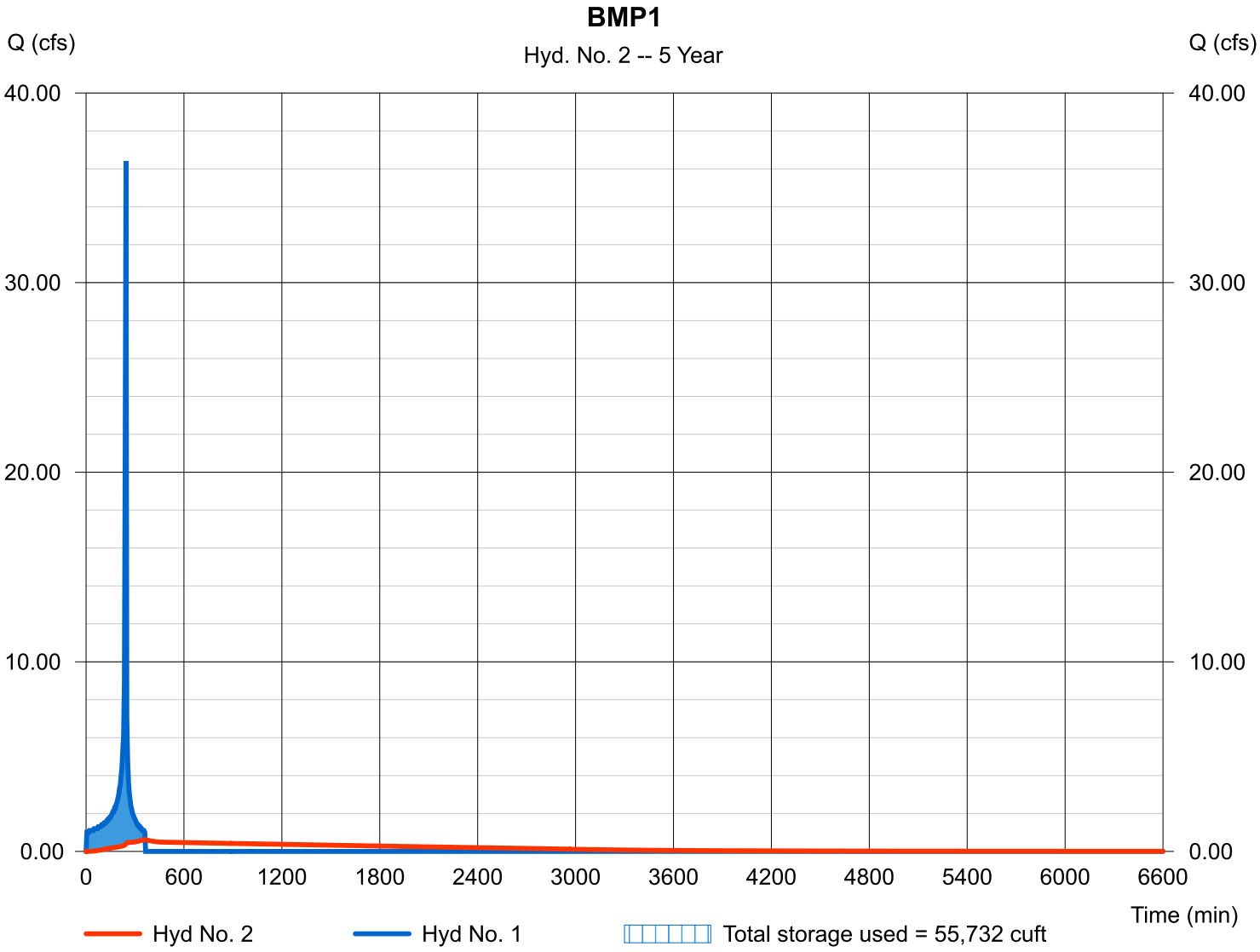
Hydrograph Report

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	0.616 cfs
Storm frequency	=	5 yrs	Time to peak	=	360 min
Time interval	=	5 min	Hyd. volume	=	61,029 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	475.21 ft
Reservoir name	=	BMP 1	Max. Storage	=	55,732 cuft

Storage Indication method used.



Pond No. 1 - BMP 1

Pond Data

UG Chambers -Invert elev. = 473.25 ft, Rise x Span = 3.00 x 100.00 ft, Barrel Len = 285.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	473.25	n/a	0	0
0.30	473.55	n/a	8,551	8,551
0.60	473.85	n/a	8,552	17,104
0.90	474.15	n/a	8,551	25,655
1.20	474.45	n/a	8,552	34,207
1.50	474.75	n/a	8,551	42,759
1.80	475.05	n/a	8,551	51,310
2.10	475.35	n/a	8,552	59,862
2.40	475.65	n/a	8,551	68,414
2.70	475.95	n/a	8,552	76,966
3.00	476.25	n/a	8,551	85,517

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	3.90	6.00	0.00
Span (in)	= 12.00	3.90	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 473.25	473.25	475.10	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 475.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	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	473.25	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	855	473.28	0.00 ic	0.00 ic	0.00	---	0.00	---	---	---	---	---	0.002
0.06	1,710	473.31	0.01 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.007
0.09	2,565	473.34	0.02 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.016
0.12	3,421	473.37	0.03 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.028
0.15	4,276	473.40	0.04 ic	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.043
0.18	5,131	473.43	0.06 ic	0.06 ic	0.00	---	0.00	---	---	---	---	---	0.058
0.21	5,986	473.46	0.08 ic	0.08 ic	0.00	---	0.00	---	---	---	---	---	0.077
0.24	6,841	473.49	0.10 ic	0.10 ic	0.00	---	0.00	---	---	---	---	---	0.097
0.27	7,696	473.52	0.12 ic	0.12 ic	0.00	---	0.00	---	---	---	---	---	0.116
0.30	8,551	473.55	0.14 ic	0.14 ic	0.00	---	0.00	---	---	---	---	---	0.136
0.33	9,407	473.58	0.16 ic	0.15 ic	0.00	---	0.00	---	---	---	---	---	0.151
0.36	10,262	473.61	0.17 ic	0.16 ic	0.00	---	0.00	---	---	---	---	---	0.163
0.39	11,117	473.64	0.18 ic	0.17 ic	0.00	---	0.00	---	---	---	---	---	0.174
0.42	11,972	473.67	0.19 ic	0.18 ic	0.00	---	0.00	---	---	---	---	---	0.185
0.45	12,827	473.70	0.20 ic	0.19 ic	0.00	---	0.00	---	---	---	---	---	0.195
0.48	13,683	473.73	0.21 ic	0.20 ic	0.00	---	0.00	---	---	---	---	---	0.204
0.51	14,538	473.76	0.21 ic	0.21 ic	0.00	---	0.00	---	---	---	---	---	0.214
0.54	15,393	473.79	0.22 ic	0.22 ic	0.00	---	0.00	---	---	---	---	---	0.224
0.57	16,248	473.82	0.24 ic	0.23 ic	0.00	---	0.00	---	---	---	---	---	0.232
0.60	17,104	473.85	0.25 ic	0.24 ic	0.00	---	0.00	---	---	---	---	---	0.240
0.63	17,959	473.88	0.25 ic	0.25 ic	0.00	---	0.00	---	---	---	---	---	0.249
0.66	18,814	473.91	0.26 ic	0.26 ic	0.00	---	0.00	---	---	---	---	---	0.257
0.69	19,669	473.94	0.26 ic	0.26 ic	0.00	---	0.00	---	---	---	---	---	0.265
0.72	20,524	473.97	0.28 ic	0.27 ic	0.00	---	0.00	---	---	---	---	---	0.273
0.75	21,379	474.00	0.28 ic	0.28 ic	0.00	---	0.00	---	---	---	---	---	0.280
0.78	22,234	474.03	0.29 ic	0.29 ic	0.00	---	0.00	---	---	---	---	---	0.288
0.81	23,090	474.06	0.31 ic	0.29 ic	0.00	---	0.00	---	---	---	---	---	0.295
0.84	23,945	474.09	0.31 ic	0.30 ic	0.00	---	0.00	---	---	---	---	---	0.303
0.87	24,800	474.12	0.31 ic	0.31 ic	0.00	---	0.00	---	---	---	---	---	0.309
0.90	25,655	474.15	0.32 ic	0.32 ic	0.00	---	0.00	---	---	---	---	---	0.316
0.93	26,510	474.18	0.32 ic	0.32 ic	0.00	---	0.00	---	---	---	---	---	0.323

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BMP 1

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
0.96	27,365	474.21	0.34 ic	0.33 ic	0.00	---	0.00	---	---	---	---	---	0.329
0.99	28,221	474.24	0.34 ic	0.34 ic	0.00	---	0.00	---	---	---	---	---	0.336
1.02	29,076	474.27	0.35 ic	0.34 ic	0.00	---	0.00	---	---	---	---	---	0.342
1.05	29,931	474.30	0.35 ic	0.35 ic	0.00	---	0.00	---	---	---	---	---	0.349
1.08	30,786	474.33	0.35 ic	0.35 ic	0.00	---	0.00	---	---	---	---	---	0.355
1.11	31,642	474.36	0.37 ic	0.36 ic	0.00	---	0.00	---	---	---	---	---	0.361
1.14	32,497	474.39	0.37 ic	0.37 ic	0.00	---	0.00	---	---	---	---	---	0.367
1.17	33,352	474.42	0.37 ic	0.37 ic	0.00	---	0.00	---	---	---	---	---	0.372
1.20	34,207	474.45	0.39 ic	0.38 ic	0.00	---	0.00	---	---	---	---	---	0.379
1.23	35,062	474.48	0.39 ic	0.38 ic	0.00	---	0.00	---	---	---	---	---	0.385
1.26	35,917	474.51	0.39 ic	0.39 ic	0.00	---	0.00	---	---	---	---	---	0.390
1.29	36,773	474.54	0.40 ic	0.40 ic	0.00	---	0.00	---	---	---	---	---	0.396
1.32	37,628	474.57	0.40 ic	0.40 ic	0.00	---	0.00	---	---	---	---	---	0.402
1.35	38,483	474.60	0.41 ic	0.41 ic	0.00	---	0.00	---	---	---	---	---	0.406
1.38	39,338	474.63	0.42 ic	0.41 ic	0.00	---	0.00	---	---	---	---	---	0.412
1.41	40,193	474.66	0.42 ic	0.42 ic	0.00	---	0.00	---	---	---	---	---	0.418
1.44	41,048	474.69	0.42 ic	0.42 ic	0.00	---	0.00	---	---	---	---	---	0.423
1.47	41,903	474.72	0.44 ic	0.43 ic	0.00	---	0.00	---	---	---	---	---	0.428
1.50	42,759	474.75	0.44 ic	0.43 ic	0.00	---	0.00	---	---	---	---	---	0.433
1.53	43,614	474.78	0.44 ic	0.44 ic	0.00	---	0.00	---	---	---	---	---	0.439
1.56	44,469	474.81	0.44 ic	0.44 ic	0.00	---	0.00	---	---	---	---	---	0.443
1.59	45,324	474.84	0.46 ic	0.45 ic	0.00	---	0.00	---	---	---	---	---	0.448
1.62	46,179	474.87	0.46 ic	0.45 ic	0.00	---	0.00	---	---	---	---	---	0.453
1.65	47,034	474.90	0.46 ic	0.46 ic	0.00	---	0.00	---	---	---	---	---	0.458
1.68	47,889	474.93	0.48 ic	0.46 ic	0.00	---	0.00	---	---	---	---	---	0.463
1.71	48,745	474.96	0.48 ic	0.47 ic	0.00	---	0.00	---	---	---	---	---	0.468
1.74	49,600	474.99	0.48 ic	0.47 ic	0.00	---	0.00	---	---	---	---	---	0.473
1.77	50,455	475.02	0.48 ic	0.48 ic	0.00	---	0.00	---	---	---	---	---	0.478
1.80	51,310	475.05	0.50 ic	0.48 ic	0.00	---	0.00	---	---	---	---	---	0.482
1.83	52,165	475.08	0.50 ic	0.49 ic	0.00	---	0.00	---	---	---	---	---	0.487
1.86	53,020	475.11	0.50 ic	0.49 ic	0.00 ic	---	0.00	---	---	---	---	---	0.495
1.89	53,876	475.14	0.52 ic	0.49 ic	0.03 ic	---	0.00	---	---	---	---	---	0.521
1.92	54,731	475.17	0.56 ic	0.50 ic	0.06 ic	---	0.00	---	---	---	---	---	0.560
1.95	55,586	475.20	0.62 ic	0.50 ic	0.11 ic	---	0.00	---	---	---	---	---	0.606
1.98	56,441	475.23	0.67 ic	0.50 ic	0.16 ic	---	0.00	---	---	---	---	---	0.661
2.01	57,296	475.26	0.74 ic	0.50 ic	0.22 ic	---	0.00	---	---	---	---	---	0.720
2.04	58,152	475.29	0.79 ic	0.50 ic	0.28 ic	---	0.00	---	---	---	---	---	0.786
2.07	59,007	475.32	0.86 ic	0.51 ic	0.35 ic	---	0.00	---	---	---	---	---	0.857
2.10	59,862	475.35	0.94 ic	0.51 ic	0.43 ic	---	0.00	---	---	---	---	---	0.932
2.13	60,717	475.38	1.02 ic	0.51 ic	0.50 ic	---	0.00	---	---	---	---	---	1.012
2.16	61,572	475.41	1.10 ic	0.51 ic	0.59 ic	---	0.00	---	---	---	---	---	1.096
2.19	62,428	475.44	1.18 ic	0.51 ic	0.67 ic	---	0.00	---	---	---	---	---	1.184
2.22	63,283	475.47	1.29 ic	0.51 ic	0.77 ic	---	0.00	---	---	---	---	---	1.276
2.25	64,138	475.50	1.38 ic	0.51 ic	0.86 ic	---	0.00	---	---	---	---	---	1.372
2.28	64,993	475.53	1.47 ic	0.51 ic	0.96 ic	---	0.00	---	---	---	---	---	1.471
2.31	65,848	475.56	1.58 ic	0.51 ic	1.06 ic	---	0.00	---	---	---	---	---	1.574
2.34	66,703	475.59	1.69 ic	0.51 ic	1.17 ic	---	0.00	---	---	---	---	---	1.679
2.37	67,558	475.62	1.77 ic	0.51 ic	1.25 ic	---	0.00	---	---	---	---	---	1.764
2.40	68,414	475.65	1.85 ic	0.51 ic	1.32 ic	---	0.00	---	---	---	---	---	1.833
2.43	69,269	475.68	1.90 ic	0.52 ic	1.38 ic	---	0.00	---	---	---	---	---	1.900
2.46	70,124	475.71	1.97 ic	0.52 ic	1.44 ic	---	0.00	---	---	---	---	---	1.963
2.49	70,979	475.74	2.02 ic	0.52 ic	1.50 ic	---	0.00	---	---	---	---	---	2.024
2.52	71,834	475.77	2.12 ic	0.52 ic	1.56 ic	---	0.04	---	---	---	---	---	2.119
2.55	72,690	475.80	2.28 ic	0.52 ic	1.61 ic	---	0.15	---	---	---	---	---	2.283
2.58	73,545	475.83	2.48 ic	0.51 ic	1.67 ic	---	0.30	---	---	---	---	---	2.483
2.61	74,400	475.86	2.71 ic	0.50 ic	1.72 ic	---	0.49	---	---	---	---	---	2.710
2.64	75,255	475.89	2.96 ic	0.49 ic	1.77 ic	---	0.70	---	---	---	---	---	2.960
2.67	76,110	475.92	3.23 ic	0.48 ic	1.82 ic	---	0.93	---	---	---	---	---	3.230
2.70	76,966	475.95	3.52 ic	0.46 ic	1.86 ic	---	1.19	---	---	---	---	---	3.518
2.73	77,821	475.98	3.82 ic	0.44 ic	1.91 ic	---	1.47	---	---	---	---	---	3.820
2.76	78,676	476.01	4.13 ic	0.41 ic	1.96 ic	---	1.77	---	---	---	---	---	4.134
2.79	79,531	476.04	4.46 ic	0.38 ic	2.00 ic	---	2.08	---	---	---	---	---	4.459
2.82	80,386	476.07	4.79 ic	0.34 ic	2.04 ic	---	2.41	---	---	---	---	---	4.788
2.85	81,241	476.10	4.97 ic	0.31 ic	1.90 ic	---	2.76	---	---	---	---	---	4.971
2.88	82,097	476.13	5.15 ic	0.29 ic	1.74 ic	---	3.12	---	---	---	---	---	5.151
2.91	82,952	476.16	5.33 ic	0.26 ic	1.57 ic	---	3.50	---	---	---	---	---	5.327
2.94	83,807	476.19	5.45 ic	0.24 ic	1.44 ic	---	3.77 s	---	---	---	---	---	5.453
2.97	84,662	476.22	5.55 ic	0.22 ic	1.36 ic	---	3.97 s	---	---	---	---	---	5.548
3.00	85,517	476.25	5.63 ic	0.21 ic	1.28 ic	---	4.14 s	---	---	---	---	---	5.630

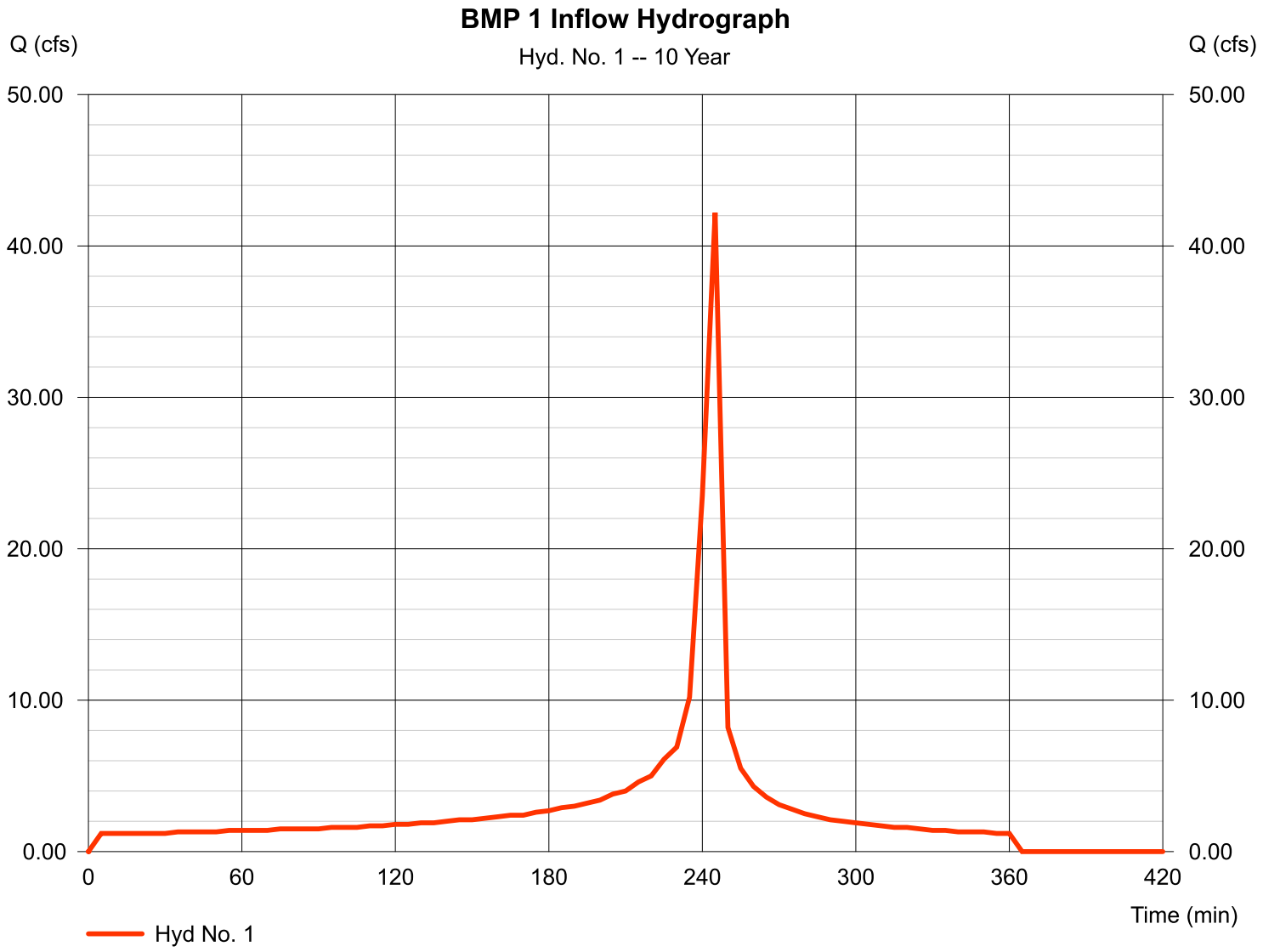
...End

Hydrograph Report

Hyd. No. 1

BMP 1 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 42.20 cfs
Storm frequency	= 10 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 70,440 cuft



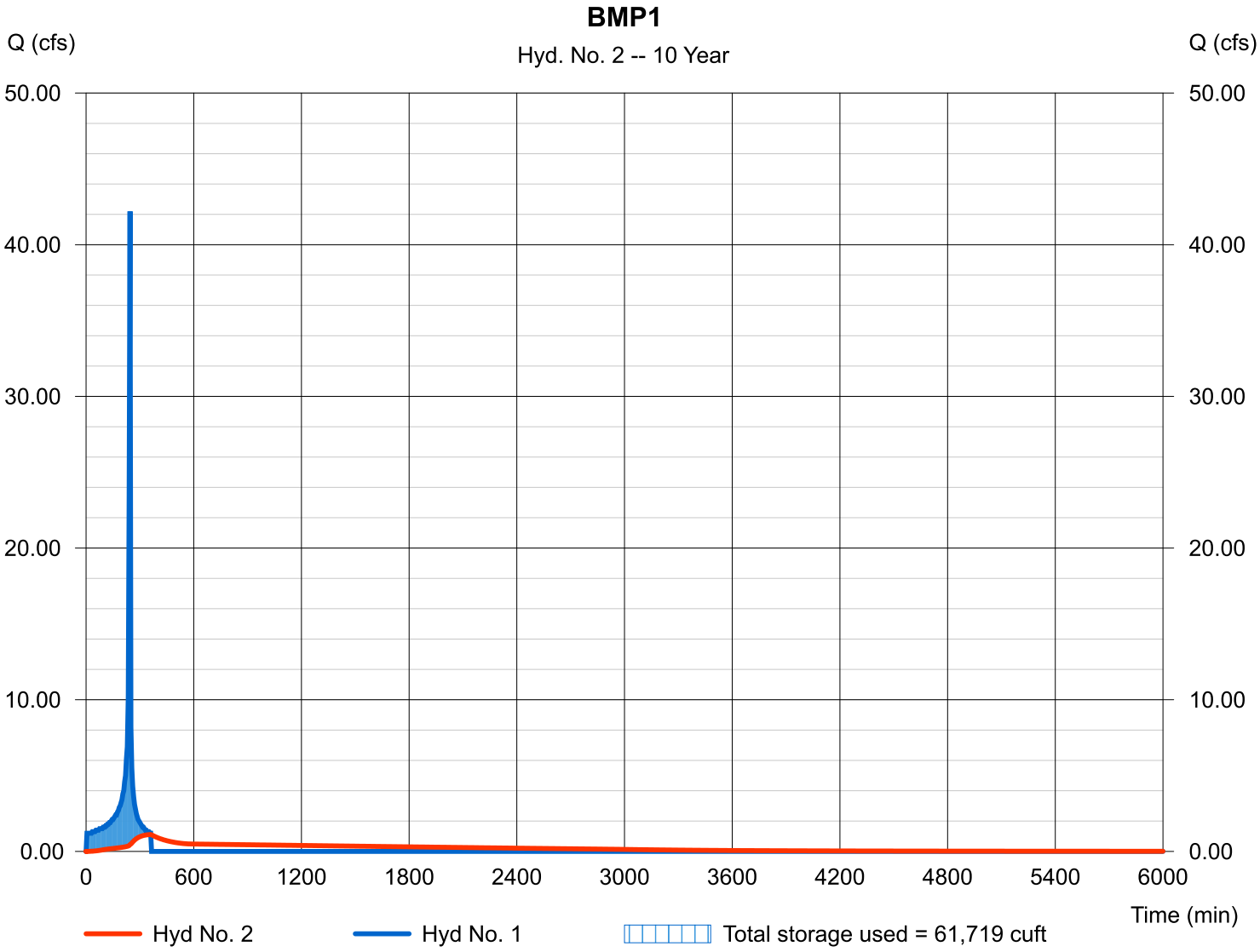
Hydrograph Report

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	1.111 cfs
Storm frequency	=	10 yrs	Time to peak	=	360 min
Time interval	=	5 min	Hyd. volume	=	69,992 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	475.42 ft
Reservoir name	=	BMP 1	Max. Storage	=	61,719 cuft

Storage Indication method used.

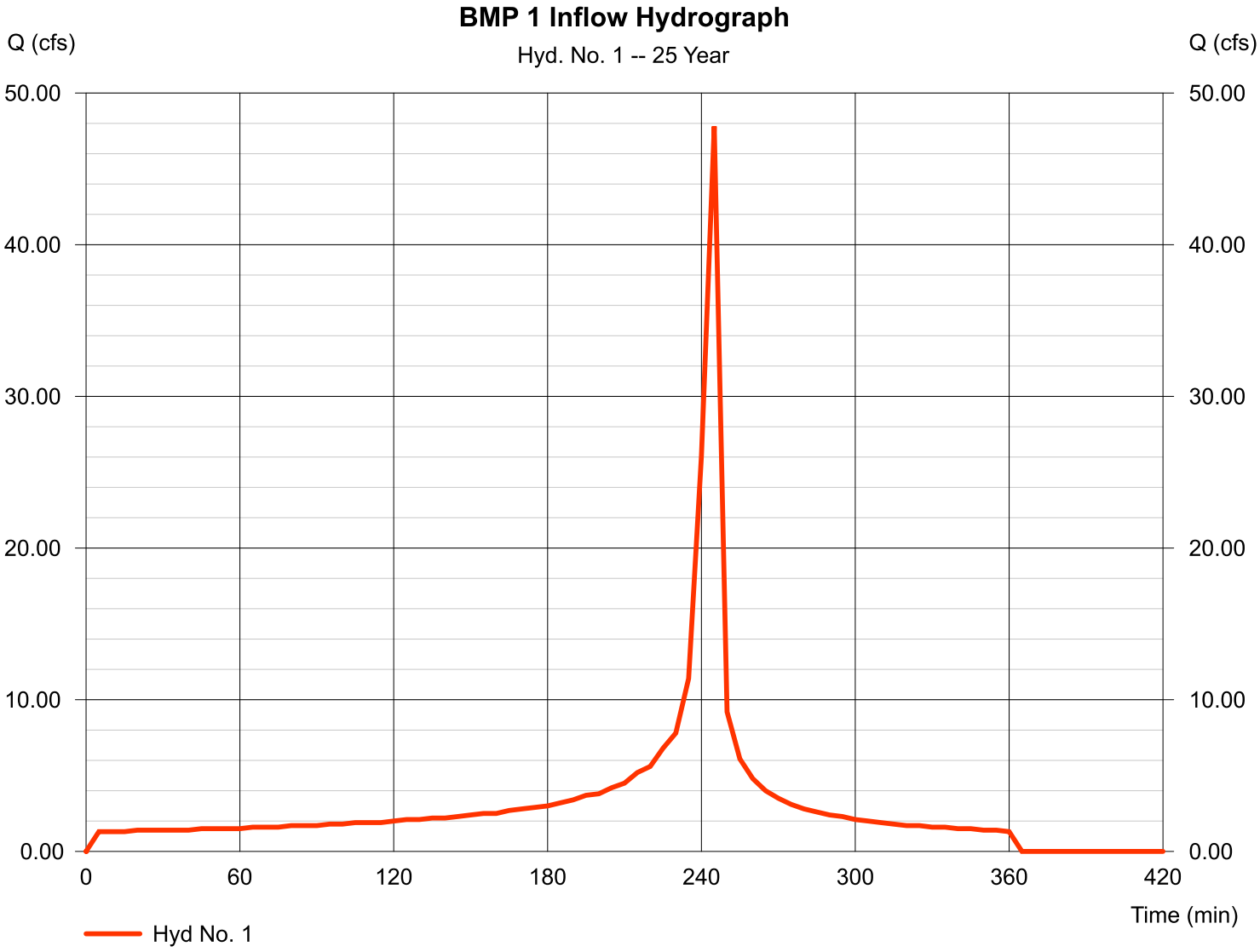


Hydrograph Report

Hyd. No. 1

BMP 1 Inflow Hydrograph

Hydrograph type	=	Manual	Peak discharge	=	47.80 cfs
Storm frequency	=	25 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	79,080 cuft



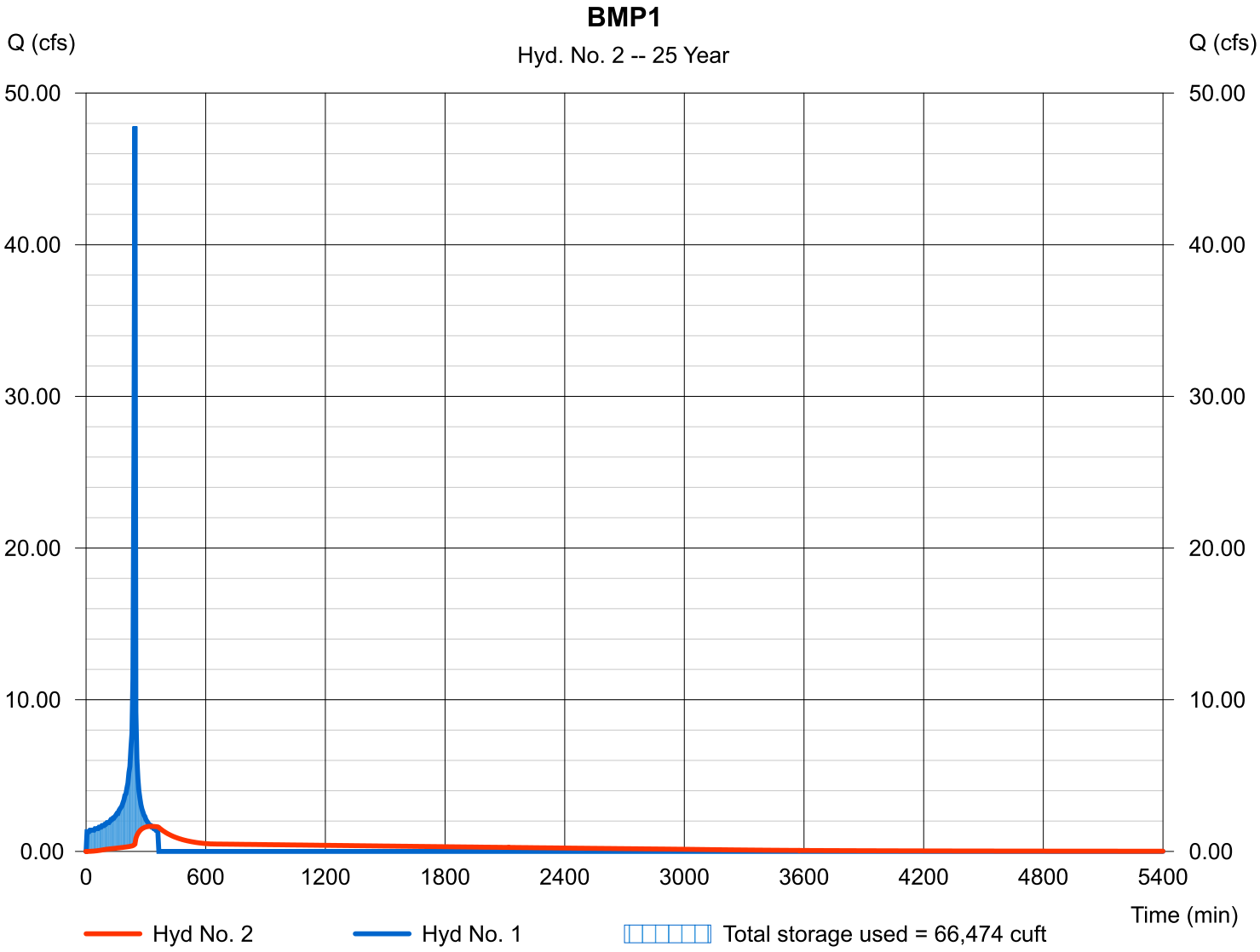
Hydrograph Report

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	1.651 cfs
Storm frequency	=	25 yrs	Time to peak	=	325 min
Time interval	=	5 min	Hyd. volume	=	78,628 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	475.58 ft
Reservoir name	=	BMP 1	Max. Storage	=	66,474 cuft

Storage Indication method used.



Hydrograph Report

Q25 analyzed with Q100 main channel TW 476.0

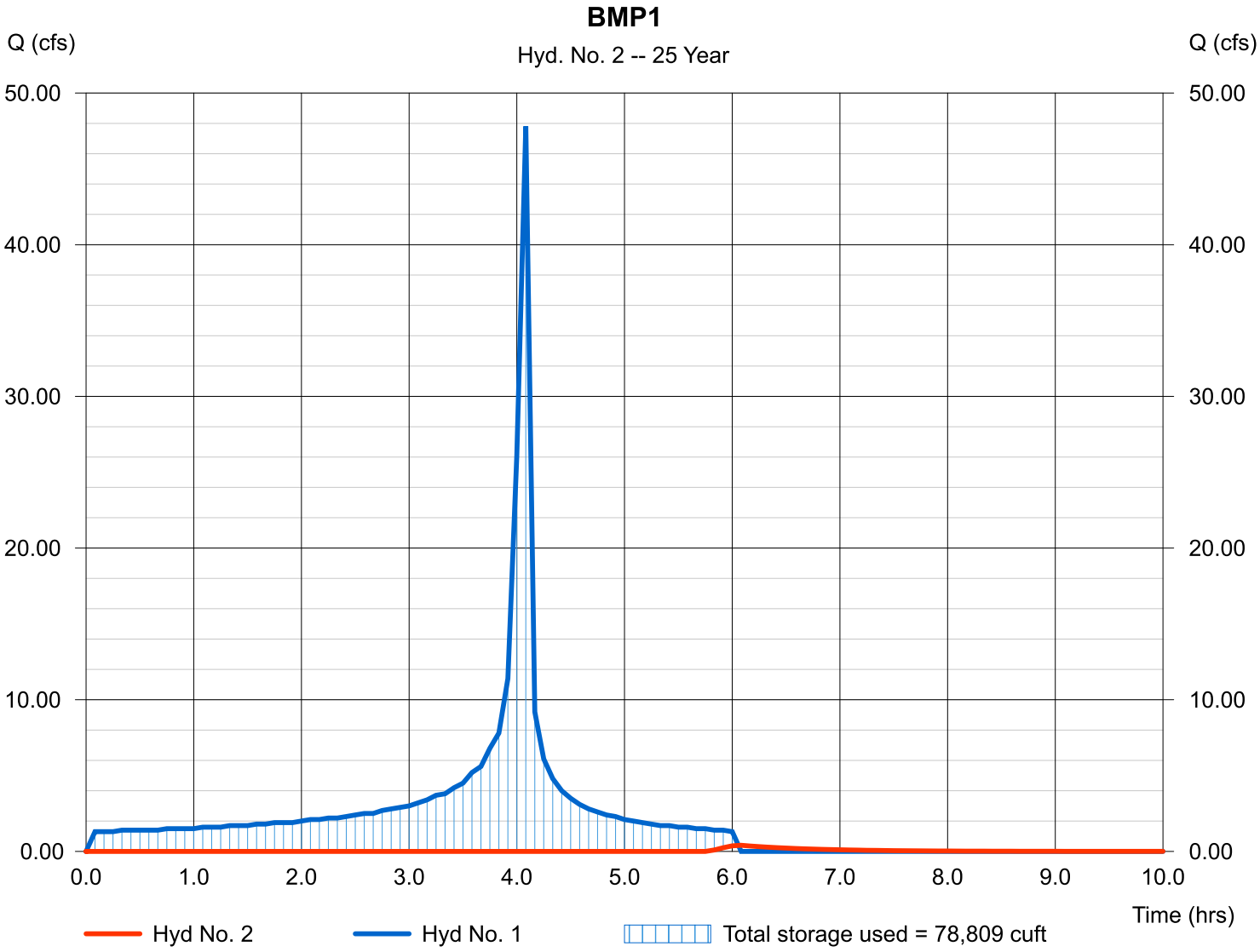
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 — Wednesday, 12 / 7 / 2022

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	0.402 cfs
Storm frequency	=	25 yrs	Time to peak	=	6.08 hrs
Time interval	=	5 min	Hyd. volume	=	1,257 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	476.01 ft
Reservoir name	=	BMP 1	Max. Storage	=	78,809 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BMP 1

Pond Data

UG Chambers -Invert elev. = 473.25 ft, Rise x Span = 3.00 x 100.00 ft, Barrel Len = 285.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	473.25	n/a	0	0
0.30	473.55	n/a	8,551	8,551
0.60	473.85	n/a	8,552	17,104
0.90	474.15	n/a	8,551	25,655
1.20	474.45	n/a	8,552	34,207
1.50	474.75	n/a	8,551	42,759
1.80	475.05	n/a	8,551	51,310
2.10	475.35	n/a	8,552	59,862
2.40	475.65	n/a	8,551	68,414
2.70	475.95	n/a	8,552	76,966
3.00	476.25	n/a	8,551	85,517

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	3.90	6.00	0.00
Span (in)	= 12.00	3.90	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 473.25	473.25	475.10	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 475.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 476.00

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	473.25	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	855	473.28	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.06	1,710	473.31	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.09	2,565	473.34	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.12	3,421	473.37	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.15	4,276	473.40	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.18	5,131	473.43	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.21	5,986	473.46	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.24	6,841	473.49	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.27	7,696	473.52	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.30	8,551	473.55	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.33	9,407	473.58	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.36	10,262	473.61	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.39	11,117	473.64	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.42	11,972	473.67	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.45	12,827	473.70	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.48	13,683	473.73	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.51	14,538	473.76	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.54	15,393	473.79	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.57	16,248	473.82	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.60	17,104	473.85	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.63	17,959	473.88	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.66	18,814	473.91	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.69	19,669	473.94	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.72	20,524	473.97	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.75	21,379	474.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.78	22,234	474.03	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.81	23,090	474.06	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.84	23,945	474.09	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.87	24,800	474.12	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.90	25,655	474.15	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.93	26,510	474.18	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000

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BMP 1

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
0.96	27,365	474.21	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.99	28,221	474.24	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.02	29,076	474.27	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.05	29,931	474.30	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.08	30,786	474.33	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.11	31,642	474.36	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.14	32,497	474.39	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.17	33,352	474.42	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.20	34,207	474.45	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.23	35,062	474.48	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.26	35,917	474.51	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.29	36,773	474.54	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.32	37,628	474.57	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.35	38,483	474.60	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.38	39,338	474.63	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.41	40,193	474.66	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.44	41,048	474.69	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.47	41,903	474.72	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.50	42,759	474.75	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.53	43,614	474.78	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.56	44,469	474.81	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.59	45,324	474.84	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.62	46,179	474.87	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.65	47,034	474.90	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.68	47,889	474.93	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.71	48,745	474.96	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.74	49,600	474.99	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.77	50,455	475.02	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.80	51,310	475.05	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.83	52,165	475.08	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.86	53,020	475.11	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.89	53,876	475.14	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.92	54,731	475.17	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.95	55,586	475.20	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.98	56,441	475.23	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.01	57,296	475.26	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.04	58,152	475.29	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.07	59,007	475.32	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.10	59,862	475.35	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.13	60,717	475.38	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.16	61,572	475.41	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.19	62,428	475.44	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.22	63,283	475.47	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.25	64,138	475.50	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.28	64,993	475.53	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.31	65,848	475.56	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.34	66,703	475.59	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.37	67,558	475.62	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.40	68,414	475.65	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.43	69,269	475.68	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.46	70,124	475.71	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.49	70,979	475.74	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.52	71,834	475.77	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.55	72,690	475.80	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.58	73,545	475.83	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.61	74,400	475.86	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.64	75,255	475.89	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.67	76,110	475.92	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.70	76,966	475.95	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.73	77,821	475.98	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.76	78,676	476.01	0.36 ic	0.01 ic	0.08 ic	---	0.25 s	---	---	---	---	---	0.347
2.79	79,531	476.04	0.71 ic	0.03 ic	0.17 ic	---	0.51 s	---	---	---	---	---	0.703
2.82	80,386	476.07	0.94 ic	0.04 ic	0.22 ic	---	0.68 s	---	---	---	---	---	0.937
2.85	81,241	476.10	1.13 ic	0.04 ic	0.25 ic	---	0.84 s	---	---	---	---	---	1.127
2.88	82,097	476.13	1.30 ic	0.04 ic	0.27 ic	---	0.98 s	---	---	---	---	---	1.293
2.91	82,952	476.16	1.44 ic	0.05 ic	0.28 ic	---	1.11 s	---	---	---	---	---	1.441
2.94	83,807	476.19	1.58 ic	0.05 ic	0.30 ic	---	1.24 s	---	---	---	---	---	1.581
2.97	84,662	476.22	1.71 ic	0.05 ic	0.30 ic	---	1.35 s	---	---	---	---	---	1.706
3.00	85,517	476.25	1.83 ic	0.05 ic	0.31 ic	---	1.47 s	---	---	---	---	---	1.827

...End

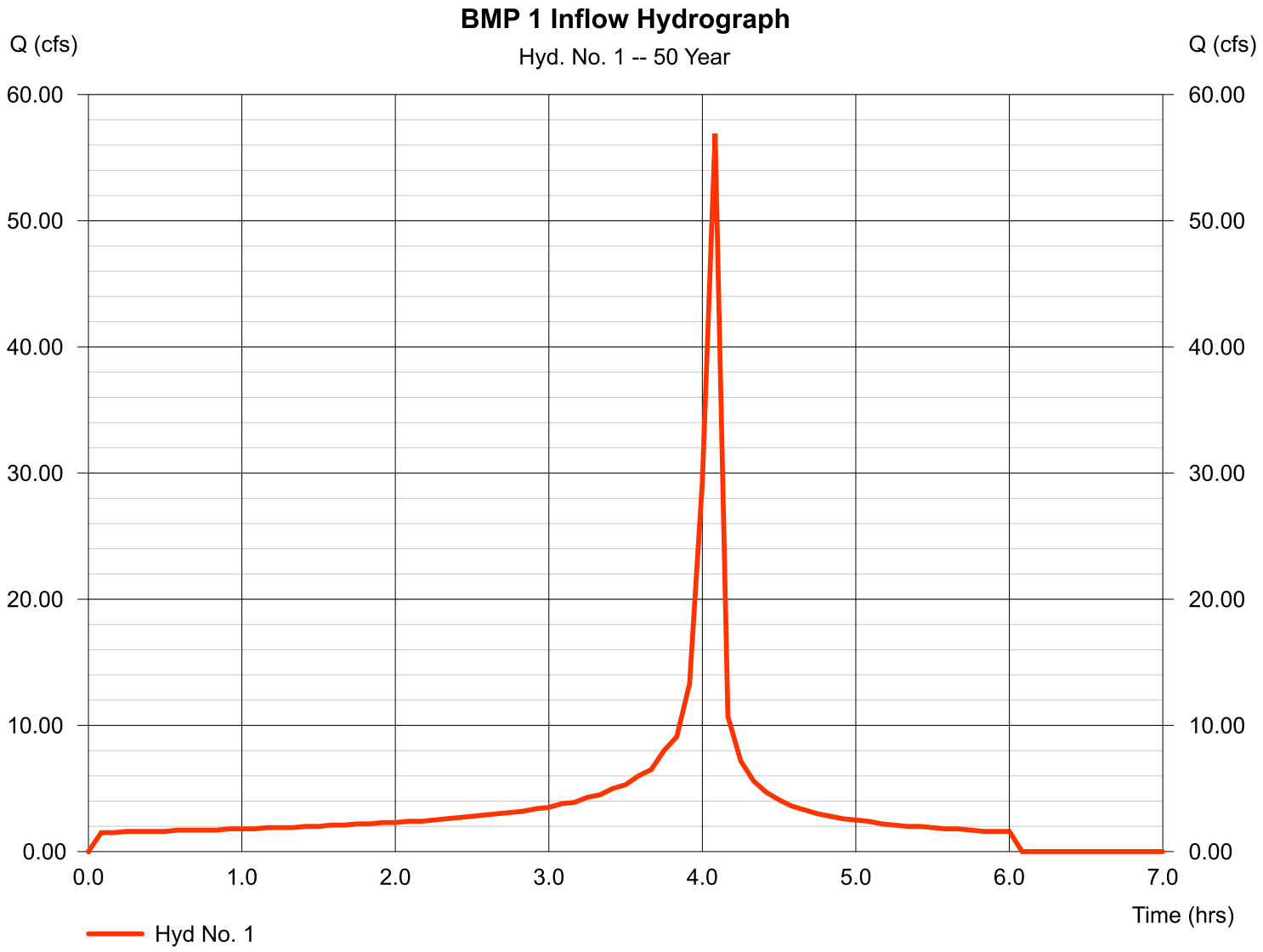
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 12 / 7 / 2022

Hyd. No. 1

BMP 1 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 56.90 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 92,310 cuft



Hydrograph Report

Q50 analyzed with Q25 main channel TW 475.6

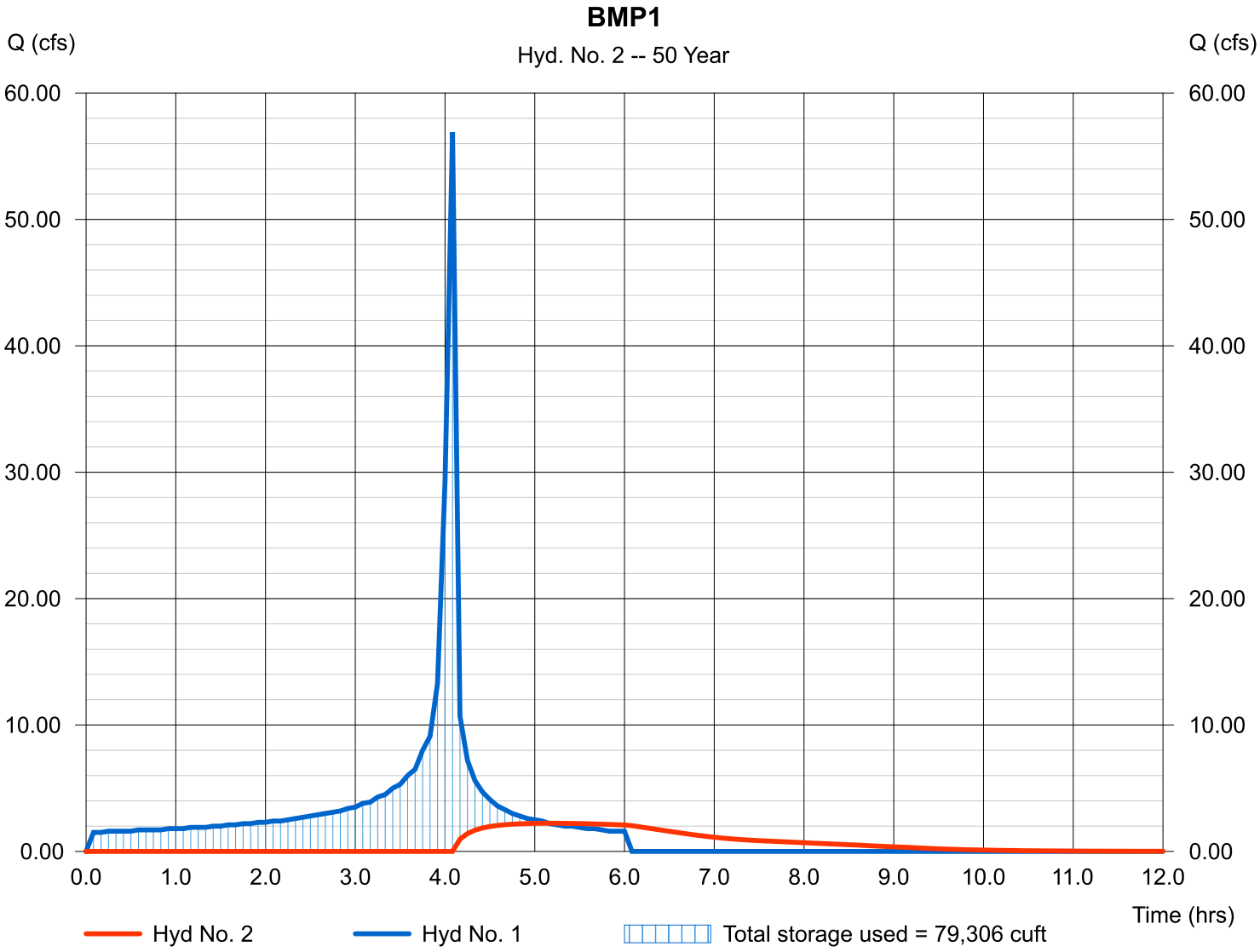
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 — Wednesday, 12 / 7 / 2022

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	2.230 cfs
Storm frequency	=	50 yrs	Time to peak	=	5.17 hrs
Time interval	=	5 min	Hyd. volume	=	25,604 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	476.03 ft
Reservoir name	=	BMP 1	Max. Storage	=	79,306 cuft

Storage Indication method used.



Pond Report

Pond No. 1 - BMP 1

Pond Data

UG Chambers -Invert elev. = 473.25 ft, Rise x Span = 3.00 x 100.00 ft, Barrel Len = 285.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	473.25	n/a	0	0
0.30	473.55	n/a	8,551	8,551
0.60	473.85	n/a	8,552	17,104
0.90	474.15	n/a	8,551	25,655
1.20	474.45	n/a	8,552	34,207
1.50	474.75	n/a	8,551	42,759
1.80	475.05	n/a	8,551	51,310
2.10	475.35	n/a	8,552	59,862
2.40	475.65	n/a	8,551	68,414
2.70	475.95	n/a	8,552	76,966
3.00	476.25	n/a	8,551	85,517

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	3.90	6.00	0.00
Span (in)	= 12.00	3.90	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 473.25	473.25	475.10	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.00	0.00	0.00	0.00
Crest El. (ft)	= 475.75	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= Yes	No	No	No

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

TW Elev. (ft) = 475.60

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	473.25	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.03	855	473.28	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.06	1,710	473.31	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.09	2,565	473.34	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.12	3,421	473.37	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.15	4,276	473.40	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.18	5,131	473.43	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.21	5,986	473.46	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.24	6,841	473.49	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.27	7,696	473.52	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.30	8,551	473.55	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.33	9,407	473.58	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.36	10,262	473.61	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.39	11,117	473.64	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.42	11,972	473.67	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.45	12,827	473.70	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.48	13,683	473.73	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.51	14,538	473.76	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.54	15,393	473.79	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.57	16,248	473.82	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.60	17,104	473.85	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.63	17,959	473.88	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.66	18,814	473.91	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.69	19,669	473.94	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.72	20,524	473.97	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.75	21,379	474.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.78	22,234	474.03	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.81	23,090	474.06	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.84	23,945	474.09	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.87	24,800	474.12	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.90	25,655	474.15	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.93	26,510	474.18	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000

Continues on next page...

BMP 1

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
0.96	27,365	474.21	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.99	28,221	474.24	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.02	29,076	474.27	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.05	29,931	474.30	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.08	30,786	474.33	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.11	31,642	474.36	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.14	32,497	474.39	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.17	33,352	474.42	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.20	34,207	474.45	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.23	35,062	474.48	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.26	35,917	474.51	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.29	36,773	474.54	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.32	37,628	474.57	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.35	38,483	474.60	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.38	39,338	474.63	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.41	40,193	474.66	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.44	41,048	474.69	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.47	41,903	474.72	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.50	42,759	474.75	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.53	43,614	474.78	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.56	44,469	474.81	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.59	45,324	474.84	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.62	46,179	474.87	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.65	47,034	474.90	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.68	47,889	474.93	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.71	48,745	474.96	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.74	49,600	474.99	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.77	50,455	475.02	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.80	51,310	475.05	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.83	52,165	475.08	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.86	53,020	475.11	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.89	53,876	475.14	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.92	54,731	475.17	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.95	55,586	475.20	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
1.98	56,441	475.23	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.01	57,296	475.26	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.04	58,152	475.29	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.07	59,007	475.32	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.10	59,862	475.35	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.13	60,717	475.38	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.16	61,572	475.41	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.19	62,428	475.44	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.22	63,283	475.47	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.25	64,138	475.50	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.28	64,993	475.53	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.31	65,848	475.56	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.34	66,703	475.59	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
2.37	67,558	475.62	0.32 ic	0.05 ic	0.27 ic	---	0.00	---	---	---	---	---	0.318
2.40	68,414	475.65	0.50 ic	0.07 ic	0.43 ic	---	0.00	---	---	---	---	---	0.504
2.43	69,269	475.68	0.64 ic	0.09 ic	0.55 ic	---	0.00	---	---	---	---	---	0.637
2.46	70,124	475.71	0.75 ic	0.11 ic	0.64 ic	---	0.00	---	---	---	---	---	0.747
2.49	70,979	475.74	0.84 ic	0.12 ic	0.72 ic	---	0.00	---	---	---	---	---	0.843
2.52	71,834	475.77	0.95 ic	0.13 ic	0.79 ic	---	0.04	---	---	---	---	---	0.953
2.55	72,690	475.80	1.10 ic	0.14 ic	0.82 ic	---	0.15	---	---	---	---	---	1.101
2.58	73,545	475.83	1.27 ic	0.14 ic	0.83 ic	---	0.30	---	---	---	---	---	1.265
2.61	74,400	475.86	1.44 ic	0.14 ic	0.82 ic	---	0.49	---	---	---	---	---	1.438
2.64	75,255	475.89	1.60 ic	0.13 ic	0.80 ic	---	0.67 s	---	---	---	---	---	1.603
2.67	76,110	475.92	1.75 ic	0.13 ic	0.78 ic	---	0.84 s	---	---	---	---	---	1.752
2.70	76,966	475.95	1.89 ic	0.13 ic	0.76 ic	---	1.01 s	---	---	---	---	---	1.892
2.73	77,821	475.98	2.02 ic	0.12 ic	0.74 ic	---	1.16 s	---	---	---	---	---	2.022
2.76	78,676	476.01	2.15 ic	0.12 ic	0.71 ic	---	1.31 s	---	---	---	---	---	2.145
2.79	79,531	476.04	2.26 ic	0.11 ic	0.69 ic	---	1.45 s	---	---	---	---	---	2.260
2.82	80,386	476.07	2.37 ic	0.11 ic	0.67 ic	---	1.59 s	---	---	---	---	---	2.369
2.85	81,241	476.10	2.47 ic	0.11 ic	0.65 ic	---	1.72 s	---	---	---	---	---	2.472
2.88	82,097	476.13	2.57 ic	0.10 ic	0.63 ic	---	1.84 s	---	---	---	---	---	2.571
2.91	82,952	476.16	2.67 ic	0.10 ic	0.60 ic	---	1.96 s	---	---	---	---	---	2.664
2.94	83,807	476.19	2.75 ic	0.10 ic	0.59 ic	---	2.07 s	---	---	---	---	---	2.753
2.97	84,662	476.22	2.84 ic	0.09 ic	0.57 ic	---	2.18 s	---	---	---	---	---	2.840
3.00	85,517	476.25	2.92 ic	0.09 ic	0.55 ic	---	2.28 s	---	---	---	---	---	2.923

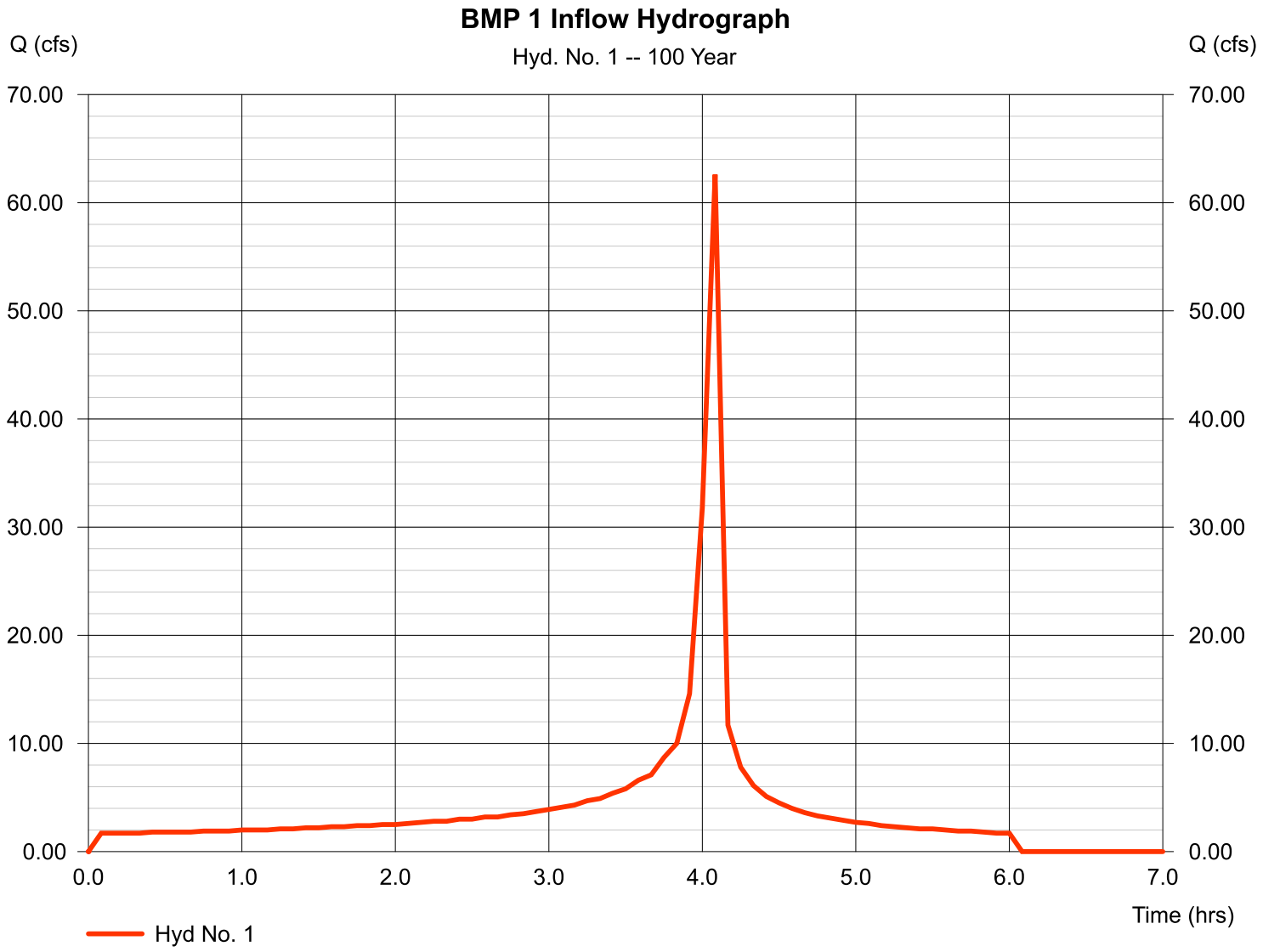
...End

Hydrograph Report

Hyd. No. 1

BMP 1 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 62.60 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 100,980 cuft



Hydrograph Report

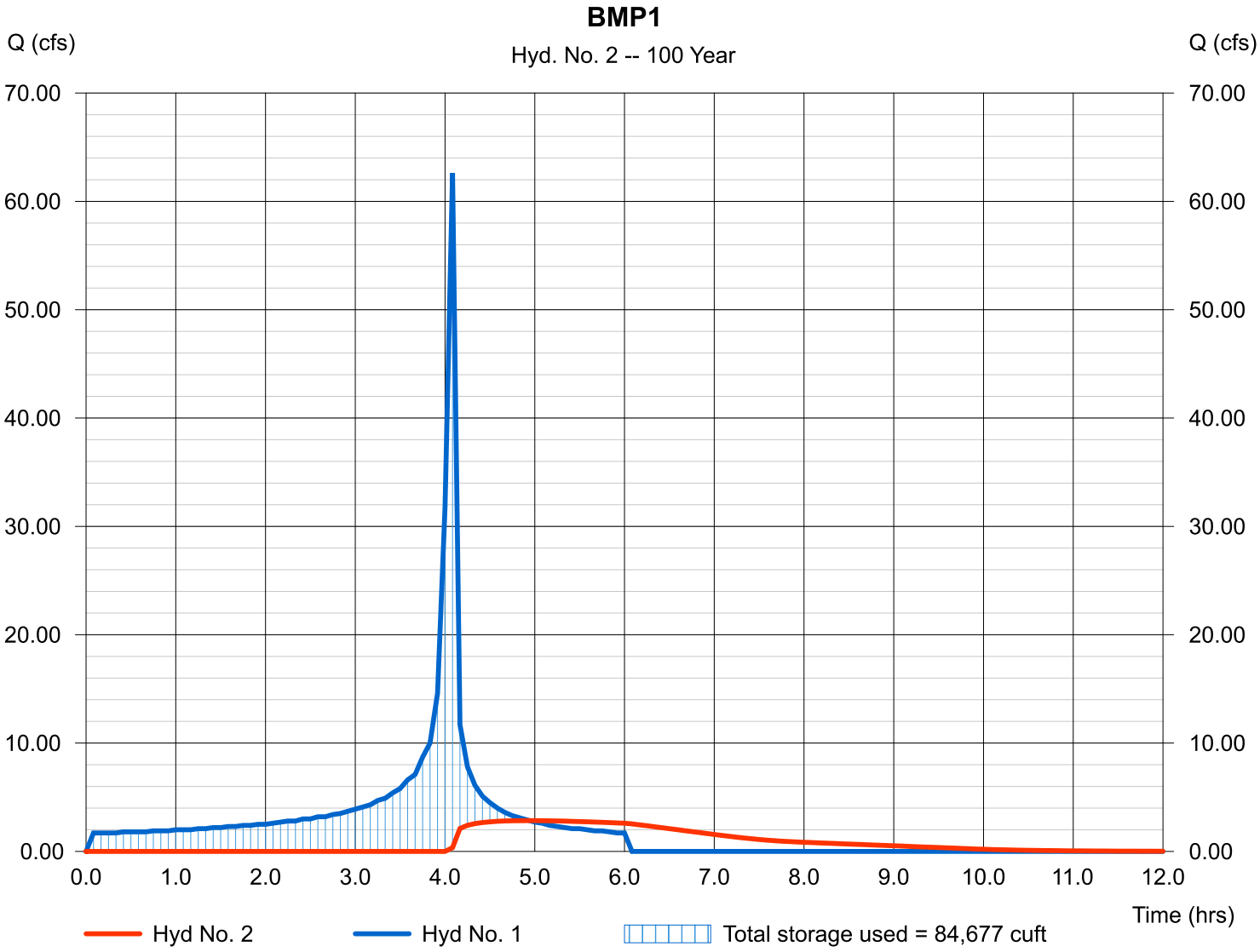
Q100 analyzed with Q25 main channel TW 475.6

Hyd. No. 2

BMP1

Hydrograph type	=	Reservoir	Peak discharge	=	2.842 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.92 hrs
Time interval	=	5 min	Hyd. volume	=	34,274 cuft
Inflow hyd. No.	=	1 - BMP 1 Inflow Hydrograph	Max. Elevation	=	476.22 ft
Reservoir name	=	BMP 1	Max. Storage	=	84,677 cuft

Storage Indication method used.



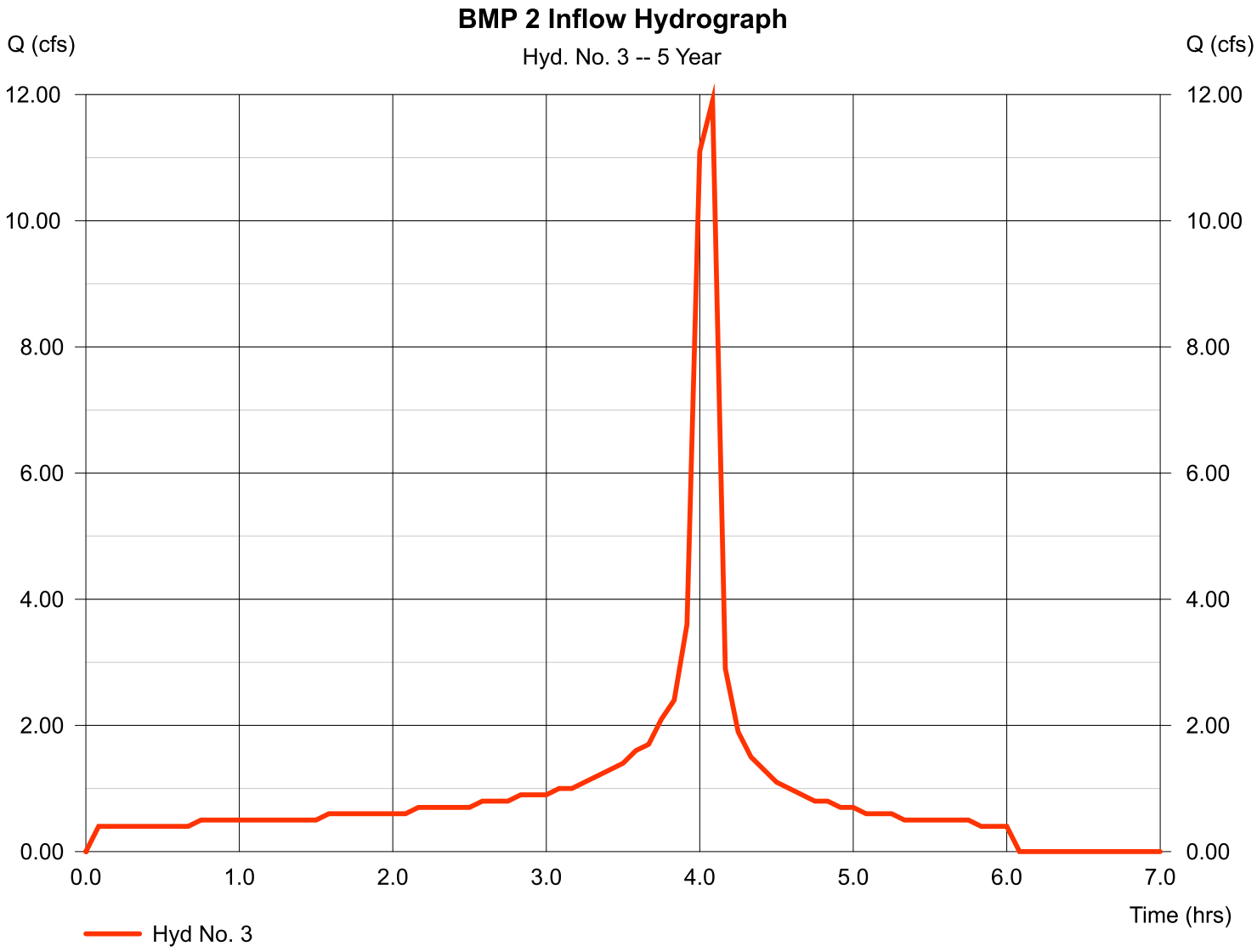
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 12 / 7 / 2022

Hyd. No. 3

BMP 2 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 11.90 cfs
Storm frequency	= 5 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 24,600 cuft



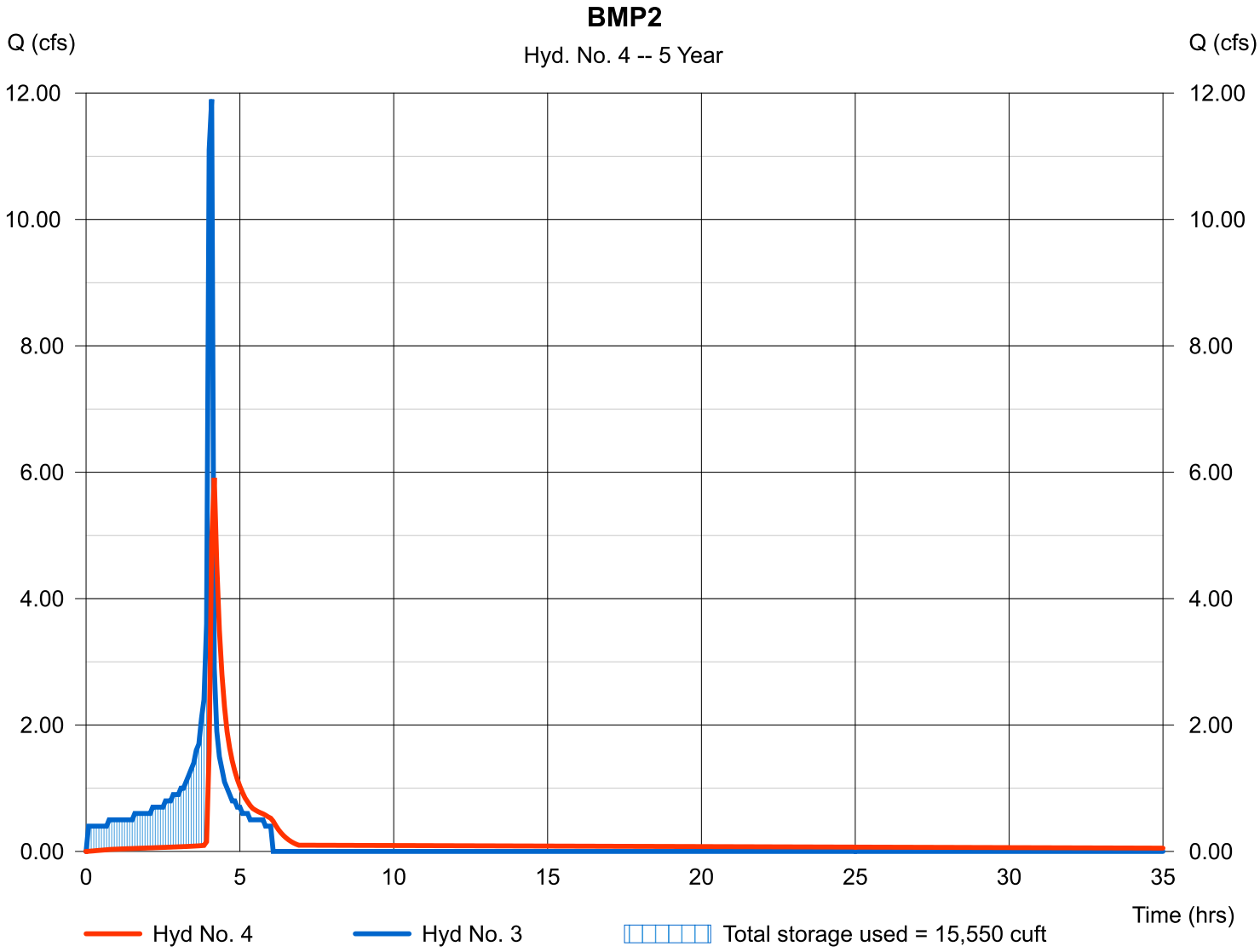
Hydrograph Report

Hyd. No. 4

BMP2

Hydrograph type	=	Reservoir	Peak discharge	=	5.912 cfs
Storm frequency	=	5 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	24,566 cuft
Inflow hyd. No.	=	3 - BMP 2 Inflow Hydrograph	Max. Elevation	=	477.73 ft
Reservoir name	=	BMP 2	Max. Storage	=	15,550 cuft

Storage Indication method used.



Pond Report

Pond No. 2 - BMP 2

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	477.00	n/a	0	0
0.50	477.50	n/a	10,435	10,435
1.00	478.00	n/a	11,245	21,680
1.50	478.50	n/a	12,065	33,745
2.00	479.00	n/a	12,891	46,636

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	2.30	Inactive	0.00
Span (in)	= 12.00	2.30	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 473.50	473.75	476.00	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	0.00	0.00
Crest El. (ft)	= 477.50	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	477.00	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.05	1,044	477.05	6.55 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.031
0.10	2,087	477.10	6.55 ic	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.044
0.15	3,131	477.15	6.55 ic	0.05 ic	0.00	---	0.00	---	---	---	---	---	0.054
0.20	4,174	477.20	6.55 ic	0.06 ic	0.00	---	0.00	---	---	---	---	---	0.062
0.25	5,218	477.25	6.55 ic	0.07 ic	0.00	---	0.00	---	---	---	---	---	0.069
0.30	6,261	477.30	6.55 ic	0.08 ic	0.00	---	0.00	---	---	---	---	---	0.076
0.35	7,305	477.35	6.55 ic	0.08 ic	0.00	---	0.00	---	---	---	---	---	0.082
0.40	8,348	477.40	6.55 ic	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.088
0.45	9,392	477.45	6.55 ic	0.09 ic	0.00	---	0.00	---	---	---	---	---	0.093
0.50	10,435	477.50	6.55 ic	0.10 ic	0.00	---	0.00	---	---	---	---	---	0.098
0.55	11,560	477.55	6.55 ic	0.10 ic	0.00	---	0.60	---	---	---	---	---	0.698
0.60	12,684	477.60	6.55 ic	0.11 ic	0.00	---	1.68	---	---	---	---	---	1.792
0.65	13,809	477.65	6.55 ic	0.11 ic	0.00	---	3.09	---	---	---	---	---	3.206
0.70	14,933	477.70	6.55 ic	0.12 ic	0.00	---	4.76	---	---	---	---	---	4.880
0.75	16,058	477.75	6.76 ic	0.10 ic	0.00	---	6.66	---	---	---	---	---	6.761
0.80	17,182	477.80	7.24 ic	0.05 ic	0.00	---	7.18 s	---	---	---	---	---	7.236
0.85	18,307	477.85	7.34 ic	0.04 ic	0.00	---	7.29 s	---	---	---	---	---	7.334
0.90	19,431	477.90	7.41 ic	0.03 ic	0.00	---	7.38 s	---	---	---	---	---	7.410
0.95	20,556	477.95	7.48 ic	0.03 ic	0.00	---	7.45 s	---	---	---	---	---	7.475
1.00	21,680	478.00	7.53 ic	0.02 ic	0.00	---	7.50 s	---	---	---	---	---	7.529
1.05	22,887	478.05	7.59 ic	0.02 ic	0.00	---	7.57 s	---	---	---	---	---	7.587
1.10	24,093	478.10	7.64 ic	0.02 ic	0.00	---	7.61 s	---	---	---	---	---	7.628
1.15	25,300	478.15	7.69 ic	0.02 ic	0.00	---	7.65 s	---	---	---	---	---	7.671
1.20	26,506	478.20	7.74 ic	0.02 ic	0.00	---	7.71 s	---	---	---	---	---	7.729
1.25	27,713	478.25	7.79 ic	0.01 ic	0.00	---	7.76 s	---	---	---	---	---	7.770
1.30	28,919	478.30	7.83 ic	0.01 ic	0.00	---	7.81 s	---	---	---	---	---	7.822
1.35	30,126	478.35	7.88 ic	0.01 ic	0.00	---	7.85 s	---	---	---	---	---	7.861
1.40	31,332	478.40	7.93 ic	0.01 ic	0.00	---	7.91 s	---	---	---	---	---	7.919
1.45	32,539	478.45	7.97 ic	0.01 ic	0.00	---	7.92 s	---	---	---	---	---	7.930
1.50	33,745	478.50	8.02 ic	0.01 ic	0.00	---	7.97 s	---	---	---	---	---	7.977
1.55	35,034	478.55	8.06 ic	0.01 ic	0.00	---	7.99 s	---	---	---	---	---	8.000
1.60	36,323	478.60	8.11 ic	0.01 ic	0.00	---	8.09 s	---	---	---	---	---	8.101
1.65	37,612	478.65	8.15 ic	0.01 ic	0.00	---	8.05 s	---	---	---	---	---	8.062
1.70	38,901	478.70	8.19 ic	0.01 ic	0.00	---	8.13 s	---	---	---	---	---	8.140
1.75	40,191	478.75	8.24 ic	0.01 ic	0.00	---	8.17 s	---	---	---	---	---	8.178
1.80	41,480	478.80	8.28 ic	0.01 ic	0.00	---	8.16 s	---	---	---	---	---	8.162
1.85	42,769	478.85	8.33 ic	0.01 ic	0.00	---	8.22 s	---	---	---	---	---	8.230
1.90	44,058	478.90	8.37 ic	0.01 ic	0.00	---	8.24 s	---	---	---	---	---	8.248

Continues on next page...

BMP 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
1.95	45,347	478.95	8.41 ic	0.01 ic	0.00	---	8.40 s	---	---	---	---	---	8.407
2.00	46,636	479.00	8.45 ic	0.01 ic	0.00	---	8.40 s	---	---	---	---	---	8.402

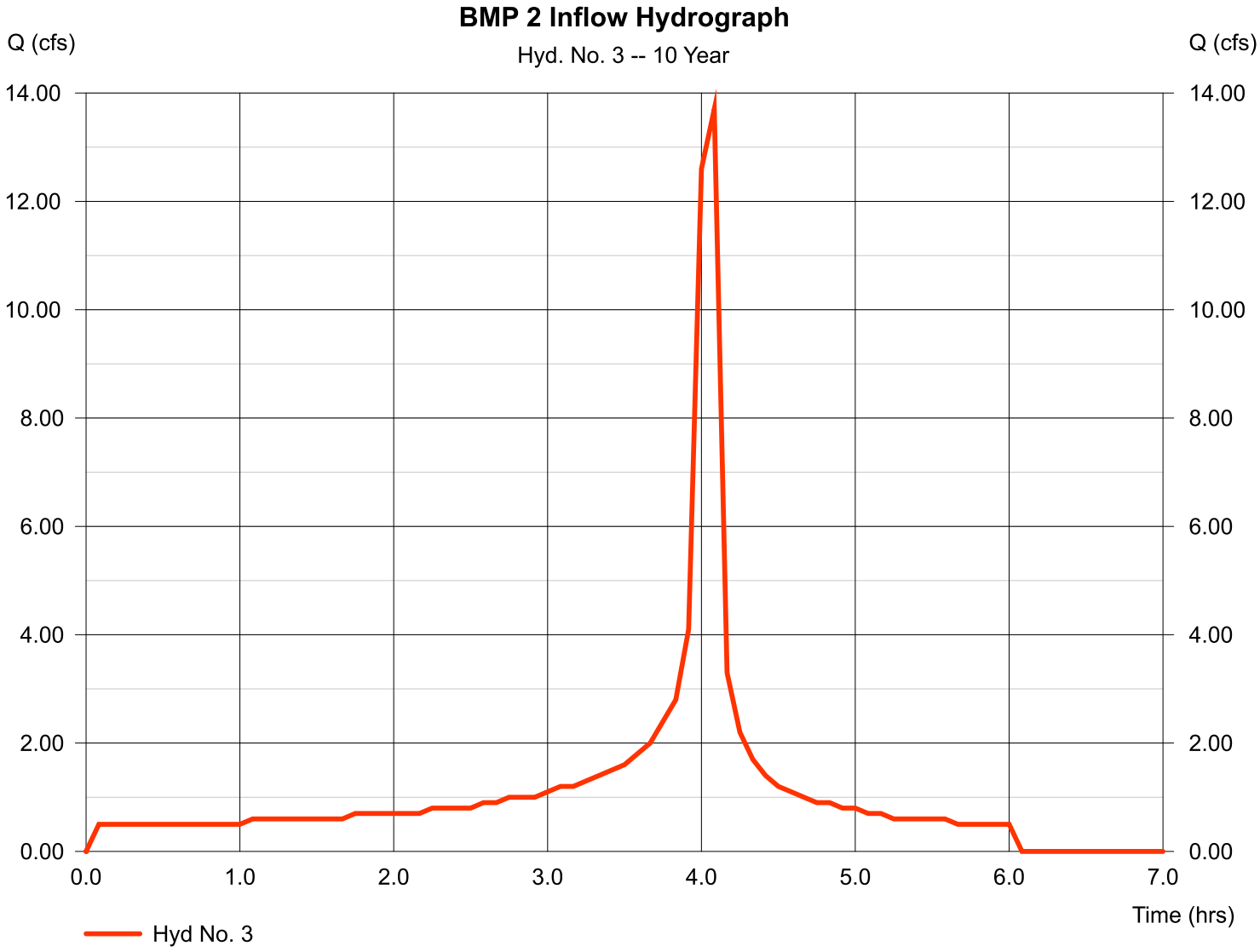
...End

Hydrograph Report

Hyd. No. 3

BMP 2 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 13.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 28,170 cuft



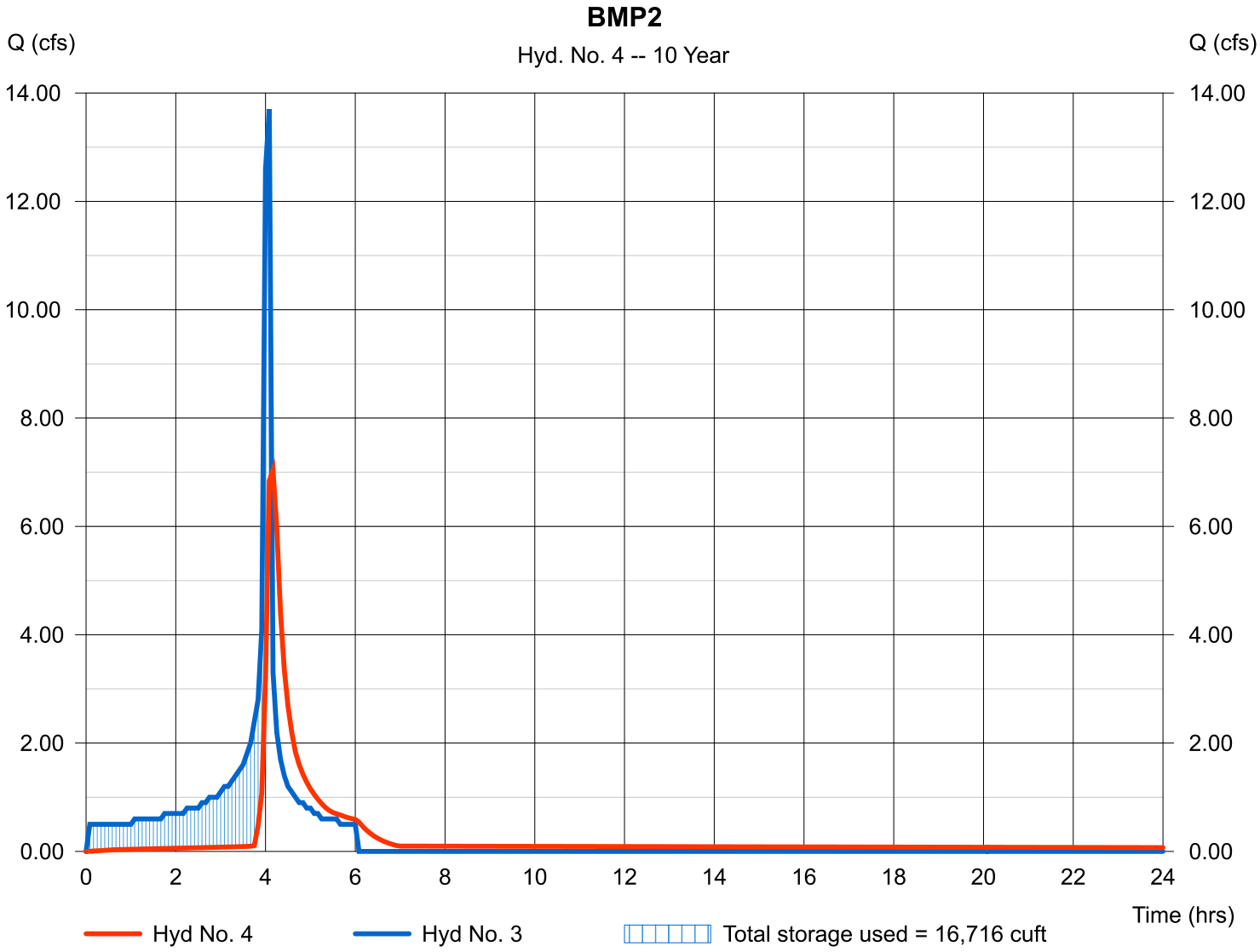
Hydrograph Report

Hyd. No. 4

BMP2

Hydrograph type	=	Reservoir	Peak discharge	=	7.039 cfs
Storm frequency	=	10 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	28,137 cuft
Inflow hyd. No.	=	3 - BMP 2 Inflow Hydrograph	Max. Elevation	=	477.78 ft
Reservoir name	=	BMP 2	Max. Storage	=	16,716 cuft

Storage Indication method used.

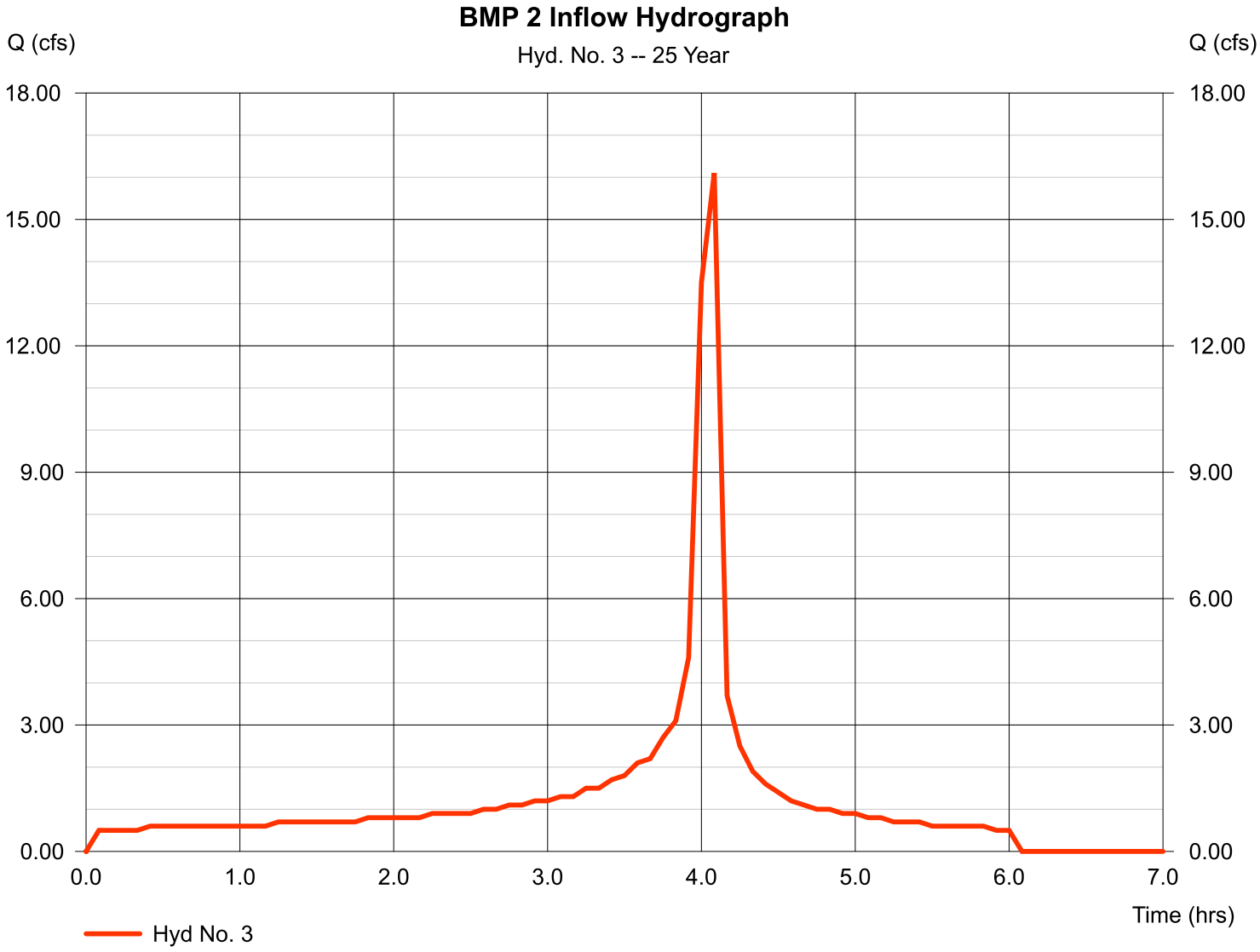


Hydrograph Report

Hyd. No. 3

BMP 2 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 16.10 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 31,620 cuft



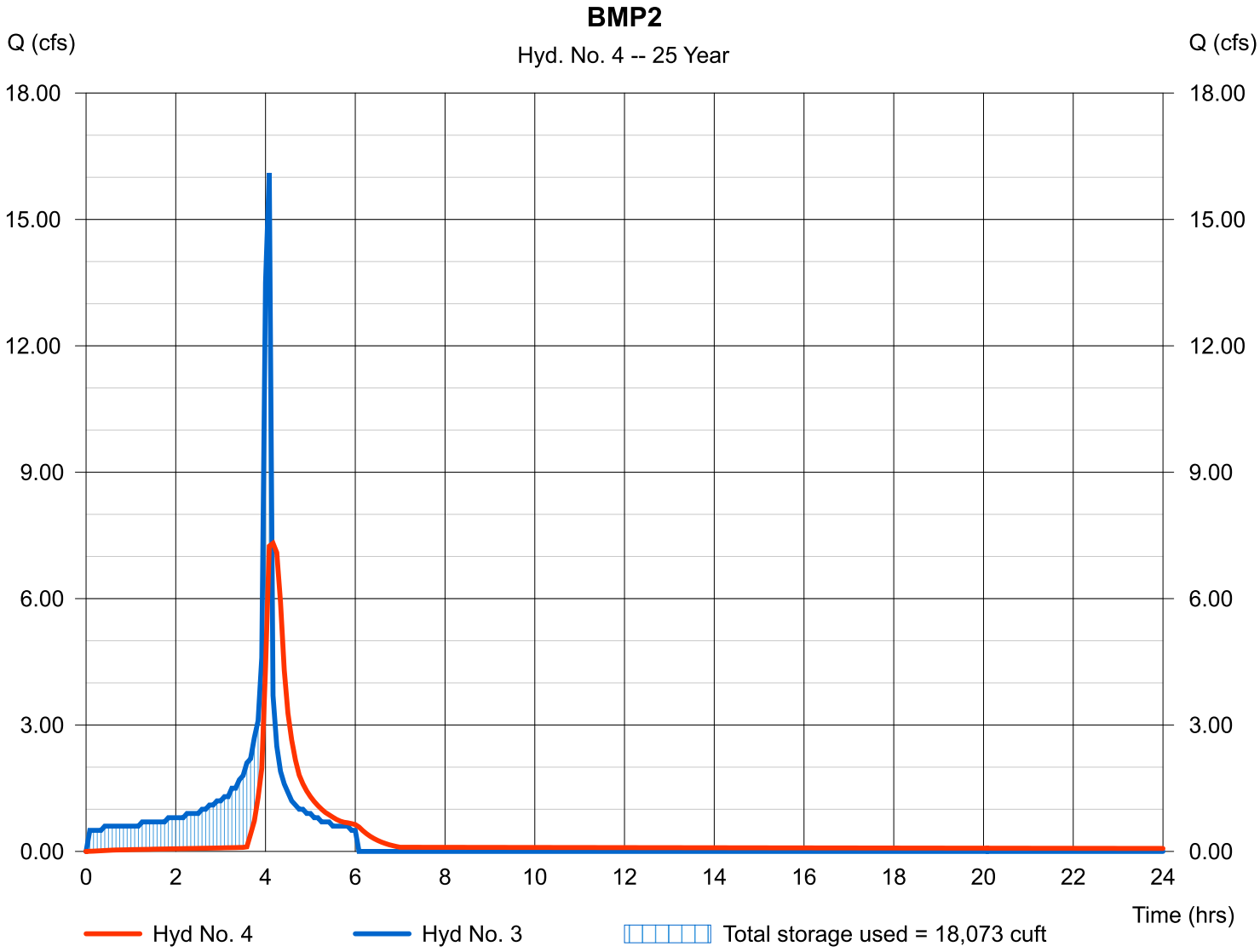
Hydrograph Report

Hyd. No. 4

BMP2

Hydrograph type	=	Reservoir	Peak discharge	=	7.314 cfs
Storm frequency	=	25 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	31,586 cuft
Inflow hyd. No.	=	3 - BMP 2 Inflow Hydrograph	Max. Elevation	=	477.84 ft
Reservoir name	=	BMP 2	Max. Storage	=	18,073 cuft

Storage Indication method used.

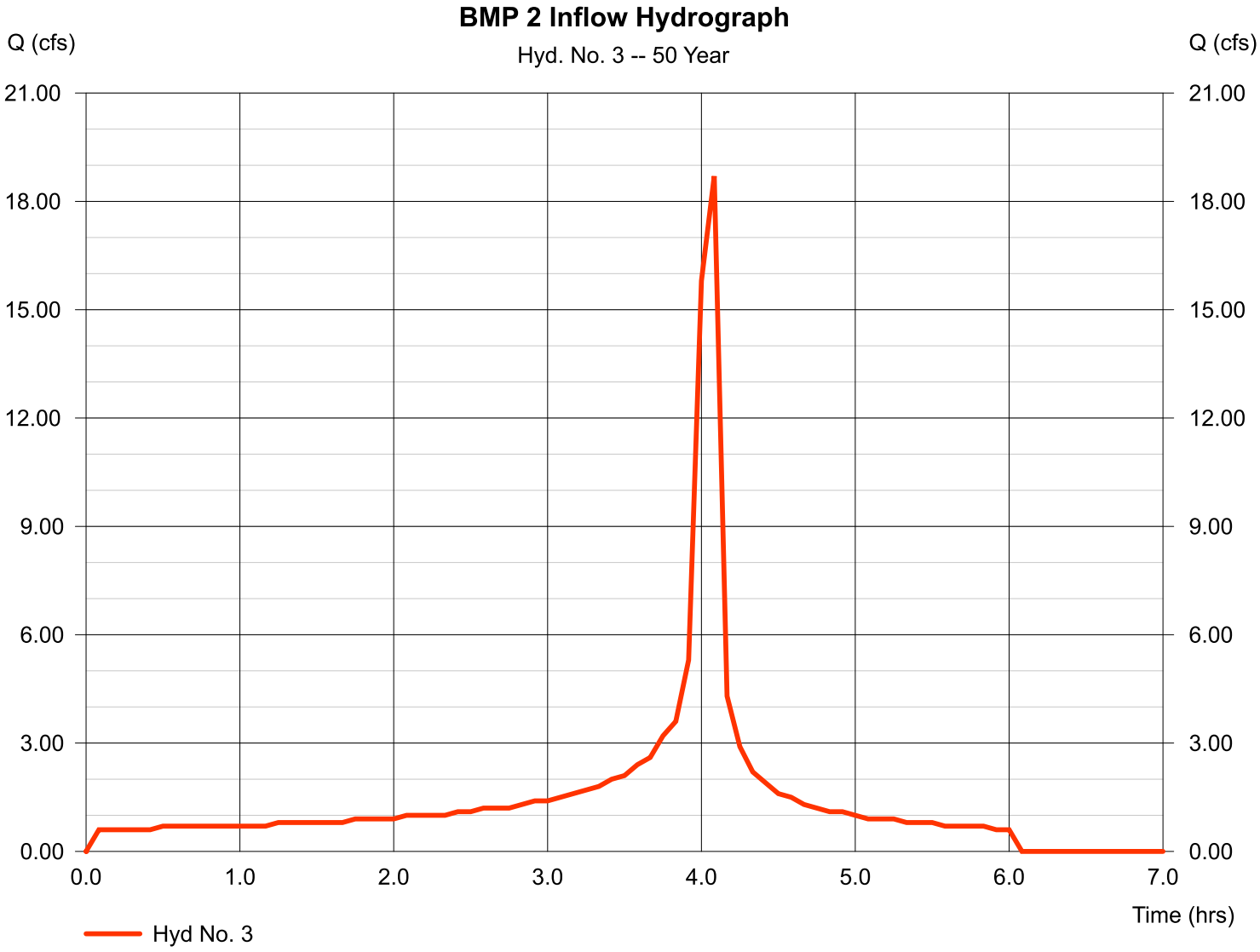


Hydrograph Report

Hyd. No. 3

BMP 2 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 18.70 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 36,930 cuft



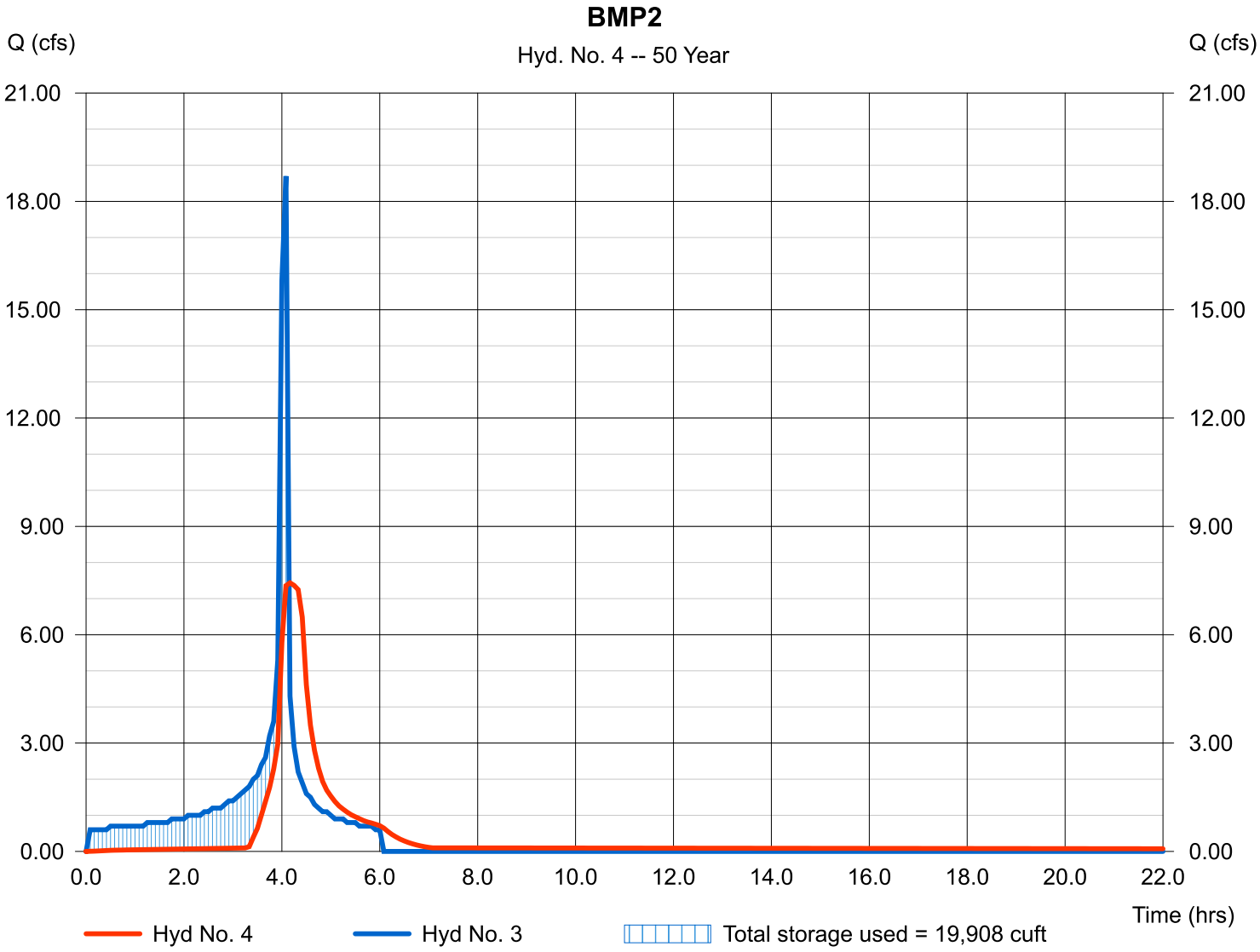
Hydrograph Report

Hyd. No. 4

BMP2

Hydrograph type	=	Reservoir	Peak discharge	=	7.437 cfs
Storm frequency	=	50 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	36,896 cuft
Inflow hyd. No.	=	3 - BMP 2 Inflow Hydrograph	Max. Elevation	=	477.92 ft
Reservoir name	=	BMP 2	Max. Storage	=	19,908 cuft

Storage Indication method used.

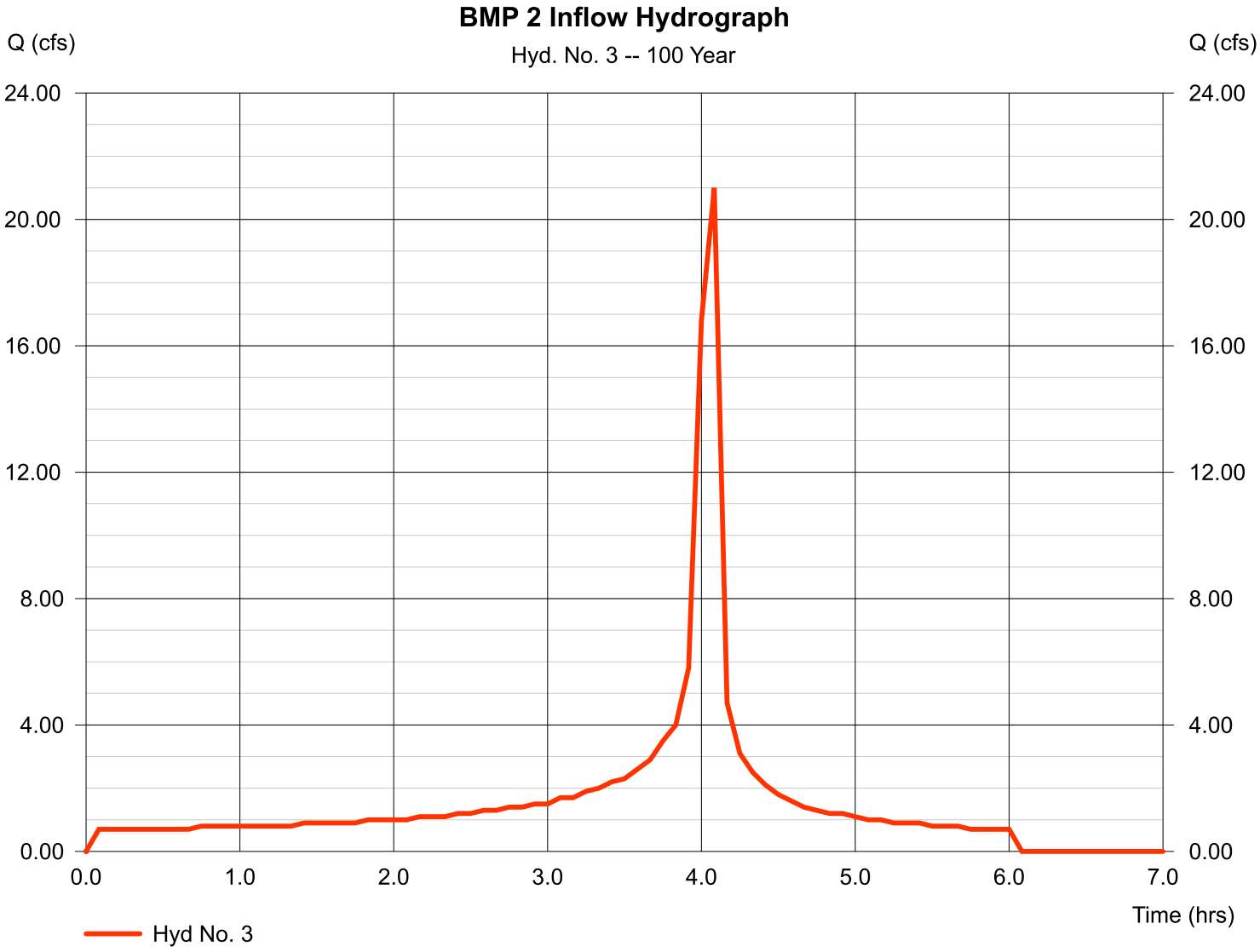


Hydrograph Report

Hyd. No. 3

BMP 2 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 21.00 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 40,470 cuft



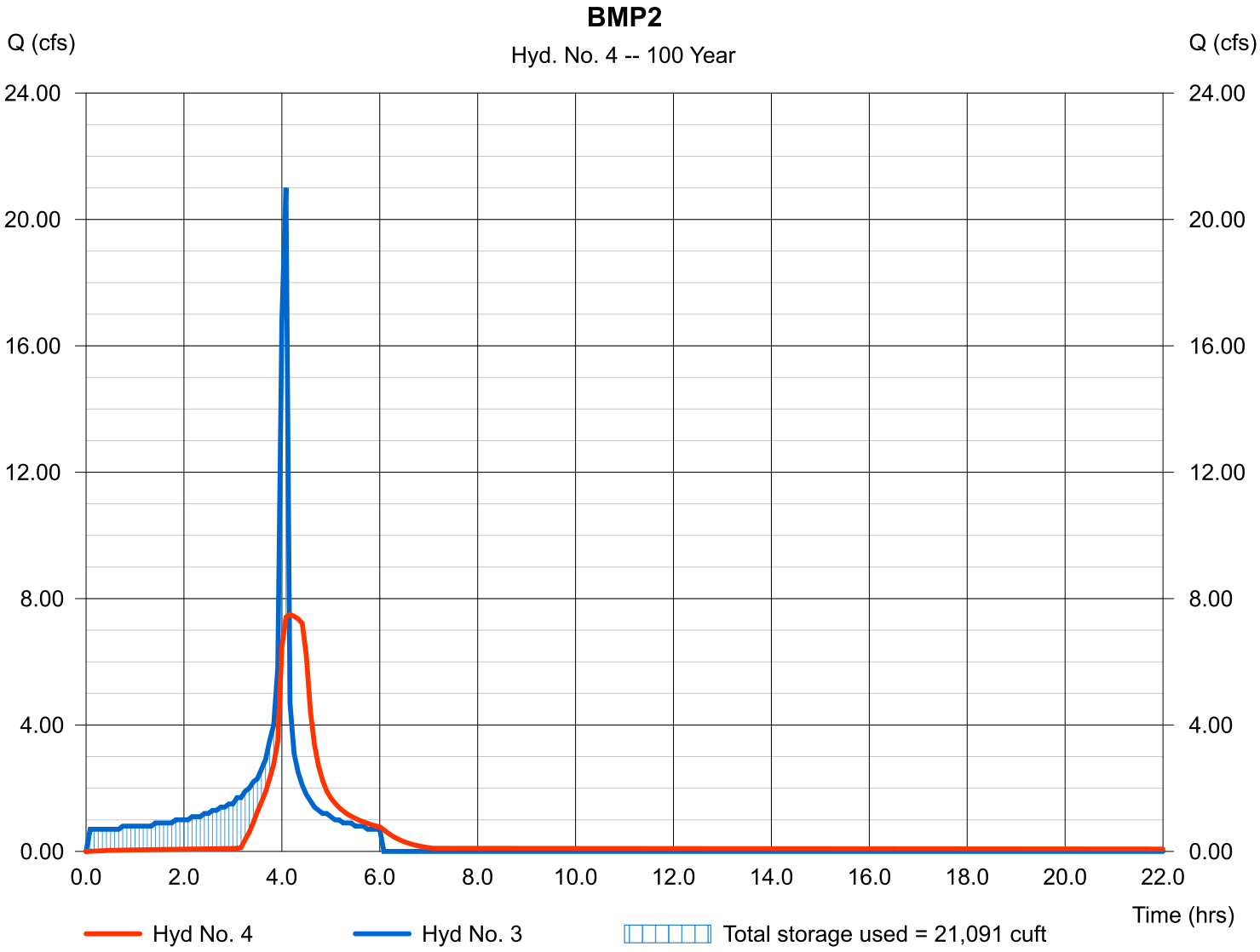
Hydrograph Report

Hyd. No. 4

BMP2

Hydrograph type	=	Reservoir	Peak discharge	=	7.501 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	40,436 cuft
Inflow hyd. No.	=	3 - BMP 2 Inflow Hydrograph	Max. Elevation	=	477.97 ft
Reservoir name	=	BMP 2	Max. Storage	=	21,091 cuft

Storage Indication method used.



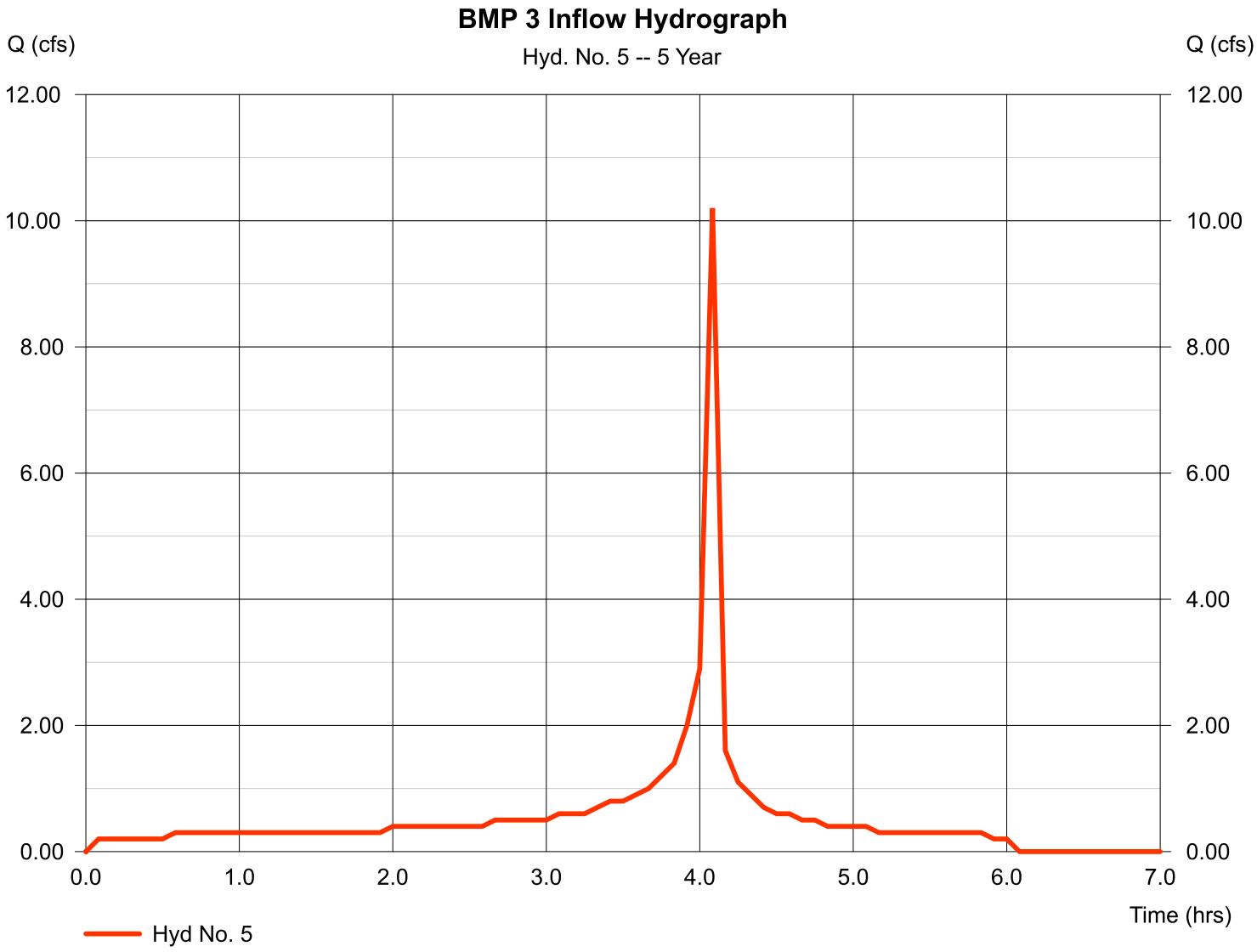
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Wednesday, 12 / 7 / 2022

Hyd. No. 5

BMP 3 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 10.20 cfs
Storm frequency	= 5 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 14,070 cuft



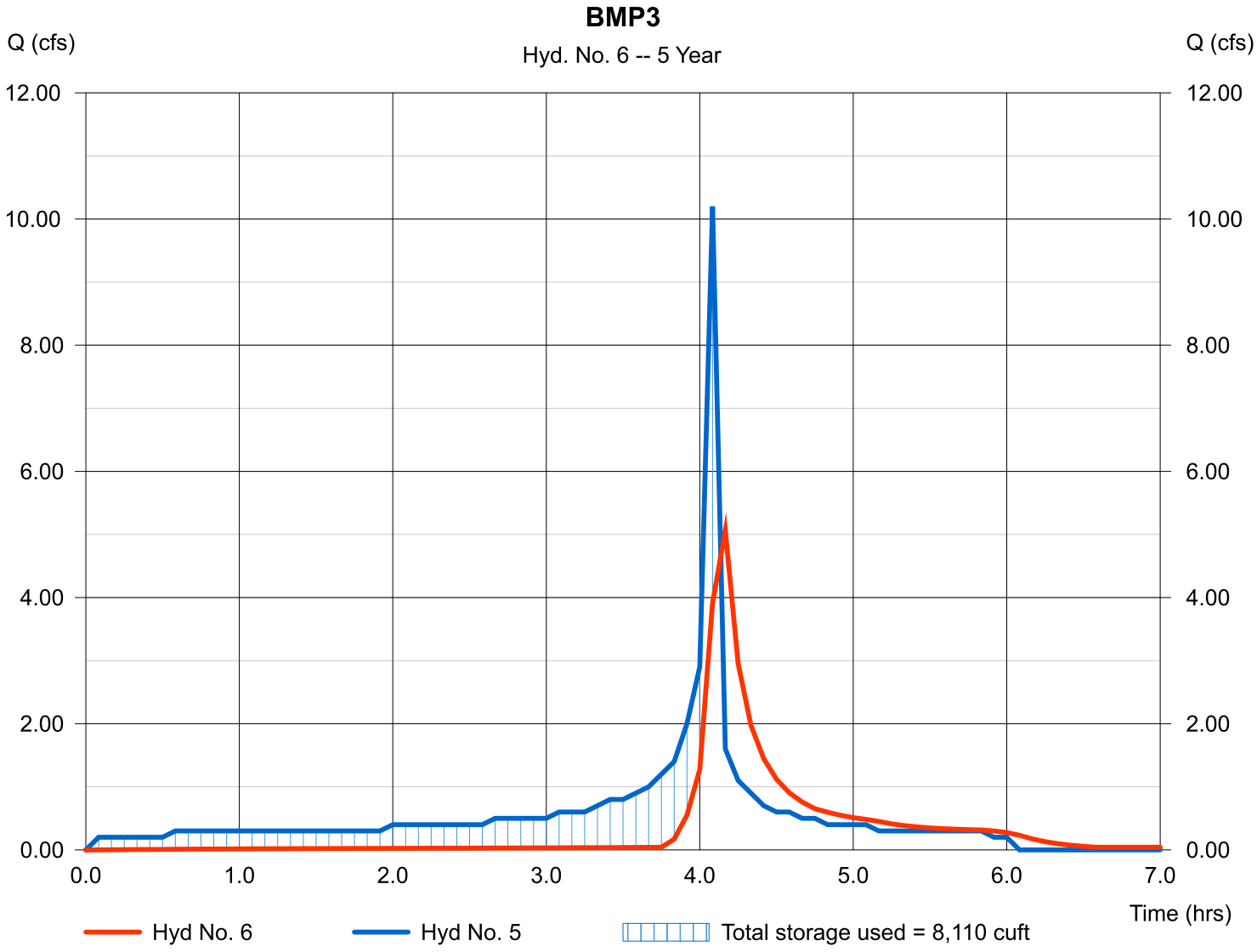
Hydrograph Report

Hyd. No. 6

BMP3

Hydrograph type	=	Reservoir	Peak discharge	=	5.063 cfs
Storm frequency	=	5 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	14,028 cuft
Inflow hyd. No.	=	5 - BMP 3 Inflow Hydrograph	Max. Elevation	=	479.21 ft
Reservoir name	=	BMP 3	Max. Storage	=	8,110 cuft

Storage Indication method used.



Pond Report

Pond No. 3 - BMP 3

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	478.50	n/a	0	0
0.50	479.00	n/a	5,500	5,500
1.00	479.50	n/a	6,316	11,816
1.50	480.00	n/a	7,139	18,955
2.00	480.50	n/a	7,969	26,924

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	1.50	Inactive	0.00
Span (in)	= 12.00	1.50	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 474.50	474.75	477.40	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	0.00	0.00
Crest El. (ft)	= 479.00	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	478.50	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.05	550	478.55	7.07 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.013
0.10	1,100	478.60	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.019
0.15	1,650	478.65	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.023
0.20	2,200	478.70	7.07 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.026
0.25	2,750	478.75	7.07 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.030
0.30	3,300	478.80	7.07 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.032
0.35	3,850	478.85	7.07 ic	0.03 ic	0.00	---	0.00	---	---	---	---	---	0.035
0.40	4,400	478.90	7.07 ic	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.037
0.45	4,950	478.95	7.07 ic	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.040
0.50	5,500	479.00	7.07 ic	0.04 ic	0.00	---	0.00	---	---	---	---	---	0.042
0.55	6,132	479.05	7.07 ic	0.04 ic	0.00	---	0.60	---	---	---	---	---	0.639
0.60	6,763	479.10	7.07 ic	0.05 ic	0.00	---	1.68	---	---	---	---	---	1.730
0.65	7,395	479.15	7.07 ic	0.05 ic	0.00	---	3.09	---	---	---	---	---	3.142
0.70	8,026	479.20	7.07 ic	0.05 ic	0.00	---	4.76	---	---	---	---	---	4.813
0.75	8,658	479.25	7.07 ic	0.05 ic	0.00	---	6.66	---	---	---	---	---	6.709
0.80	9,290	479.30	7.69 ic	0.02 ic	0.00	---	7.66 s	---	---	---	---	---	7.685
0.85	9,921	479.35	7.79 ic	0.02 ic	0.00	---	7.77 s	---	---	---	---	---	7.793
0.90	10,553	479.40	7.87 ic	0.02 ic	0.00	---	7.85 s	---	---	---	---	---	7.868
0.95	11,184	479.45	7.93 ic	0.01 ic	0.00	---	7.92 s	---	---	---	---	---	7.930
1.00	11,816	479.50	7.99 ic	0.01 ic	0.00	---	7.97 s	---	---	---	---	---	7.986
1.05	12,530	479.55	8.04 ic	0.01 ic	0.00	---	8.02 s	---	---	---	---	---	8.033
1.10	13,244	479.60	8.09 ic	0.01 ic	0.00	---	8.08 s	---	---	---	---	---	8.087
1.15	13,958	479.65	8.14 ic	0.01 ic	0.00	---	8.13 s	---	---	---	---	---	8.138
1.20	14,672	479.70	8.18 ic	0.01 ic	0.00	---	8.16 s	---	---	---	---	---	8.171
1.25	15,386	479.75	8.23 ic	0.01 ic	0.00	---	8.22 s	---	---	---	---	---	8.226
1.30	16,099	479.80	8.28 ic	0.01 ic	0.00	---	8.26 s	---	---	---	---	---	8.270
1.35	16,813	479.85	8.32 ic	0.01 ic	0.00	---	8.31 s	---	---	---	---	---	8.312
1.40	17,527	479.90	8.36 ic	0.01 ic	0.00	---	8.35 s	---	---	---	---	---	8.357
1.45	18,241	479.95	8.41 ic	0.00 ic	0.00	---	8.38 s	---	---	---	---	---	8.389
1.50	18,955	480.00	8.45 ic	0.00 ic	0.00	---	8.44 s	---	---	---	---	---	8.445
1.55	19,752	480.05	8.49 ic	0.00 ic	0.00	---	8.46 s	---	---	---	---	---	8.464
1.60	20,549	480.10	8.54 ic	0.00 ic	0.00	---	8.47 s	---	---	---	---	---	8.474
1.65	21,346	480.15	8.58 ic	0.00 ic	0.00	---	8.56 s	---	---	---	---	---	8.567
1.70	22,143	480.20	8.62 ic	0.00 ic	0.00	---	8.61 s	---	---	---	---	---	8.613
1.75	22,940	480.25	8.66 ic	0.00 ic	0.00	---	8.59 s	---	---	---	---	---	8.598
1.80	23,736	480.30	8.70 ic	0.00 ic	0.00	---	8.62 s	---	---	---	---	---	8.624
1.85	24,533	480.35	8.74 ic	0.00 ic	0.00	---	8.73 s	---	---	---	---	---	8.737
1.90	25,330	480.40	8.78 ic	0.00 ic	0.00	---	8.67 s	---	---	---	---	---	8.671

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BMP 3

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
1.95	26,127	480.45	8.83 ic	0.00 ic	0.00	---	8.70 s	---	---	---	---	---	8.699
2.00	26,924	480.50	8.87 ic	0.00 ic	0.00	---	8.71 s	---	---	---	---	---	8.712

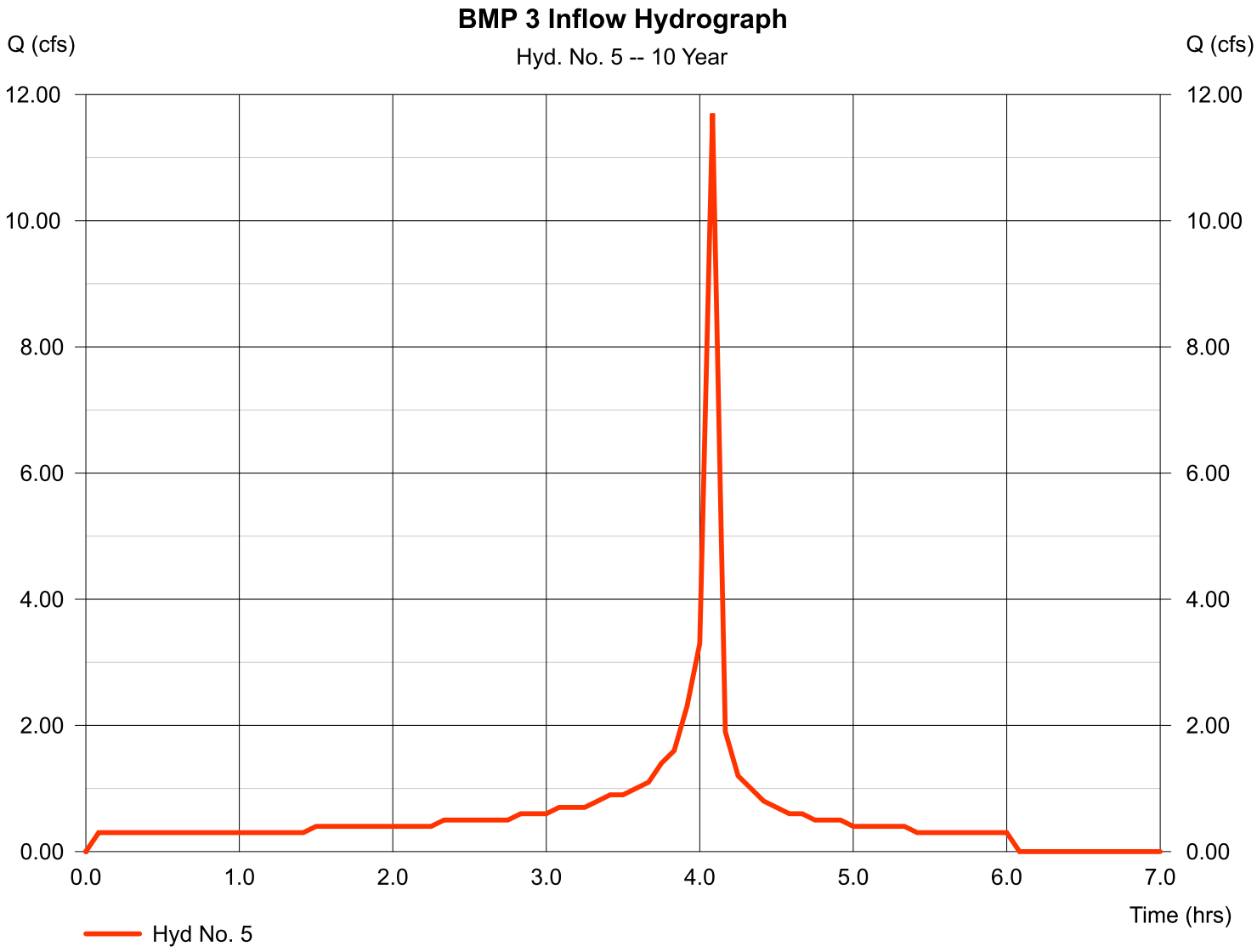
...End

Hydrograph Report

Hyd. No. 5

BMP 3 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 11.70 cfs
Storm frequency	= 10 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 16,110 cuft



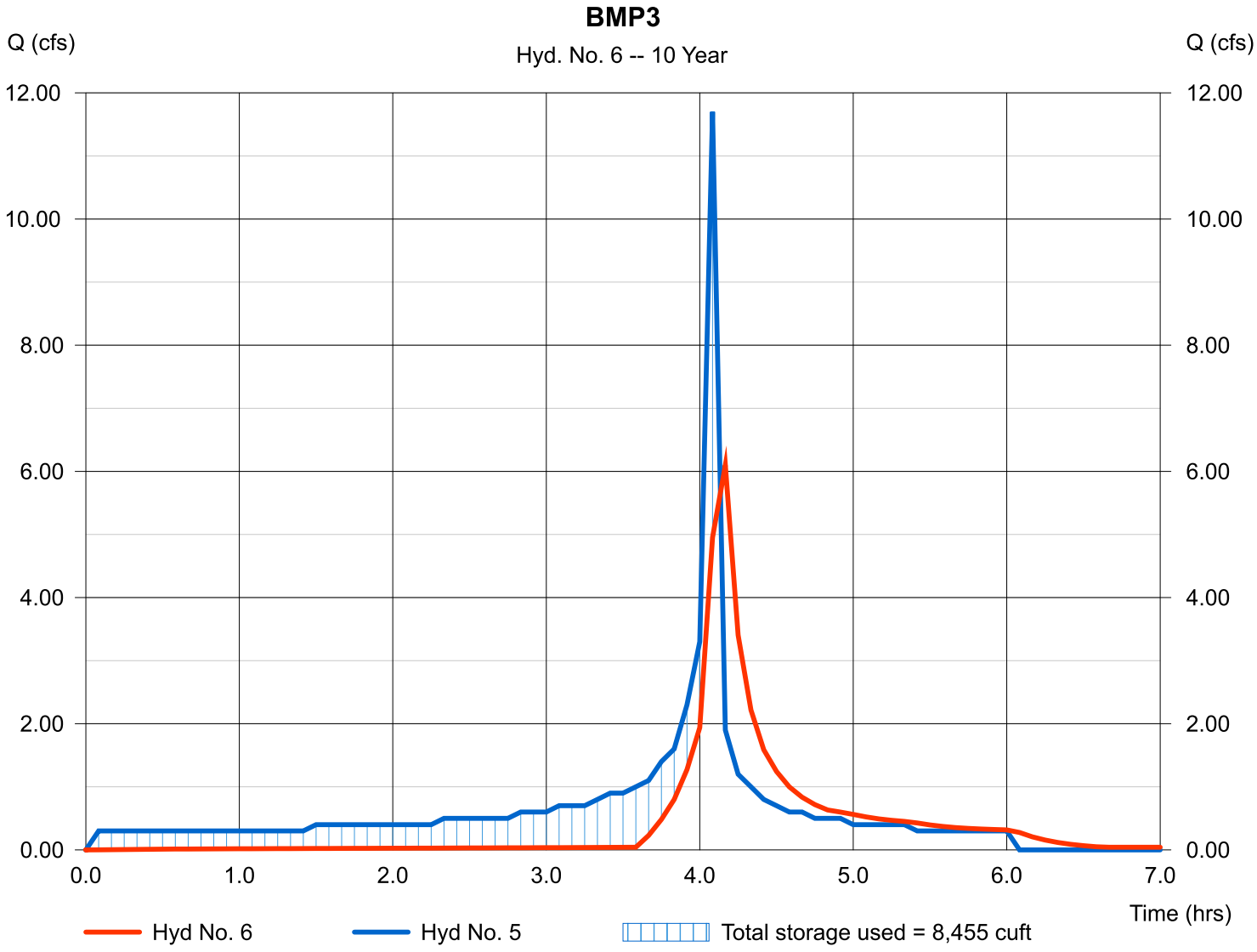
Hydrograph Report

Hyd. No. 6

BMP3

Hydrograph type	=	Reservoir	Peak discharge	=	6.100 cfs
Storm frequency	=	10 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	16,068 cuft
Inflow hyd. No.	=	5 - BMP 3 Inflow Hydrograph	Max. Elevation	=	479.23 ft
Reservoir name	=	BMP 3	Max. Storage	=	8,455 cuft

Storage Indication method used.

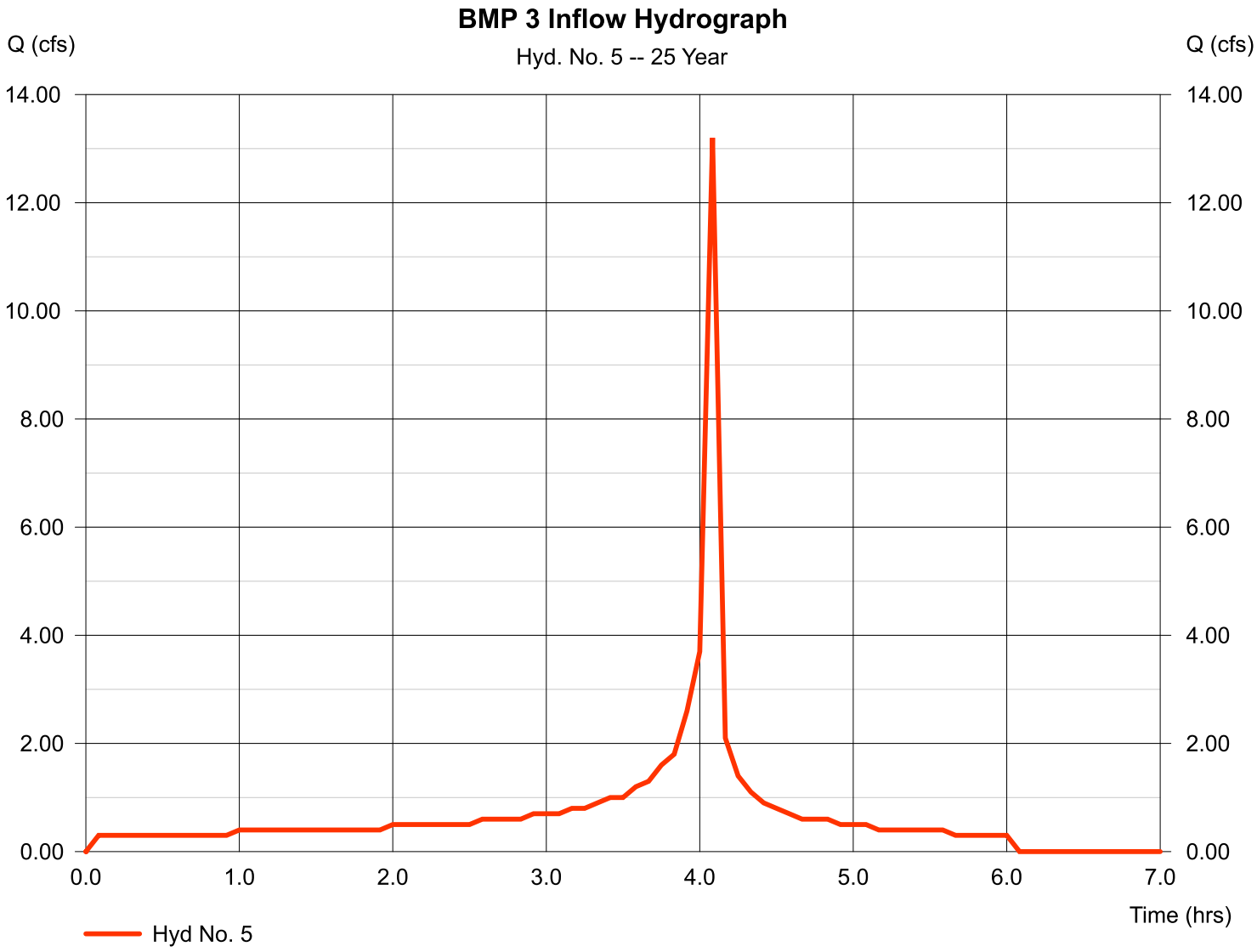


Hydrograph Report

Hyd. No. 5

BMP 3 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 13.20 cfs
Storm frequency	= 25 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 18,060 cuft



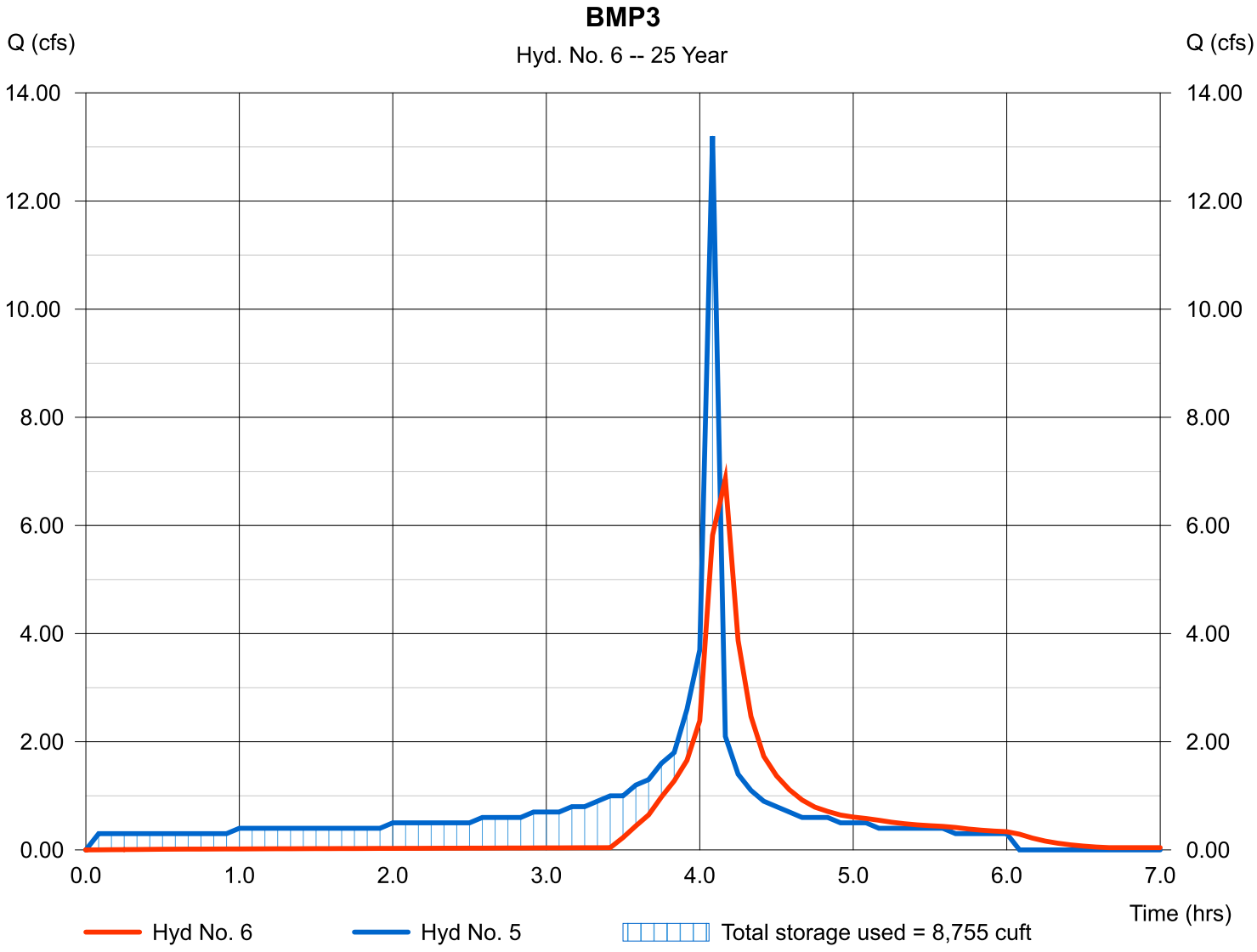
Hydrograph Report

Hyd. No. 6

BMP3

Hydrograph type	=	Reservoir	Peak discharge	=	6.859 cfs
Storm frequency	=	25 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	18,018 cuft
Inflow hyd. No.	=	5 - BMP 3 Inflow Hydrograph	Max. Elevation	=	479.26 ft
Reservoir name	=	BMP 3	Max. Storage	=	8,755 cuft

Storage Indication method used.

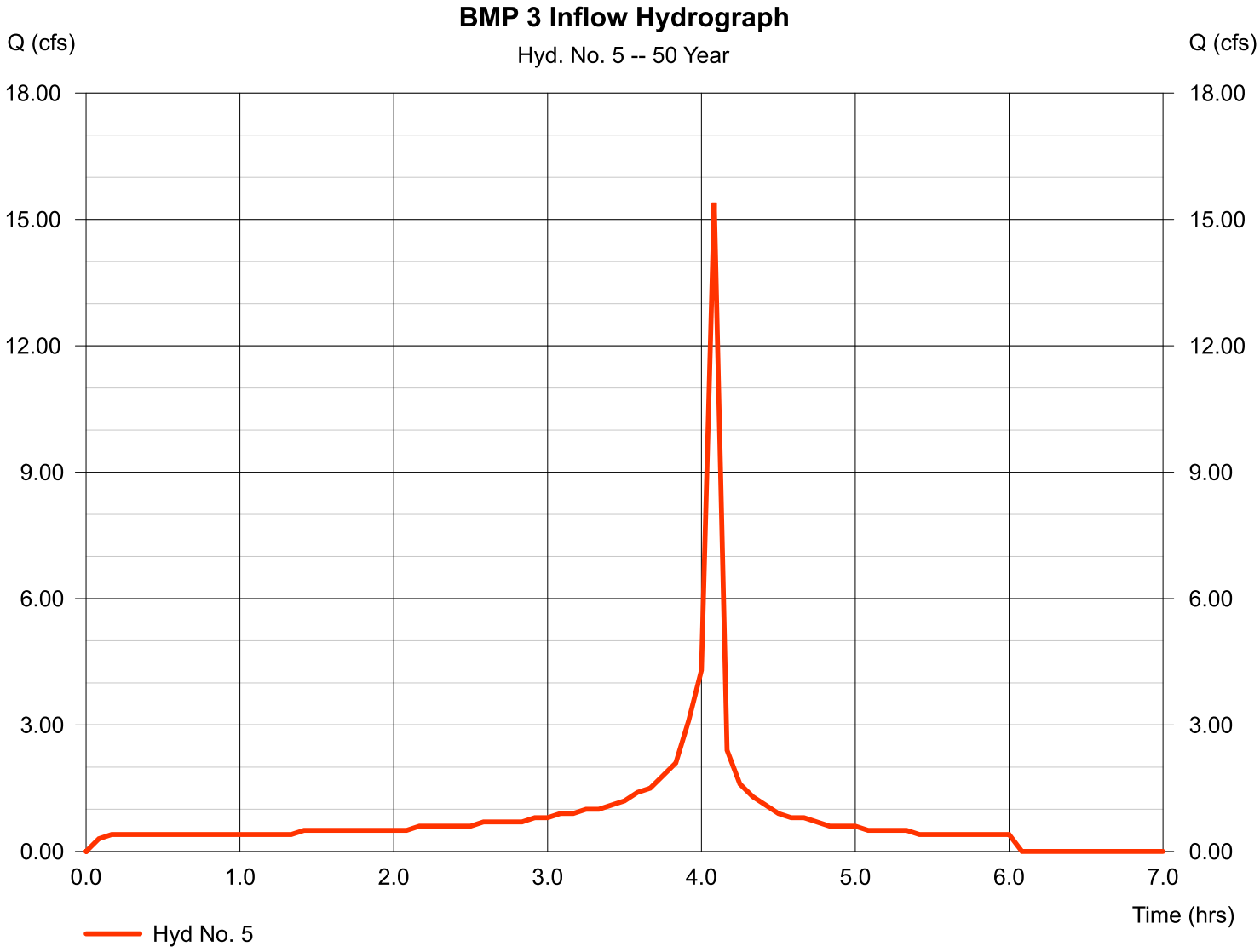


Hydrograph Report

Hyd. No. 5

BMP 3 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 15.40 cfs
Storm frequency	= 50 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 21,150 cuft



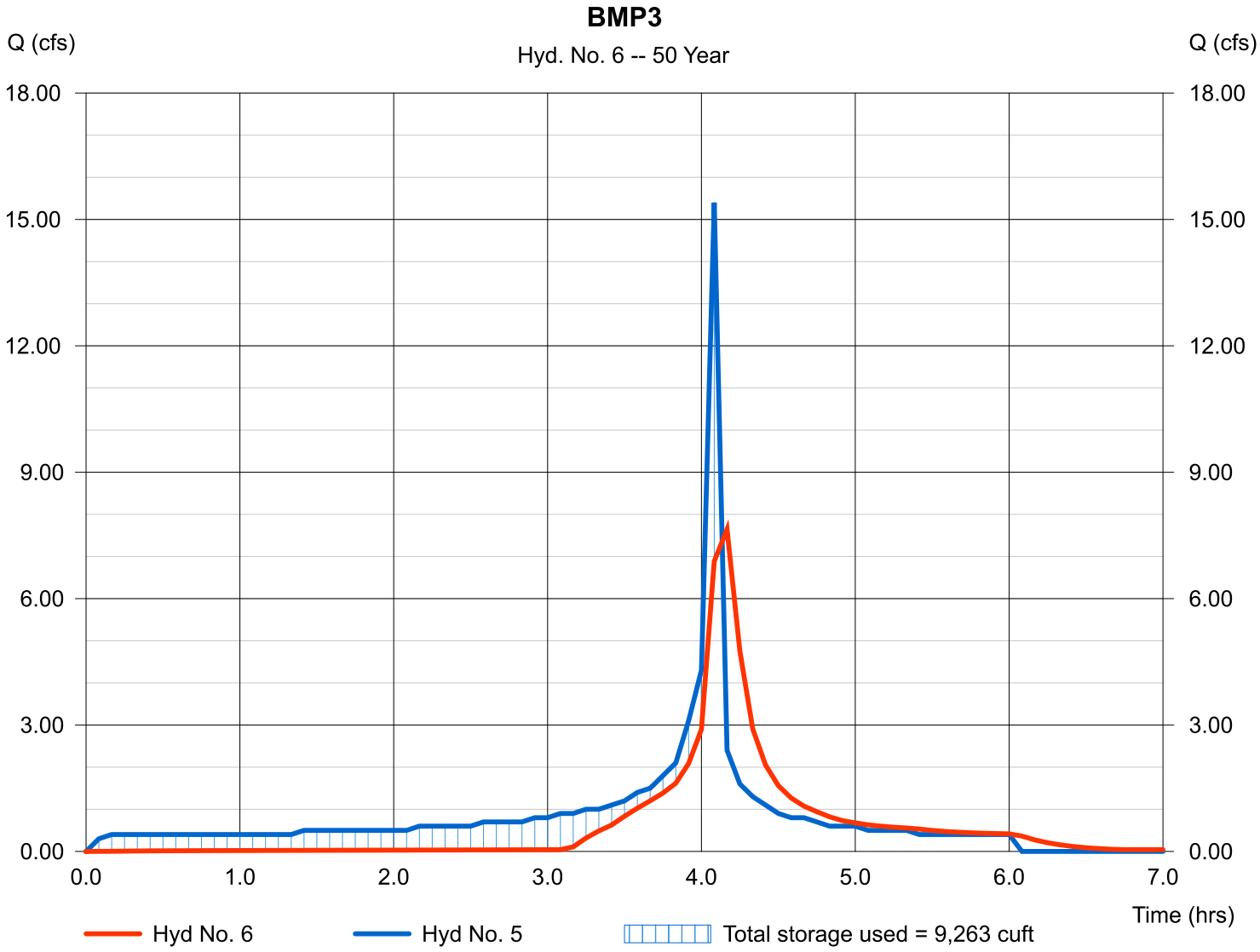
Hydrograph Report

Hyd. No. 6

BMP3

Hydrograph type	=	Reservoir	Peak discharge	=	7.644 cfs
Storm frequency	=	50 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	21,108 cuft
Inflow hyd. No.	=	5 - BMP 3 Inflow Hydrograph	Max. Elevation	=	479.30 ft
Reservoir name	=	BMP 3	Max. Storage	=	9,263 cuft

Storage Indication method used.

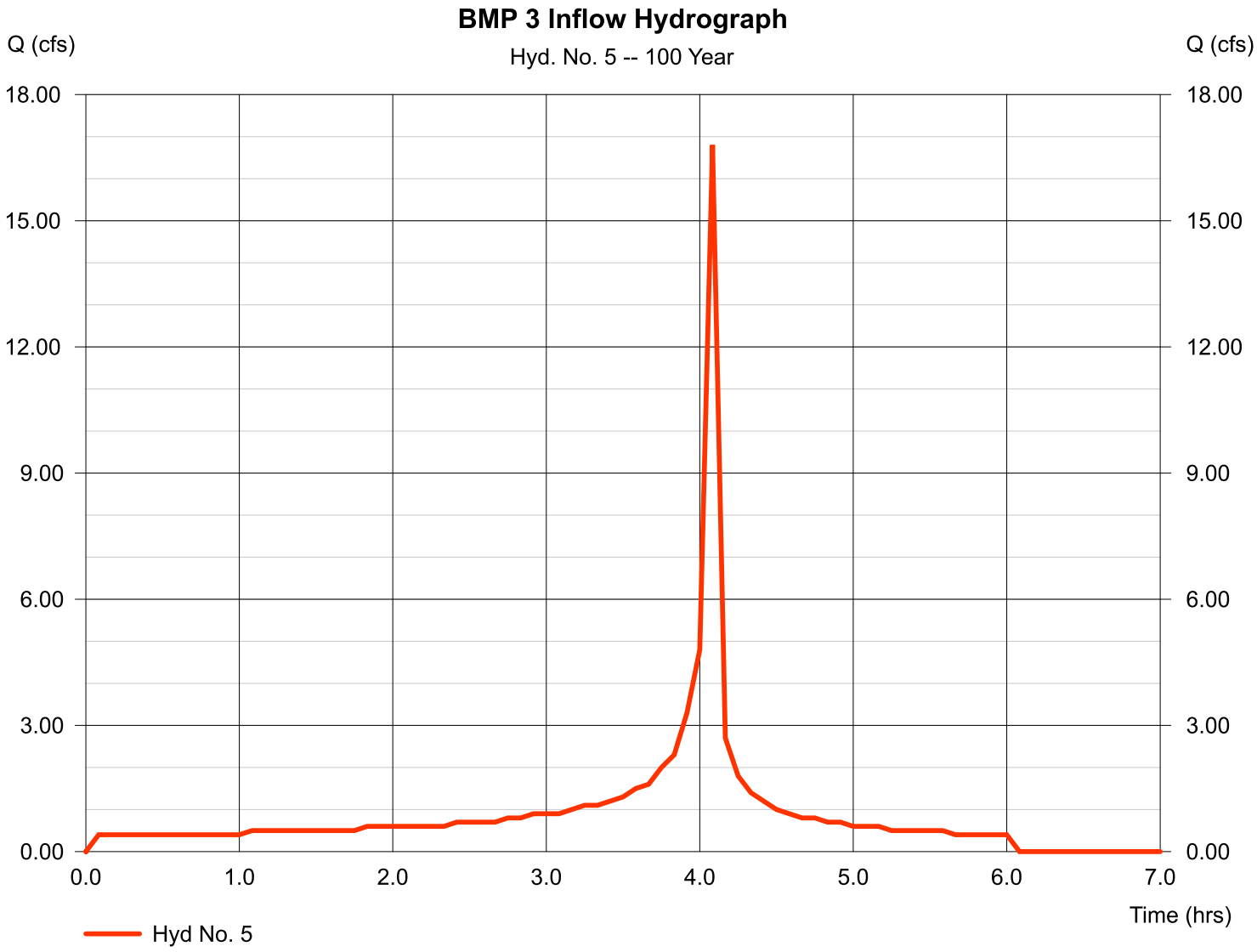


Hydrograph Report

Hyd. No. 5

BMP 3 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 16.80 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 23,070 cuft



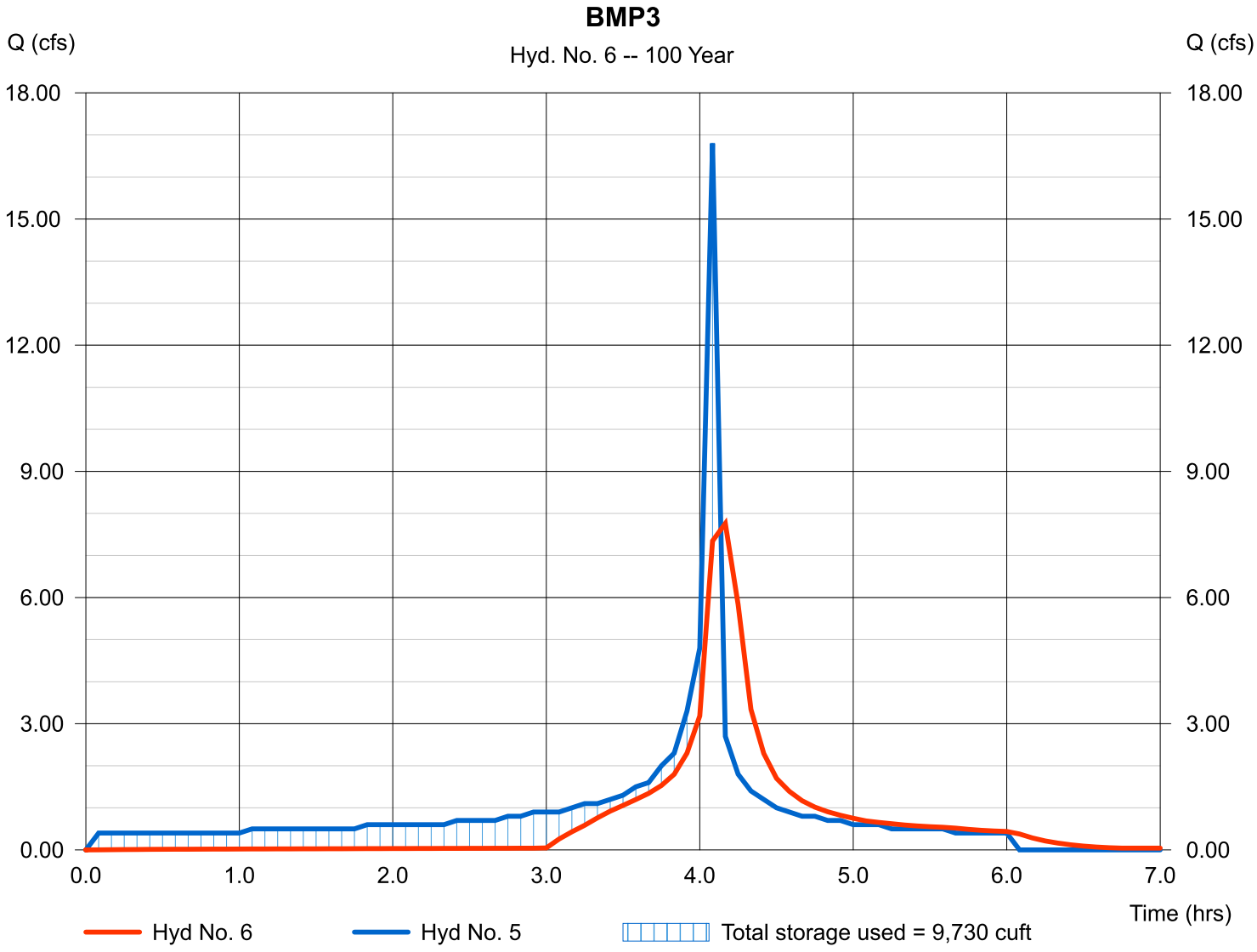
Hydrograph Report

Hyd. No. 6

BMP3

Hydrograph type	=	Reservoir	Peak discharge	=	7.760 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	23,028 cuft
Inflow hyd. No.	=	5 - BMP 3 Inflow Hydrograph	Max. Elevation	=	479.33 ft
Reservoir name	=	BMP 3	Max. Storage	=	9,730 cuft

Storage Indication method used.



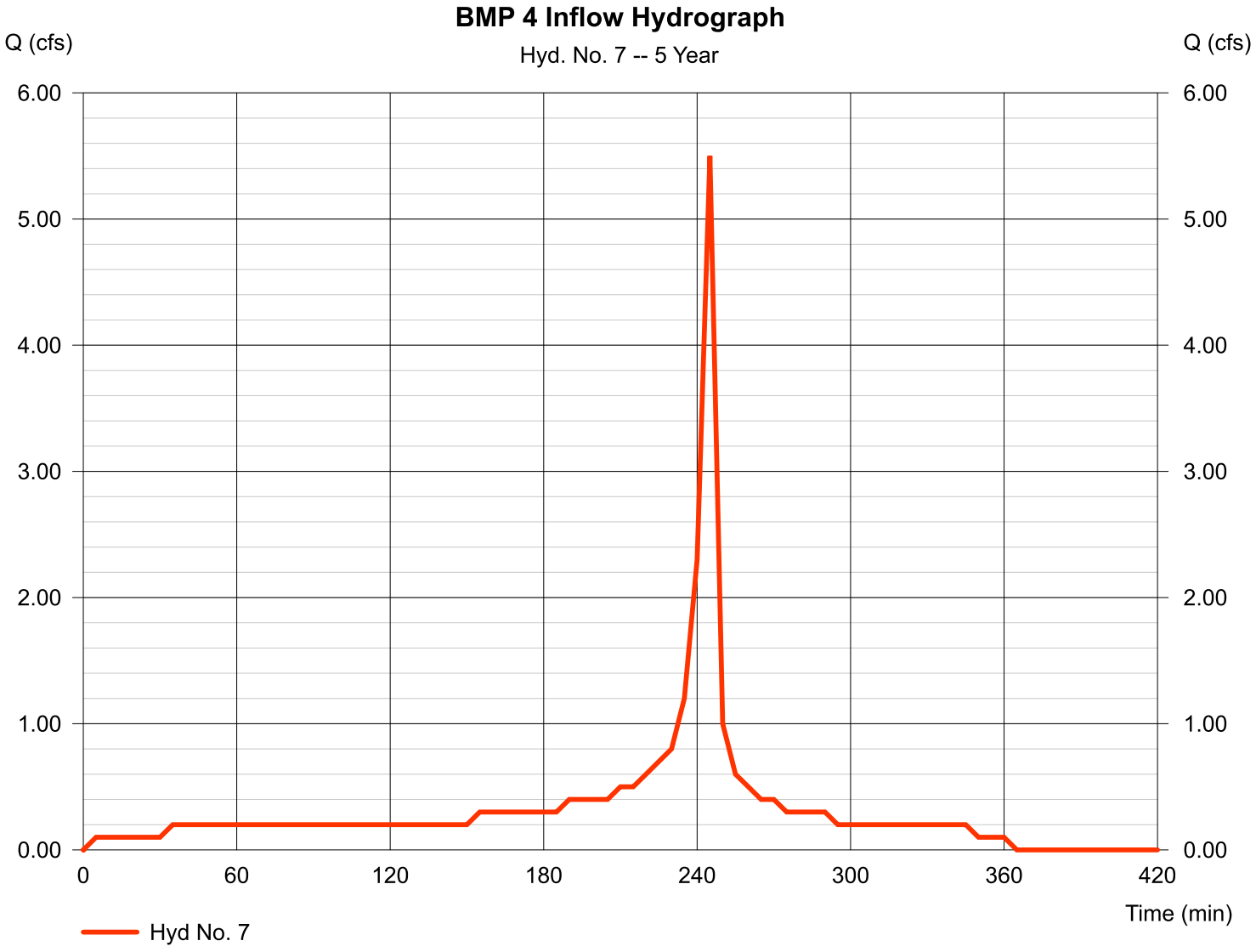
Hydrograph Report

Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 12 / 20 / 2022

Hyd. No. 7

BMP 4 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 5.500 cfs
Storm frequency	= 5 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 8,340 cuft



Hydrograph Report

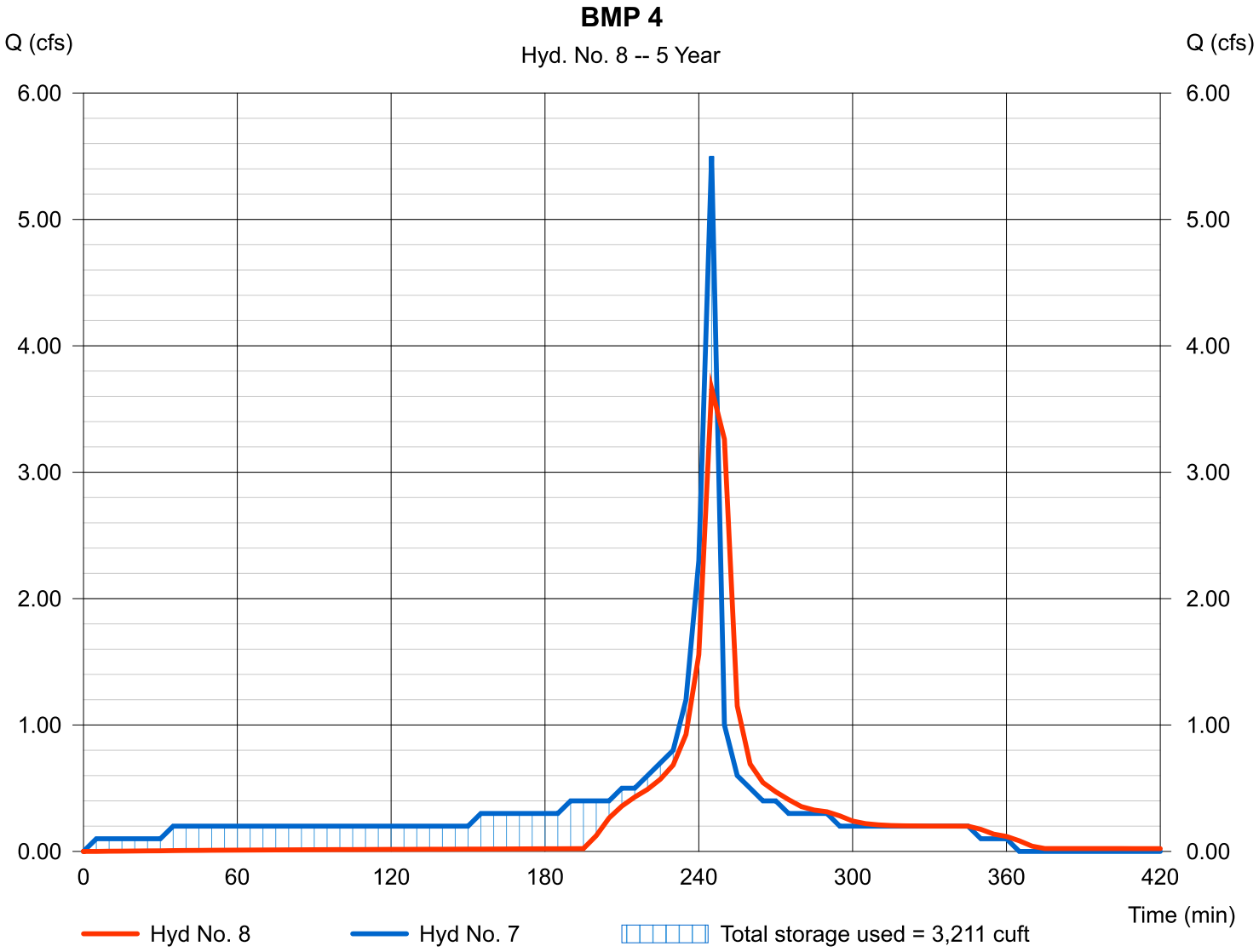
Hydraflow Hydrographs Extension for Autodesk® Civil 3D® by Autodesk, Inc. v2022 Tuesday, 12 / 20 / 2022

Hyd. No. 8

BMP 4

Hydrograph type	=	Reservoir	Peak discharge	=	3.662 cfs
Storm frequency	=	5 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	8,307 cuft
Inflow hyd. No.	=	7 - BMP 4 Inflow Hydrograph	Max. Elevation	=	479.49 ft
Reservoir name	=	BMP 4	Max. Storage	=	3,211 cuft

Storage Indication method used.



Pond Report

Pond No. 4 - BMP 4

Pond Data

Pond storage is based on user-defined values.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	478.82	n/a	0	0
0.50	479.32	n/a	2,332	2,332
1.00	479.82	n/a	2,643	4,975
1.50	480.32	n/a	2,960	7,935
2.00	480.82	n/a	3,283	11,218

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	1.10	Inactive	0.00
Span (in)	= 12.00	1.10	12.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 474.82	475.07	479.60	0.00
Length (ft)	= 0.00	0.00	0.00	0.00
Slope (%)	= 0.00	0.00	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	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 16.00	0.00	0.00	0.00
Crest El. (ft)	= 479.32	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	478.82	0.00	0.00	0.00	---	0.00	---	---	---	---	---	0.000
0.05	233	478.87	7.07 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.007
0.10	466	478.92	7.07 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.010
0.15	700	478.97	7.07 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.012
0.20	933	479.02	7.07 ic	0.01 ic	0.00	---	0.00	---	---	---	---	---	0.014
0.25	1,166	479.07	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.016
0.30	1,399	479.12	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.017
0.35	1,632	479.17	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.019
0.40	1,866	479.22	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.020
0.45	2,099	479.27	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.021
0.50	2,332	479.32	7.07 ic	0.02 ic	0.00	---	0.00	---	---	---	---	---	0.022
0.55	2,596	479.37	7.07 ic	0.02 ic	0.00	---	0.60	---	---	---	---	---	0.619
0.60	2,861	479.42	7.07 ic	0.02 ic	0.00	---	1.69	---	---	---	---	---	1.710
0.65	3,125	479.47	7.07 ic	0.03 ic	0.00	---	3.10	---	---	---	---	---	3.121
0.70	3,389	479.52	7.07 ic	0.03 ic	0.00	---	4.76	---	---	---	---	---	4.791
0.75	3,654	479.57	7.07 ic	0.03 ic	0.00	---	6.66	---	---	---	---	---	6.683
0.80	3,918	479.62	7.69 ic	0.01 ic	0.00	---	7.67 s	---	---	---	---	---	7.685
0.85	4,182	479.67	7.79 ic	0.01 ic	0.00	---	7.78 s	---	---	---	---	---	7.791
0.90	4,446	479.72	7.87 ic	0.01 ic	0.00	---	7.86 s	---	---	---	---	---	7.869
0.95	4,711	479.77	7.93 ic	0.01 ic	0.00	---	7.92 s	---	---	---	---	---	7.930
1.00	4,975	479.82	7.99 ic	0.01 ic	0.00	---	7.97 s	---	---	---	---	---	7.981
1.05	5,271	479.87	8.04 ic	0.01 ic	0.00	---	8.03 s	---	---	---	---	---	8.040
1.10	5,567	479.92	8.09 ic	0.00 ic	0.00	---	8.08 s	---	---	---	---	---	8.088
1.15	5,863	479.97	8.14 ic	0.00 ic	0.00	---	8.12 s	---	---	---	---	---	8.123
1.20	6,159	480.02	8.18 ic	0.00 ic	0.00	---	8.17 s	---	---	---	---	---	8.174
1.25	6,455	480.07	8.23 ic	0.00 ic	0.00	---	8.20 s	---	---	---	---	---	8.206
1.30	6,751	480.12	8.28 ic	0.00 ic	0.00	---	8.25 s	---	---	---	---	---	8.257
1.35	7,047	480.17	8.32 ic	0.00 ic	0.00	---	8.30 s	---	---	---	---	---	8.298
1.40	7,343	480.22	8.36 ic	0.00 ic	0.00	---	8.35 s	---	---	---	---	---	8.355
1.45	7,639	480.27	8.41 ic	0.00 ic	0.00	---	8.38 s	---	---	---	---	---	8.387
1.50	7,935	480.32	8.45 ic	0.00 ic	0.00	---	8.44 s	---	---	---	---	---	8.443
1.55	8,263	480.37	8.49 ic	0.00 ic	0.00	---	8.46 s	---	---	---	---	---	8.462
1.60	8,592	480.42	8.54 ic	0.00 ic	0.00	---	8.49 s	---	---	---	---	---	8.496
1.65	8,920	480.47	8.58 ic	0.00 ic	0.00	---	8.50 s	---	---	---	---	---	8.506
1.70	9,248	480.52	8.62 ic	0.00 ic	0.00	---	8.54 s	---	---	---	---	---	8.545
1.75	9,576	480.57	8.66 ic	0.00 ic	0.00	---	8.64 s	---	---	---	---	---	8.638
1.80	9,905	480.62	8.70 ic	0.00 ic	0.00	---	8.58 s	---	---	---	---	---	8.585
1.85	10,233	480.67	8.74 ic	0.00 ic	0.00	---	8.69 s	---	---	---	---	---	8.695
1.90	10,561	480.72	8.78 ic	0.00 ic	0.00	---	8.67 s	---	---	---	---	---	8.669

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BMP 4

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
1.95	10,890	480.77	8.83 ic	0.00 ic	0.00	---	8.70 s	---	---	---	---	---	8.698
2.00	11,218	480.82	8.87 ic	0.00 ic	0.00	---	8.71 s	---	---	---	---	---	8.711

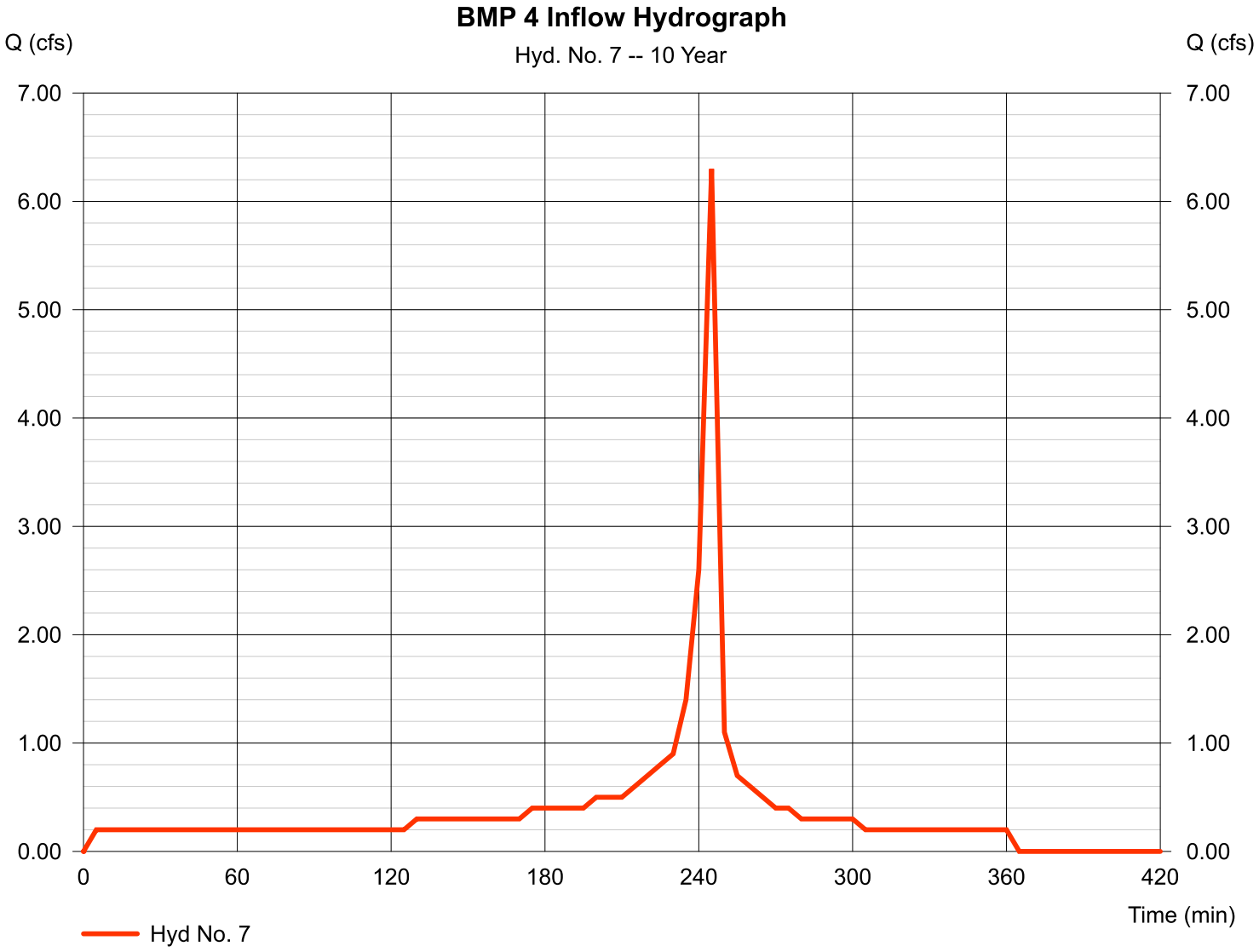
...End

Hydrograph Report

Hyd. No. 7

BMP 4 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 6.300 cfs
Storm frequency	= 10 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 9,630 cuft



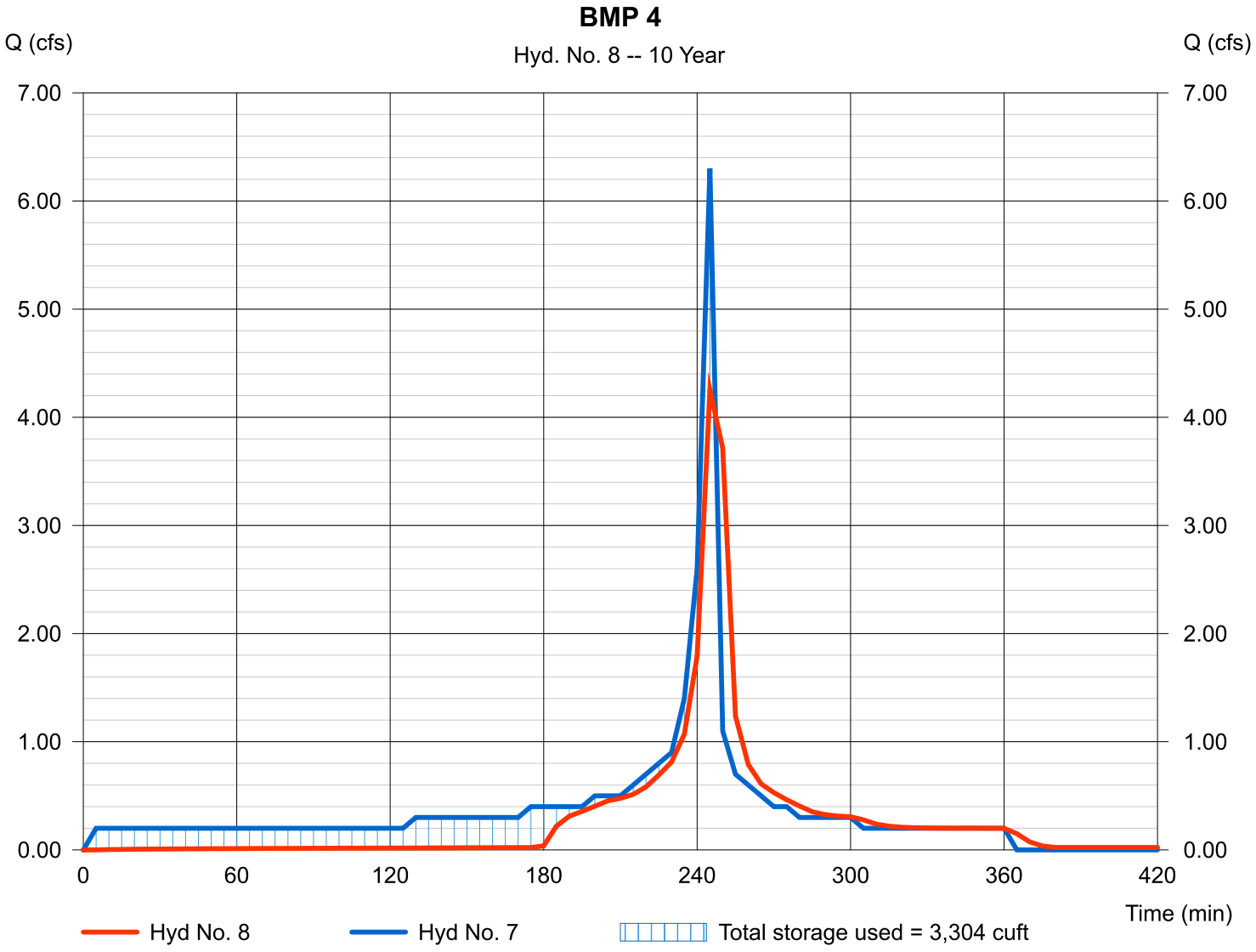
Hydrograph Report

Hyd. No. 8

BMP 4

Hydrograph type	=	Reservoir	Peak discharge	=	4.254 cfs
Storm frequency	=	10 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	9,597 cuft
Inflow hyd. No.	=	7 - BMP 4 Inflow Hydrograph	Max. Elevation	=	479.50 ft
Reservoir name	=	BMP 4	Max. Storage	=	3,304 cuft

Storage Indication method used.

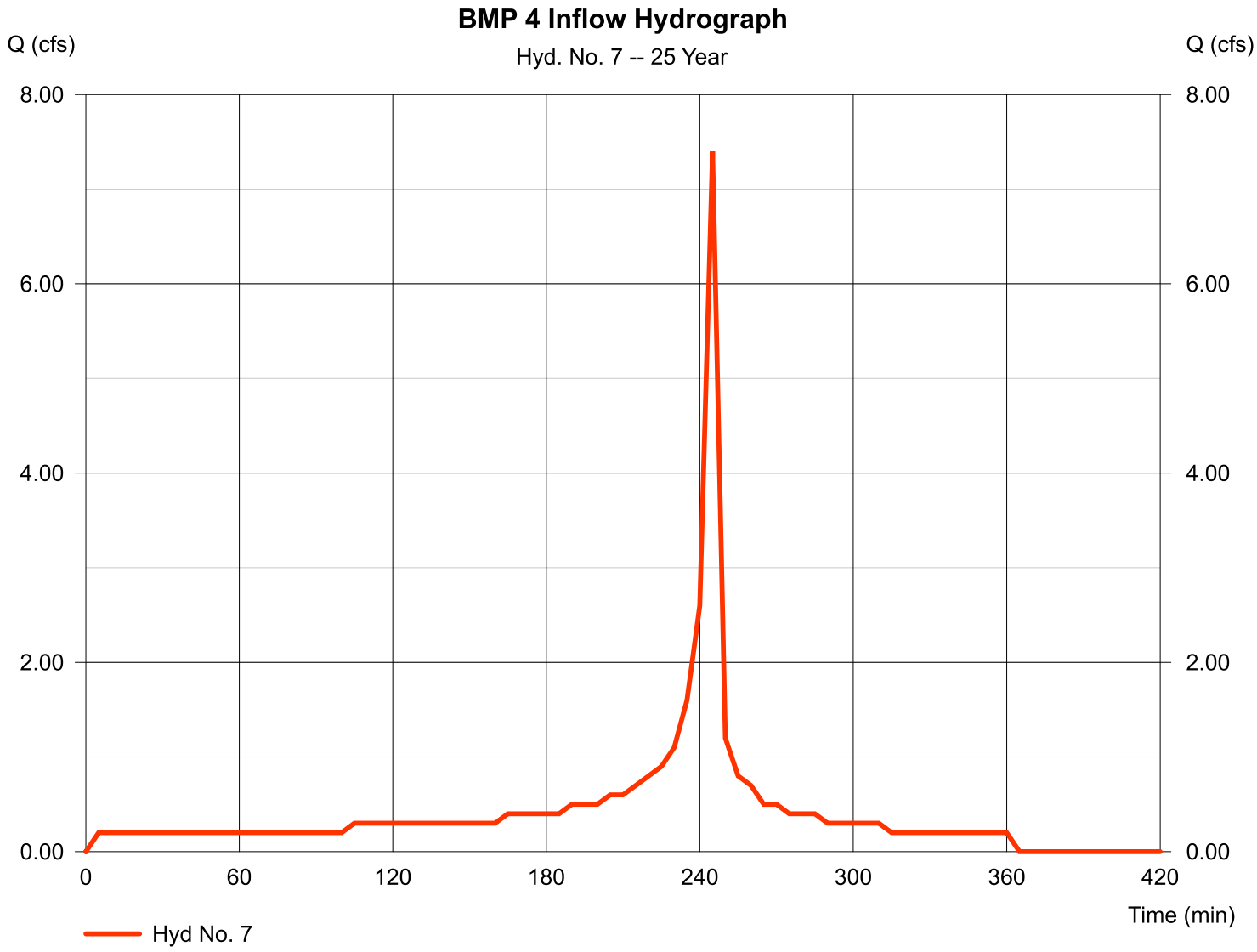


Hydrograph Report

Hyd. No. 7

BMP 4 Inflow Hydrograph

Hydrograph type	=	Manual	Peak discharge	=	7.400 cfs
Storm frequency	=	25 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	10,740 cuft



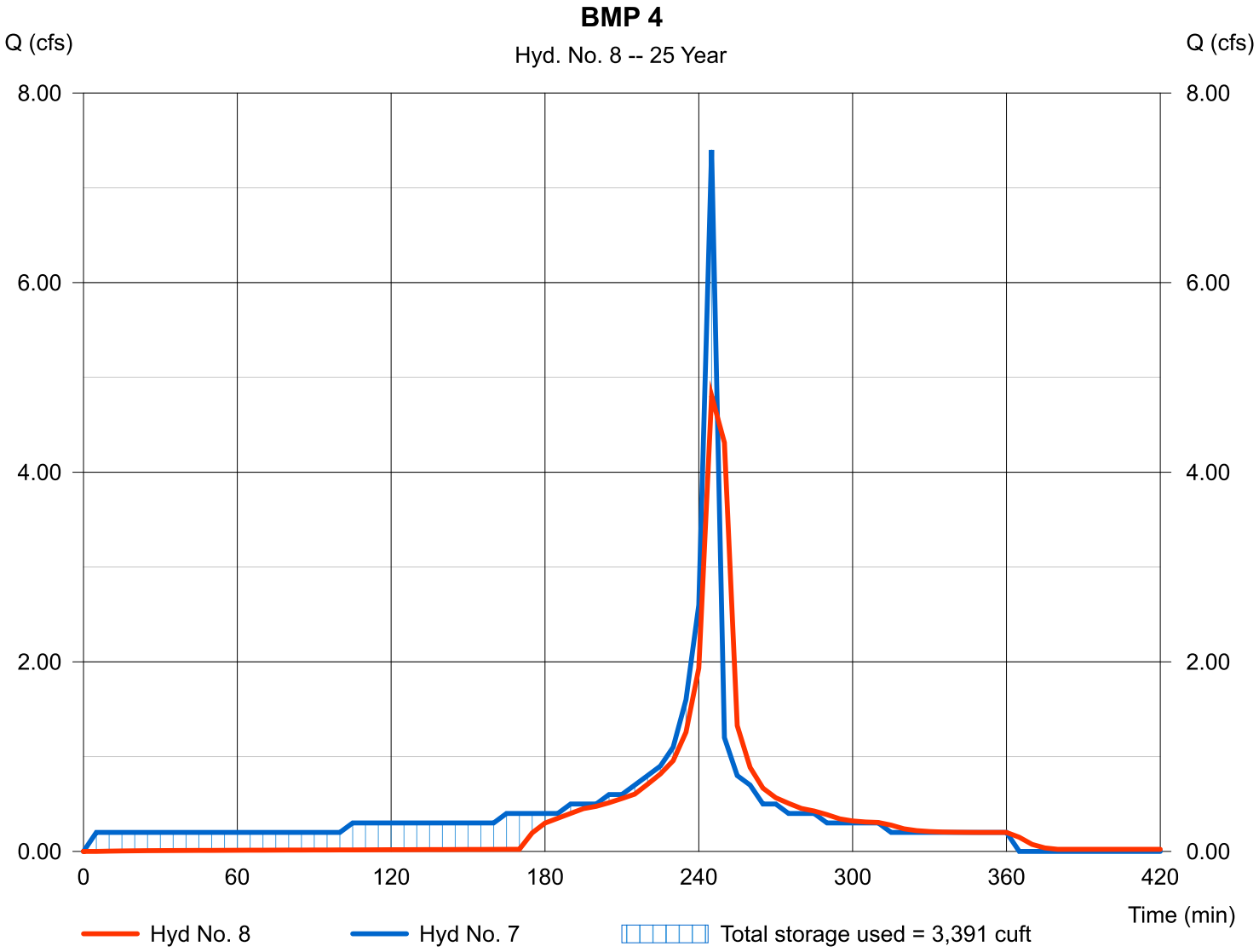
Hydrograph Report

Hyd. No. 8

BMP 4

Hydrograph type	=	Reservoir	Peak discharge	=	4.807 cfs
Storm frequency	=	25 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	10,707 cuft
Inflow hyd. No.	=	7 - BMP 4 Inflow Hydrograph	Max. Elevation	=	479.52 ft
Reservoir name	=	BMP 4	Max. Storage	=	3,391 cuft

Storage Indication method used.

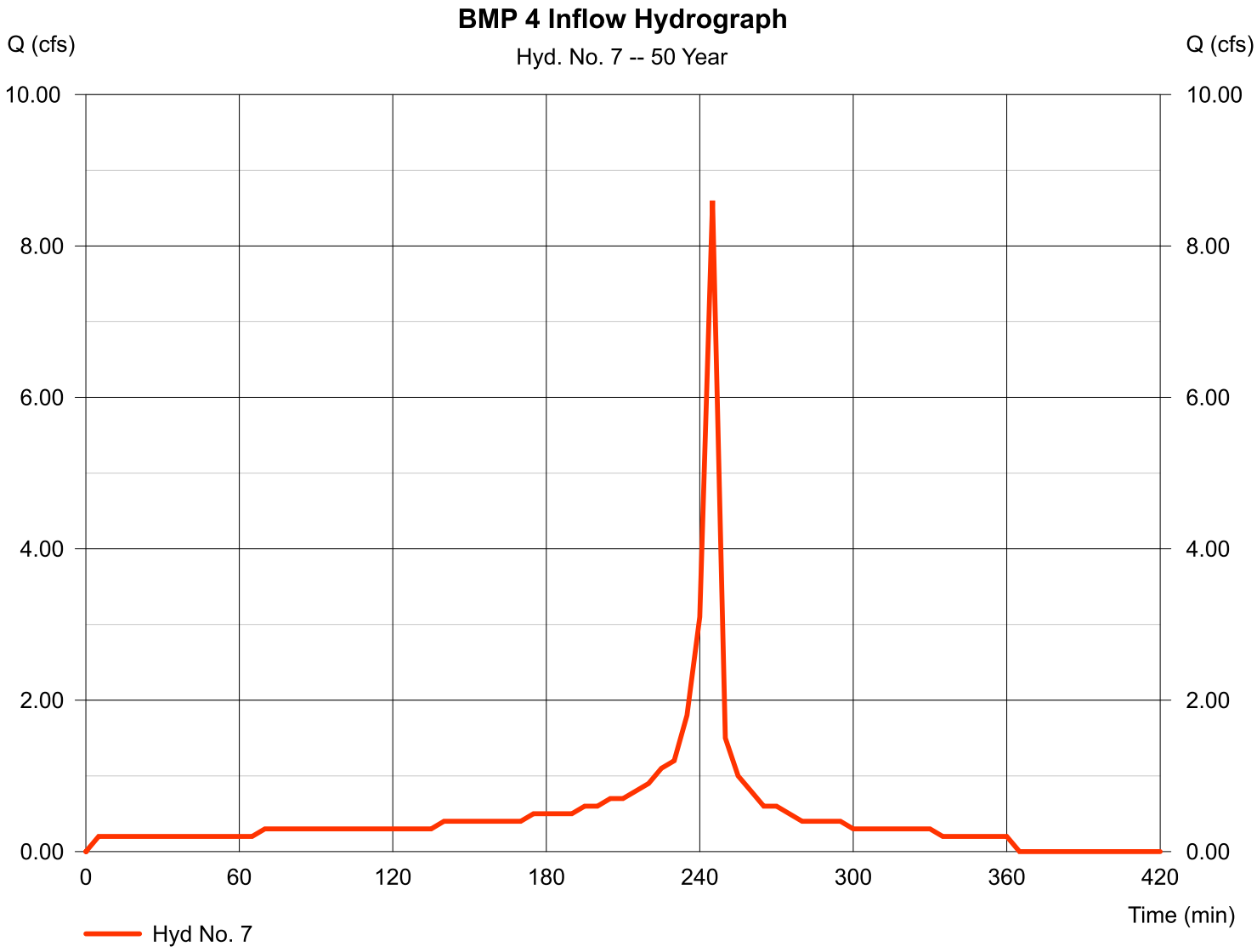


Hydrograph Report

Hyd. No. 7

BMP 4 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 8.600 cfs
Storm frequency	= 50 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 12,480 cuft



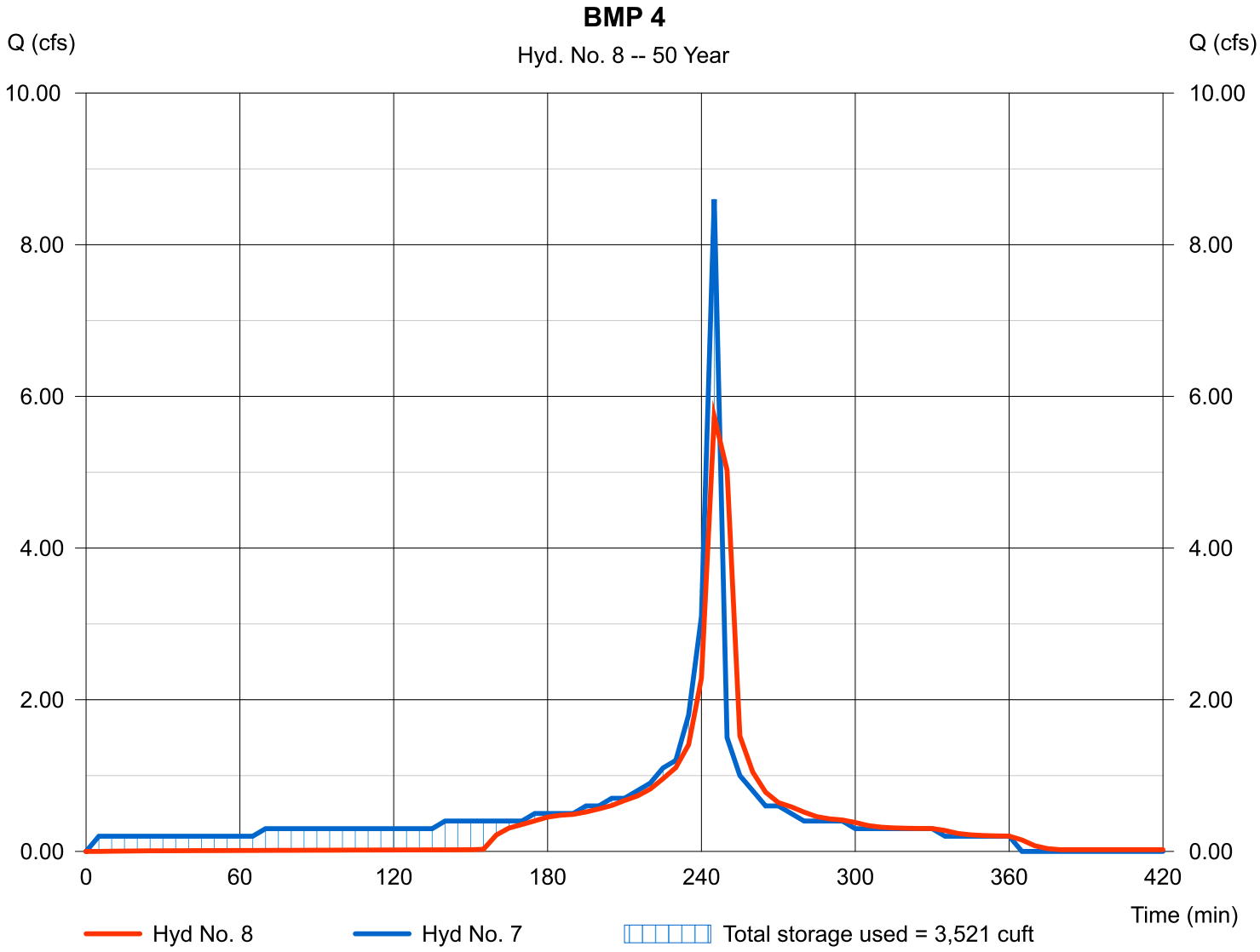
Hydrograph Report

Hyd. No. 8

BMP 4

Hydrograph type	=	Reservoir	Peak discharge	=	5.733 cfs
Storm frequency	=	50 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	12,447 cuft
Inflow hyd. No.	=	7 - BMP 4 Inflow Hydrograph	Max. Elevation	=	479.54 ft
Reservoir name	=	BMP 4	Max. Storage	=	3,521 cuft

Storage Indication method used.

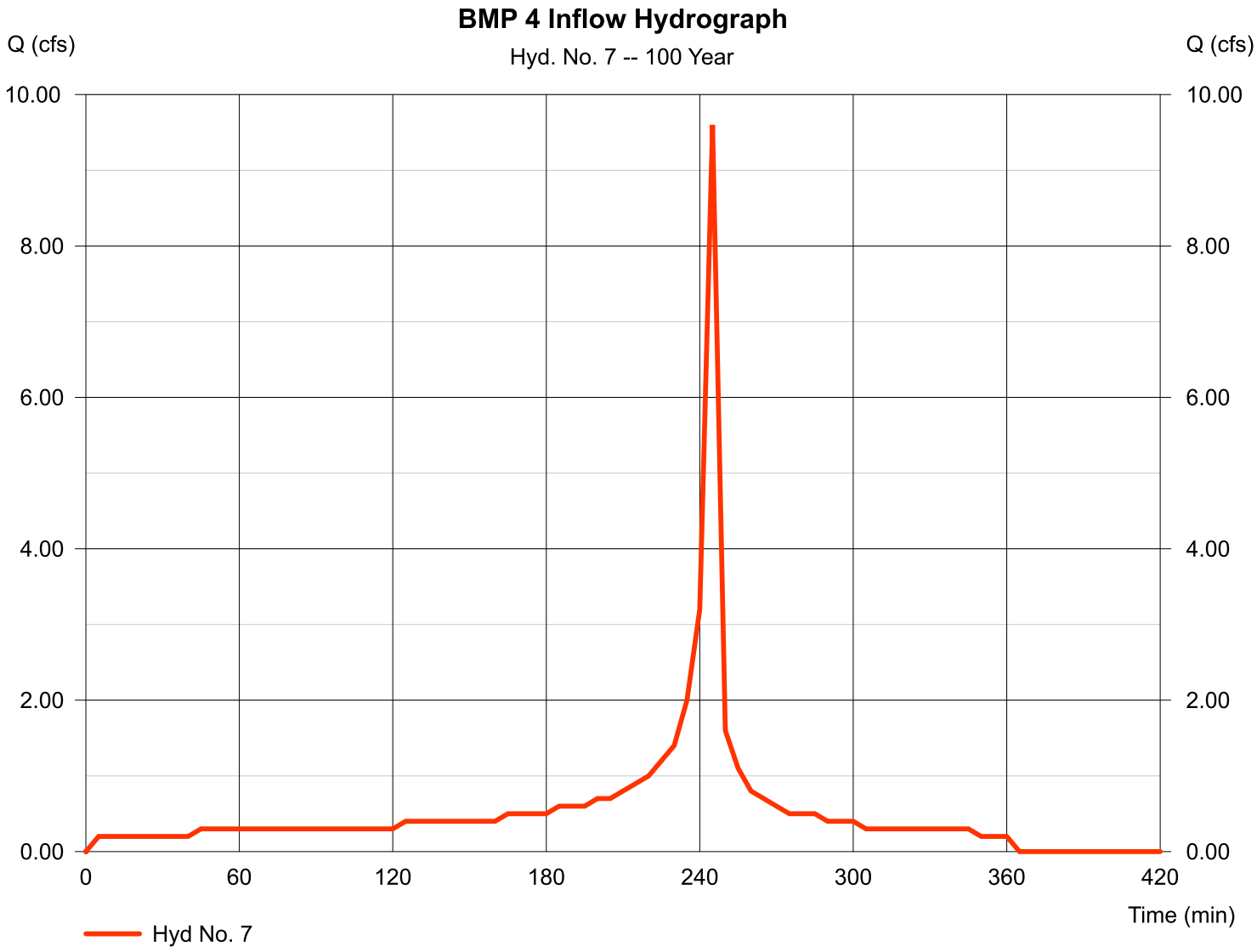


Hydrograph Report

Hyd. No. 7

BMP 4 Inflow Hydrograph

Hydrograph type	= Manual	Peak discharge	= 9.600 cfs
Storm frequency	= 100 yrs	Time to peak	= 245 min
Time interval	= 5 min	Hyd. volume	= 13,710 cuft



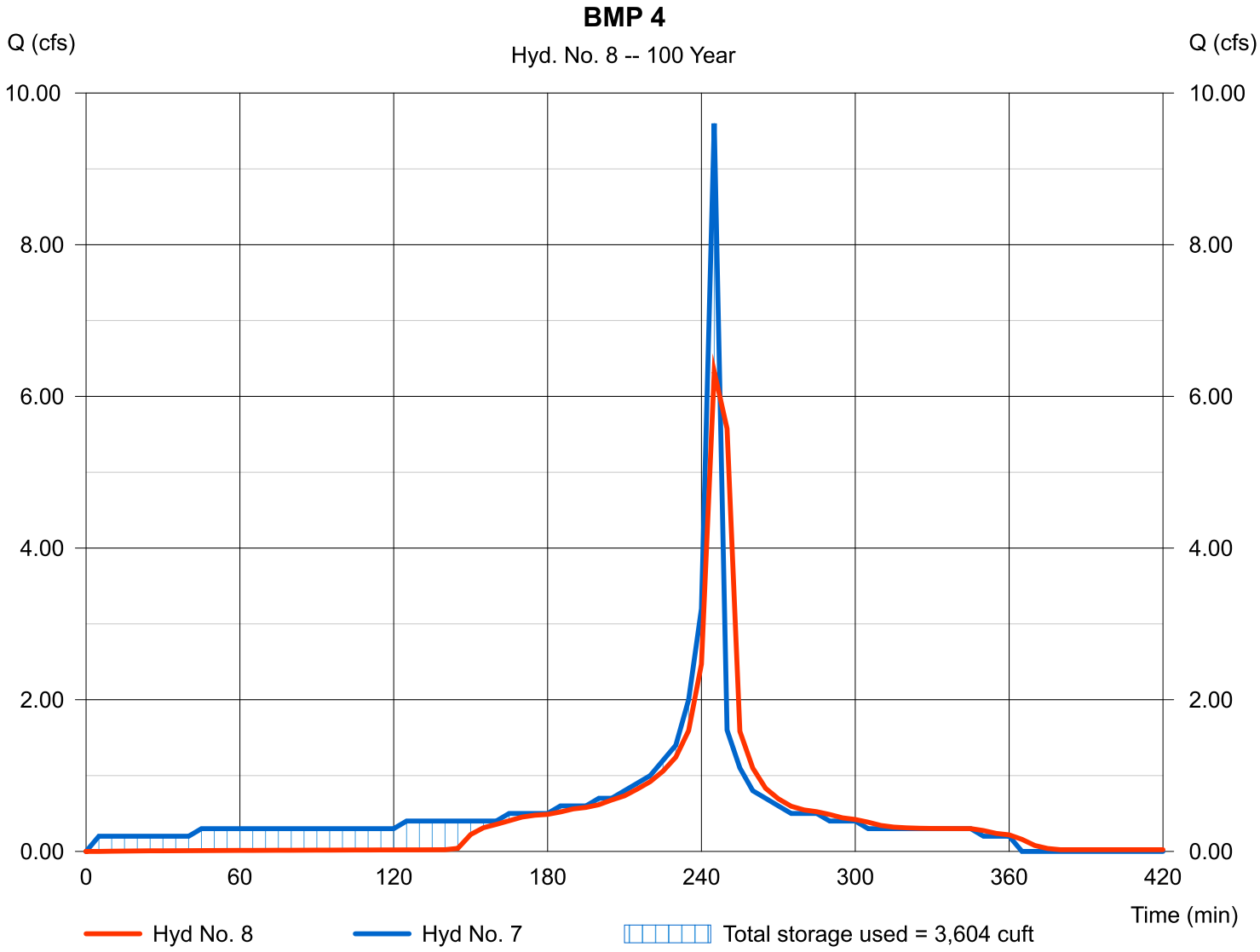
Hydrograph Report

Hyd. No. 8

BMP 4

Hydrograph type	=	Reservoir	Peak discharge	=	6.326 cfs
Storm frequency	=	100 yrs	Time to peak	=	245 min
Time interval	=	5 min	Hyd. volume	=	13,677 cuft
Inflow hyd. No.	=	7 - BMP 4 Inflow Hydrograph	Max. Elevation	=	479.56 ft
Reservoir name	=	BMP 4	Max. Storage	=	3,604 cuft

Storage Indication method used.



Circular Orifice - BMP1 5yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	1.96 ft
Centroid Elevation	0.16 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	3.9 in

Results	
Discharge	0.54 cfs
Headwater Height Above Centroid	1.80 ft
Tailwater Height Above Centroid	-0.16 ft
Flow Area	0.1 ft²
Velocity	6.46 ft/s

Circular Orifice - BMP1 10yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	2.17 ft
Centroid Elevation	0.16 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	3.9 in

Results	
Discharge	0.57 cfs
Headwater Height Above Centroid	2.01 ft
Tailwater Height Above Centroid	-0.16 ft
Flow Area	0.1 ft²
Velocity	6.83 ft/s

Circular Orifice - BMP1 25yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	2.33 ft
Centroid Elevation	0.16 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	3.9 in

Results	
Discharge	0.59 cfs
Headwater Height Above Centroid	2.17 ft
Tailwater Height Above Centroid	-0.16 ft
Flow Area	0.1 ft²
Velocity	7.09 ft/s

Circular Orifice - BMP1 50yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	2.78 ft
Centroid Elevation	0.16 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	3.9 in

Results	
Discharge	0.65 cfs
Headwater Height Above Centroid	2.62 ft
Tailwater Height Above Centroid	-0.16 ft
Flow Area	0.1 ft²
Velocity	7.79 ft/s

Circular Orifice - BMP1 100yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	2.97 ft
Centroid Elevation	0.16 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	3.9 in

Results	
Discharge	0.67 cfs
Headwater Height Above Centroid	2.81 ft
Tailwater Height Above Centroid	-0.16 ft
Flow Area	0.1 ft²
Velocity	8.07 ft/s

Circular Orifice - BMP2 5yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.23 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	2.4 in

Results	
Discharge	0.31 cfs
Headwater Height Above Centroid	4.13 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft²
Velocity	9.79 ft/s

Circular Orifice - BMP2 10yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.28 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	2.4 in

Results	
Discharge	0.31 cfs
Headwater Height Above Centroid	4.18 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft²
Velocity	9.85 ft/s

Circular Orifice - BMP2 25yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.34 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	2.4 in

Results	
Discharge	0.31 cfs
Headwater Height Above Centroid	4.24 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft²
Velocity	9.92 ft/s

Circular Orifice - BMP2 50yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.42 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	2.4 in

Results	
Discharge	0.31 cfs
Headwater Height Above Centroid	4.32 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft²
Velocity	10.01 ft/s

Circular Orifice - BMP2 100yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.47 ft
Centroid Elevation	0.10 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	2.4 in

Results	
Discharge	0.32 cfs
Headwater Height Above Centroid	4.37 ft
Tailwater Height Above Centroid	-0.10 ft
Flow Area	0.0 ft²
Velocity	10.07 ft/s

Circular Orifice - BMP3 5yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.71 ft
Centroid Elevation	0.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.5 in

Results	
Discharge	0.13 cfs
Headwater Height Above Centroid	4.71 ft
Tailwater Height Above Centroid	0.00 ft
Flow Area	0.0 ft²
Velocity	10.44 ft/s

Circular Orifice - BMP3 10yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.73 ft
Centroid Elevation	0.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.5 in

Results	
Discharge	0.13 cfs
Headwater Height Above Centroid	4.73 ft
Tailwater Height Above Centroid	0.00 ft
Flow Area	0.0 ft²
Velocity	10.46 ft/s

Circular Orifice - BMP3 25yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.76 ft
Centroid Elevation	0.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.5 in

Results	
Discharge	0.13 cfs
Headwater Height Above Centroid	4.76 ft
Tailwater Height Above Centroid	0.00 ft
Flow Area	0.0 ft²
Velocity	10.50 ft/s

Circular Orifice - BMP3 50yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.80 ft
Centroid Elevation	0.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.5 in

Results	
Discharge	0.13 cfs
Headwater Height Above Centroid	4.80 ft
Tailwater Height Above Centroid	0.00 ft
Flow Area	0.0 ft²
Velocity	10.54 ft/s

Circular Orifice - BMP3 100yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.83 ft
Centroid Elevation	0.00 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.5 in

Results	
Discharge	0.13 cfs
Headwater Height Above Centroid	4.83 ft
Tailwater Height Above Centroid	0.00 ft
Flow Area	0.0 ft²
Velocity	10.57 ft/s

Circular Orifice - BMP4 5yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.67 ft
Centroid Elevation	0.05 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.1 in

Results	
Discharge	0.07 cfs
Headwater Height Above Centroid	4.62 ft
Tailwater Height Above Centroid	-0.05 ft
Flow Area	0.0 ft²
Velocity	10.35 ft/s

Circular Orifice - BMP4 10yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.68 ft
Centroid Elevation	0.05 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.1 in

Results	
Discharge	0.07 cfs
Headwater Height Above Centroid	4.63 ft
Tailwater Height Above Centroid	-0.05 ft
Flow Area	0.0 ft²
Velocity	10.36 ft/s

Circular Orifice - BMP4 25yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.70 ft
Centroid Elevation	0.05 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.1 in

Results	
Discharge	0.07 cfs
Headwater Height Above Centroid	4.65 ft
Tailwater Height Above Centroid	-0.05 ft
Flow Area	0.0 ft²
Velocity	10.38 ft/s

Circular Orifice - BMP4 50yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.72 ft
Centroid Elevation	0.05 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.1 in

Results	
Discharge	0.07 cfs
Headwater Height Above Centroid	4.67 ft
Tailwater Height Above Centroid	-0.05 ft
Flow Area	0.0 ft^2
Velocity	10.40 ft/s

Circular Orifice - BMP4 100yr

Project Description	
Solve For	Discharge

Input Data	
Headwater Elevation	4.74 ft
Centroid Elevation	0.05 ft
Tailwater Elevation	0.00 ft
Discharge Coefficient	0.600
Diameter	1.1 in

Results	
Discharge	0.07 cfs
Headwater Height Above Centroid	4.69 ft
Tailwater Height Above Centroid	-0.05 ft
Flow Area	0.0 ft²
Velocity	10.42 ft/s

BASIN 1 DRAWDOWN						
STORM EVENT	WSE (HYDRAFLOW)	ORIFICE ELEVATION	HEADWATER ELEVATION	VOLUME (HYDRAFLOW)	Q_{OUT} (FLOWMASTER)	TIME (HRS)
5	475.21	473.25	1.96	55732	0.54	28.67
10	475.42	473.25	2.17	61719	0.57	30.08
25	475.58	473.25	2.33	66474	0.59	31.30
50	476.03	473.25	2.78	79306	0.65	33.89
100	476.22	473.25	2.97	84677	0.67	35.11

BASIN 2 DRAWDOWN						
STORM EVENT	WSE (HYDRAFLOW)	ORIFICE ELEVATION	HEADWATER ELEVATION	VOLUME (HYDRAFLOW)	Q_{OUT} (FLOWMASTER)	TIME (HRS)
5	477.73	473.5	4.23	15550	0.31	13.93
10	477.78	473.5	4.28	16716	0.31	14.98
25	477.84	473.5	4.34	18073	0.31	16.19
50	477.92	473.5	4.42	19908	0.31	17.84
100	477.97	473.5	4.47	21091	0.32	18.31

BASIN 3 DRAWDOWN						
STORM EVENT	WSE (HYDRAFLOW)	ORIFICE ELEVATION	HEADWATER ELEVATION	VOLUME (HYDRAFLOW)	Q_{OUT} (FLOWMASTER)	TIME (HRS)
5	479.21	474.5	4.71	8110	0.13	17.33
10	479.23	474.5	4.73	8455	0.13	18.07
25	479.26	474.5	4.76	8755	0.13	18.71
50	479.3	474.5	4.8	9263	0.13	19.79
100	479.33	474.5	4.83	9730	0.13	20.79

BASIN 4 DRAWDOWN						
STORM EVENT	WSE (HYDRAFLOW)	ORIFICE ELEVATION	HEADWATER ELEVATION	VOLUME (HYDRAFLOW)	Q_{OUT} (FLOWMASTER)	TIME (HRS)
5	479.49	474.82	4.67	3211	0.07	12.74
10	479.5	474.82	4.68	3304	0.07	13.11
25	479.52	474.82	4.7	3391	0.07	13.46
50	479.54	474.82	4.72	3521	0.07	13.97
100	479.56	474.82	4.74	3604	0.07	14.30

APPENDIX G

FEMA MAP

National Flood Hazard Layer FIRMette

FEMA

116°58'4"W 32°33'53"N

116°57'26"W 32°33'23"N

Feet 1:6,000

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

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

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

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

N

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

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

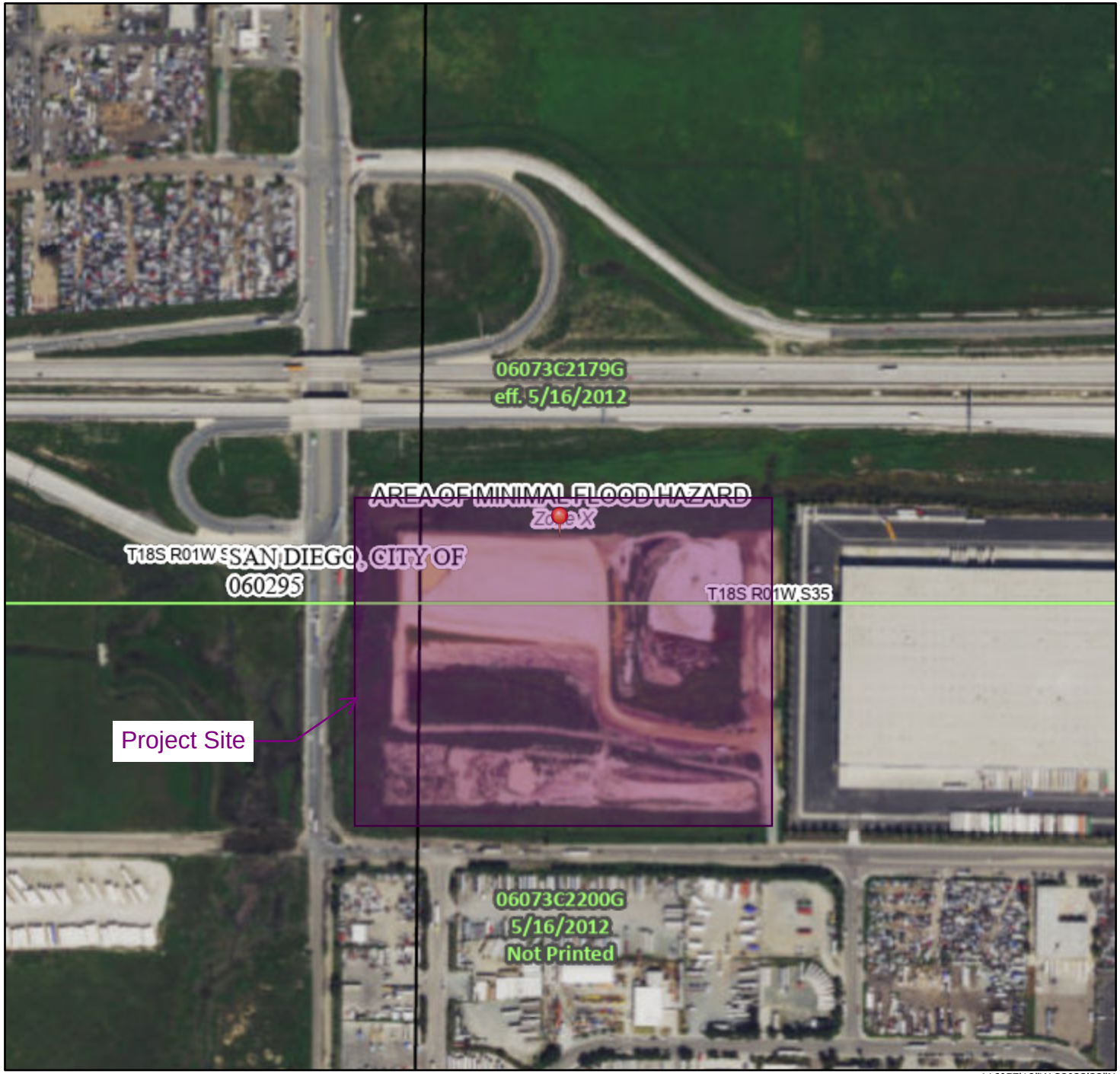
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/5/2021 at 2:59 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

National Flood Hazard Layer FIRMette

FEMA

116°57'55"W 32°34'2"N



116°57'18"W 32°33'32"N

Feet 1:6,000

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

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

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

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

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

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

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

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

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

N

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

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

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APPENDIX H

HEC-RAS MODELS

LEGEND

FLOWLINE

1000 HEC-RAS CROSS SECTION

PROPOSED CONDITION INUNDATION

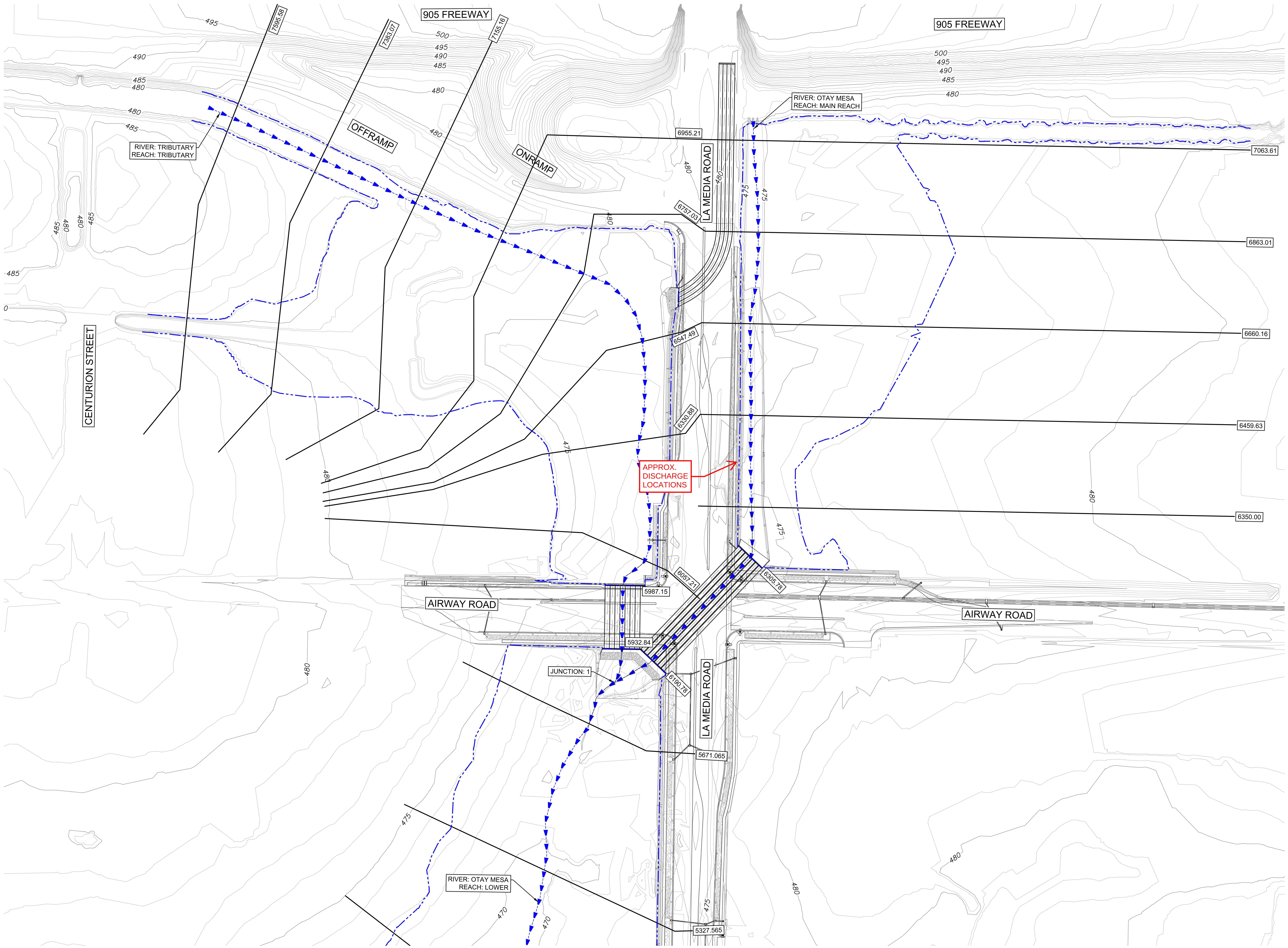
NOTES:

1. CROSS SECTIONS ARE ORIENTED LEFT TO RIGHT LOOKING DOWNSTREAM.

N

100 50 0 100 200 300

GRAPHIC SCALE: 1" = 100'



PROPOSED CONDITION HEC-RAS WORKMAP
FOR
METROPOLITAN AIRPARK - LA MEDIA ROAD

SHEET 1 OF 3

J-18429
DATE: DECEMBER 16, 2019

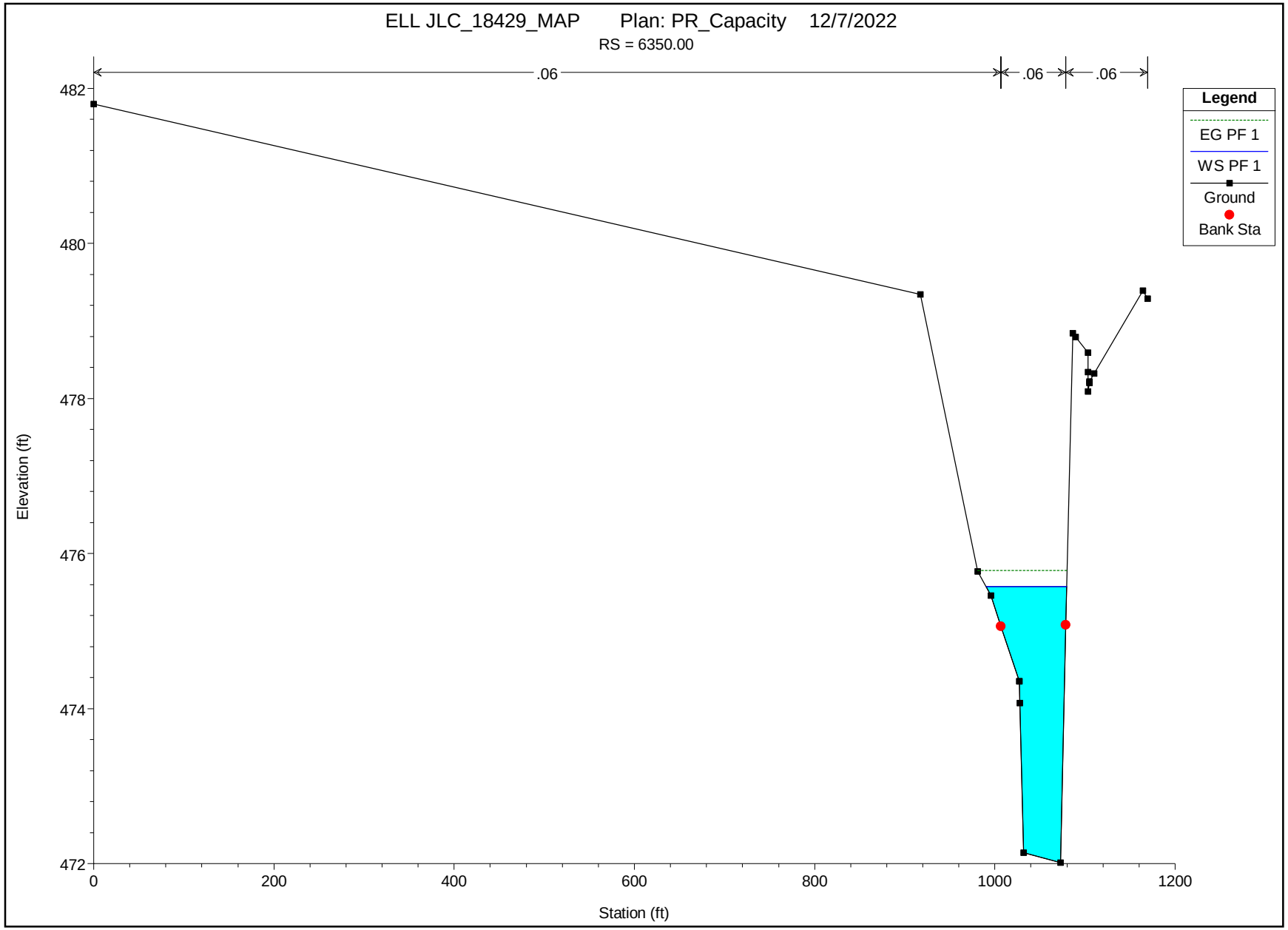
RICK ENGINEERING COMPANY
San Diego
5620 FRIARS ROAD
SAN DIEGO, CA 92110
619.291.0707
(FAX)619.291.4165
rickengineering.com
Orange - Riverside - Sacramento - San Luis Obispo - Phoenix - Tucson - Denver - Las Vegas

Q25

HEC-RAS Plan: PR_Capacity River: Otay Mesa Reach: Main Reach Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main Reach	7063.61	PF 1	682.00	473.36	477.83		477.91	0.001791	2.51	331.52	143.59	0.23
Main Reach	6863.01	PF 1	682.00	473.09	477.55		477.60	0.001276	2.18	407.77	180.19	0.19
Main Reach	6660.16	PF 1	682.00	472.82	477.15		477.26	0.002239	2.94	282.90	133.24	0.26
Main Reach	6459.63	PF 1	682.00	472.58	476.54		476.71	0.003428	3.39	214.77	73.98	0.31
Main Reach	6350.00	PF 1	682.00	472.01	475.57		475.78	0.006466	3.68	188.38	89.64	0.41
Main Reach	6305.78	PF 1	682.00	472.00	475.07	473.44	475.23	0.003716	3.19	213.73	69.55	0.32
Main Reach	6255.99		Culvert									
Main Reach	6190.78	PF 1	682.00	471.40	474.78		474.91	0.002660	2.88	236.88	76.62	0.28

Q25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EG PF 1
WS PF 1
Ground
Bank Sta
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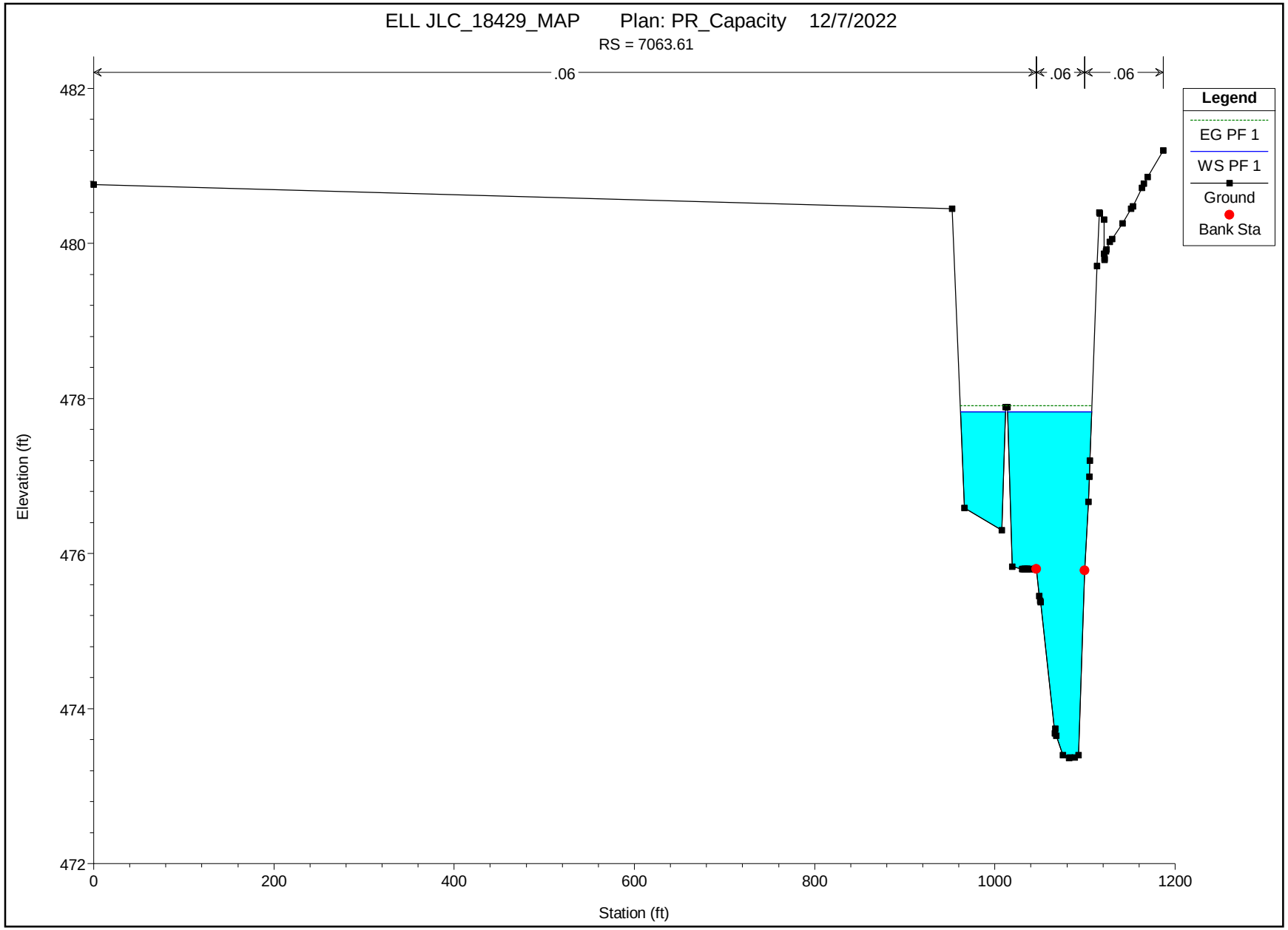
480
478
476
474
472
0
200
400
600
800
1000
1200
Station (ft)

Q25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WS PF 1
Ground
Bank Sta
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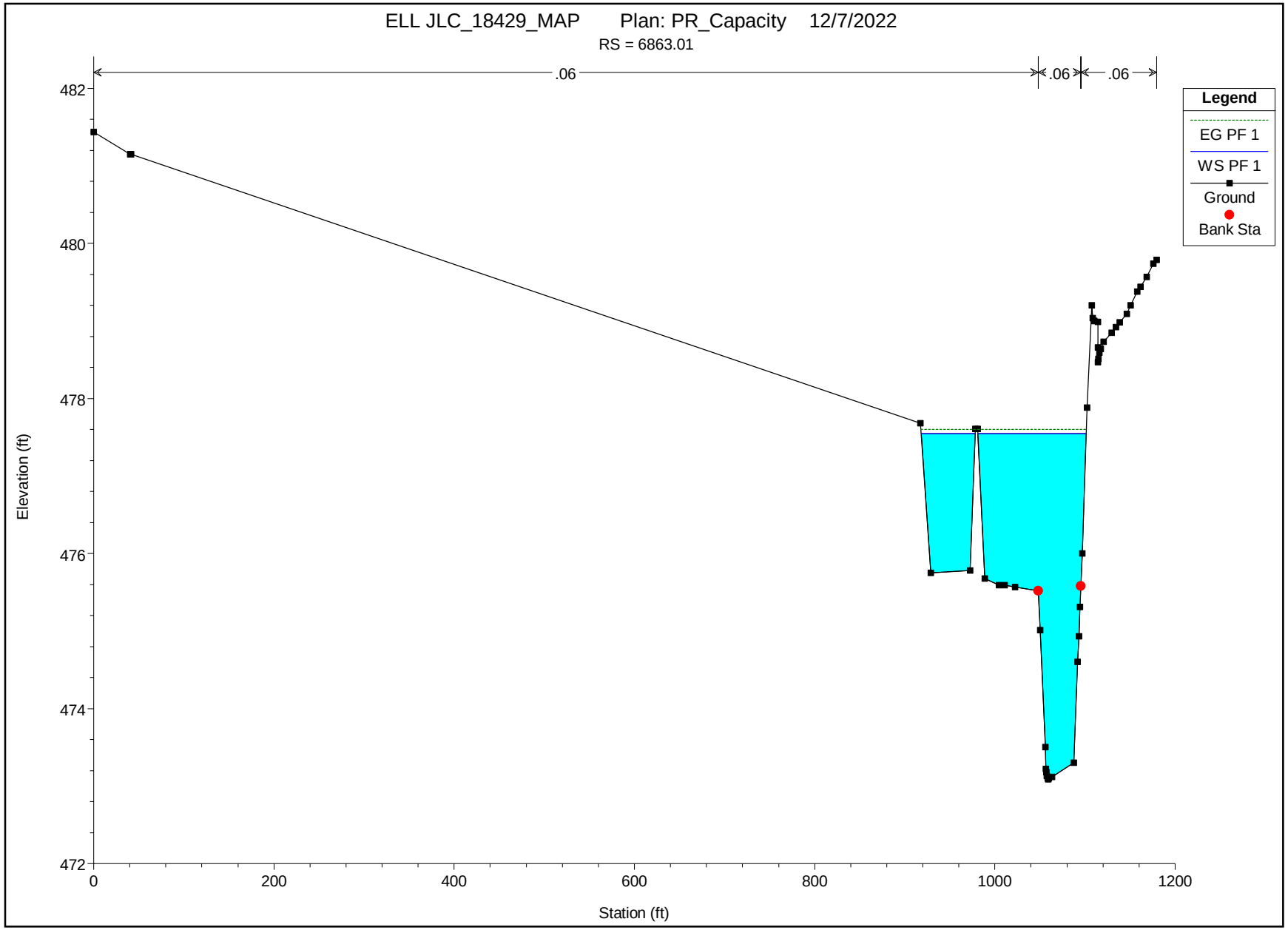
474
472
0
200
400
600
800
1000
1200
Station (ft)

Q25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WS PF 1
Ground
Bank Sta
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476
474
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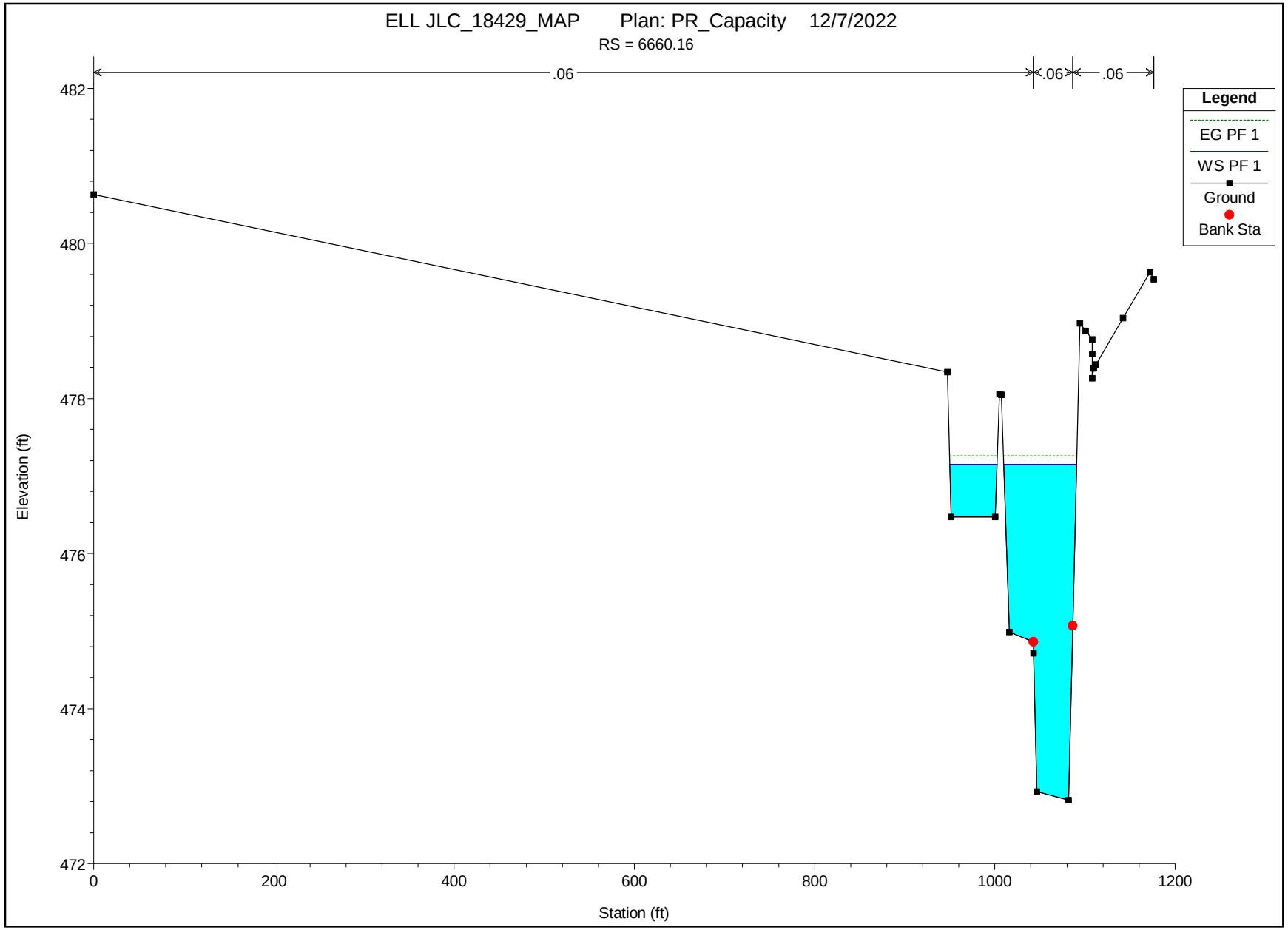
200
400
600
800
1000
1200
Station (ft)

Q25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WS PF 1
Ground
Bank Sta
Elevation (ft)
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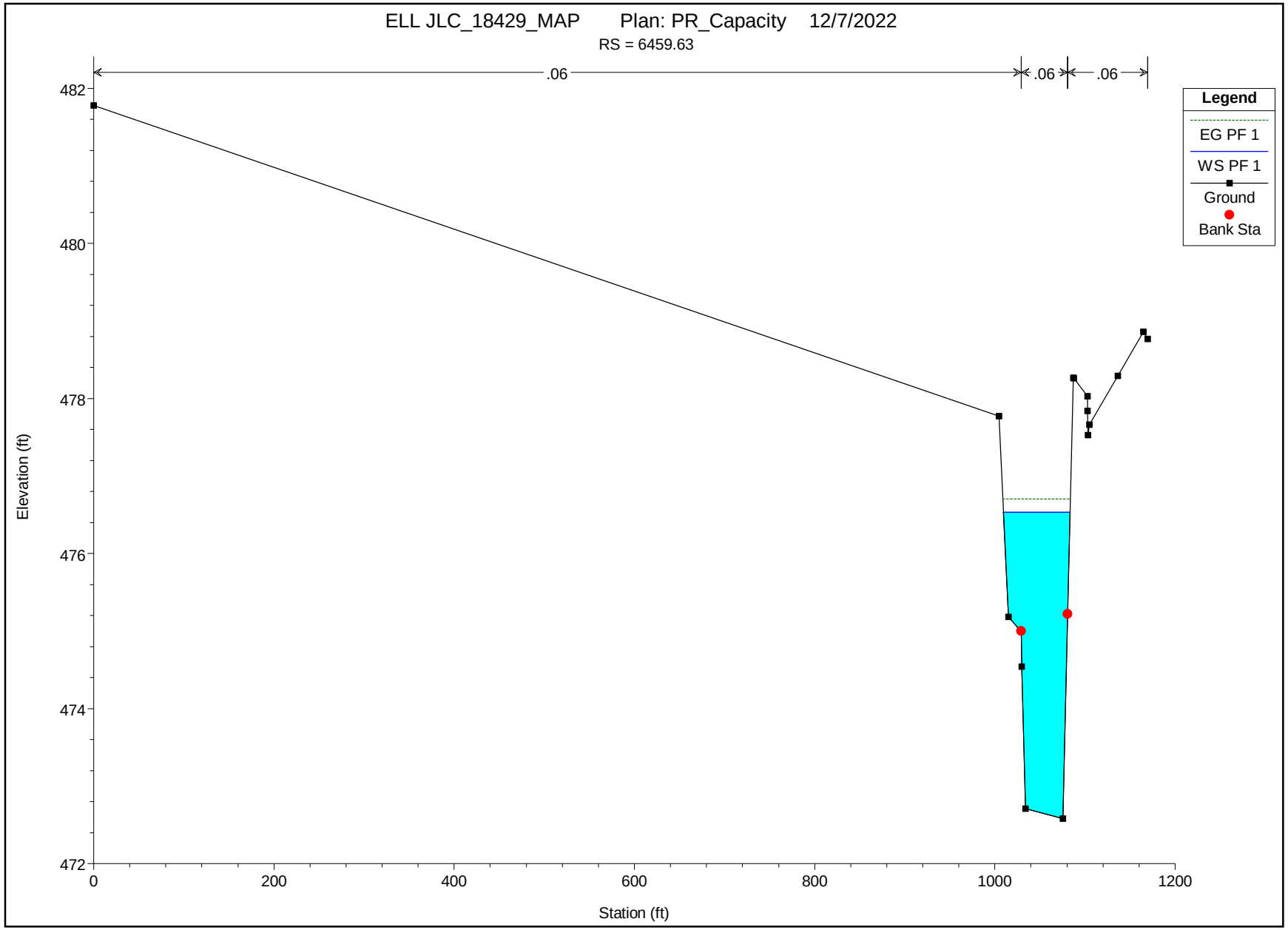
0
200
400
600
800
1000
1200
Station (ft)

Q25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EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
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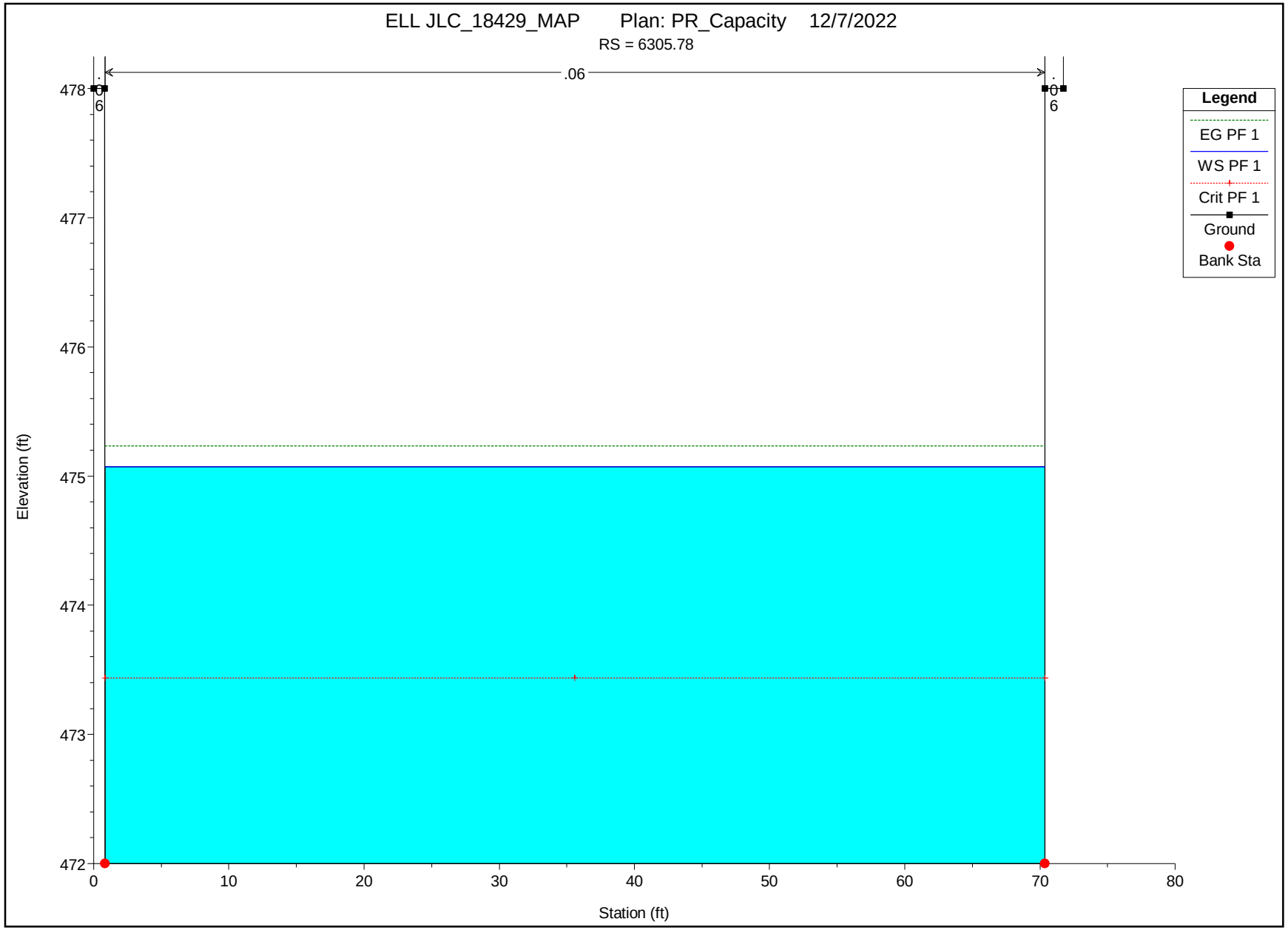
474
472
0
200
400
600
800
1000
1200
Station (ft)

Q25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Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
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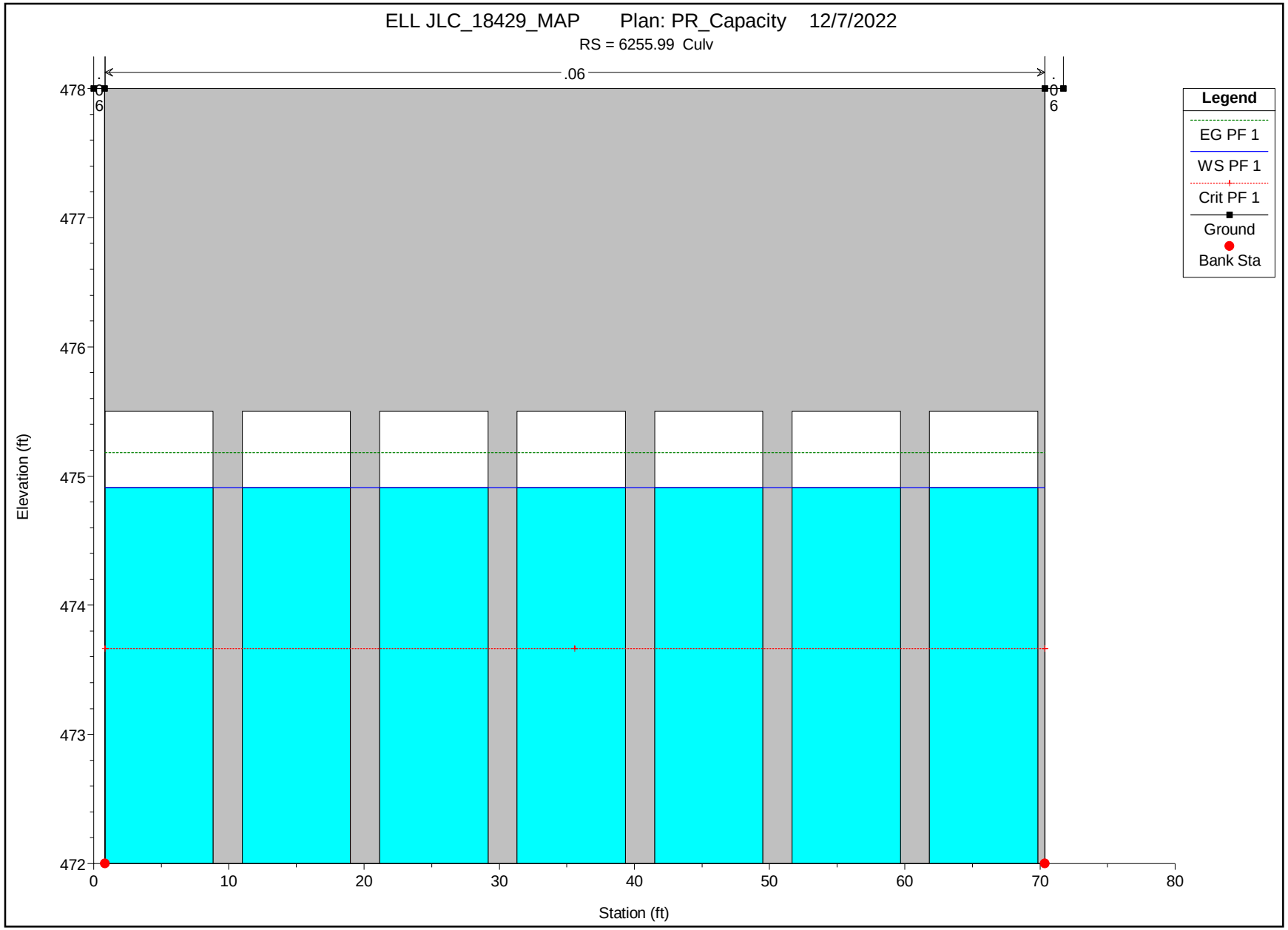
476
475
474
473
472
0
10
20
30
40
50
60
70
80
Station (ft)

Q25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EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
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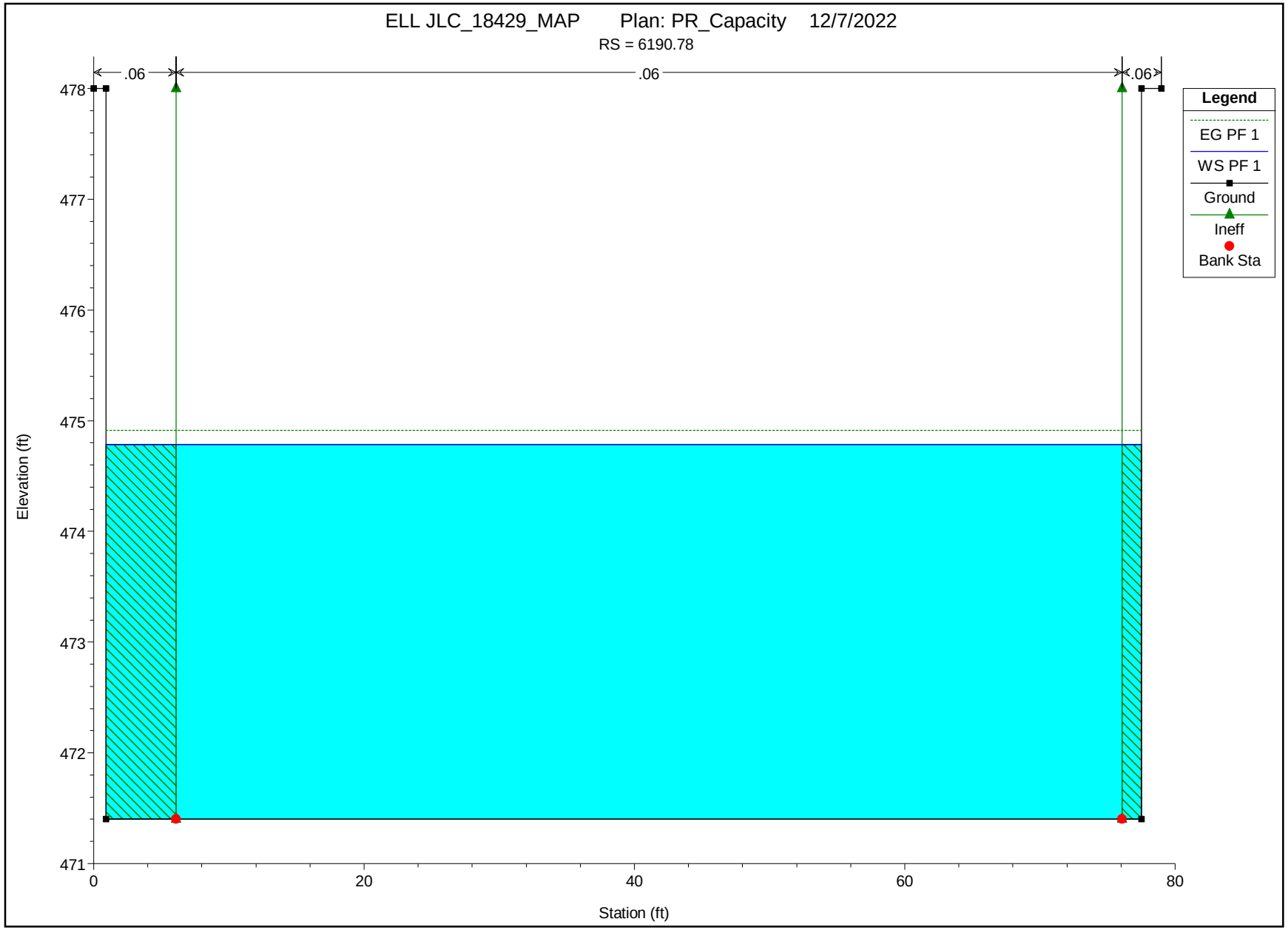
Q25


ELL JLC_18429_MAP Plan: PR_Capacity 12/7/2022
RS = 6190.78
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Legend
EG PF 1
WS PF 1
Ground
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Bank Sta
Elevation (ft)
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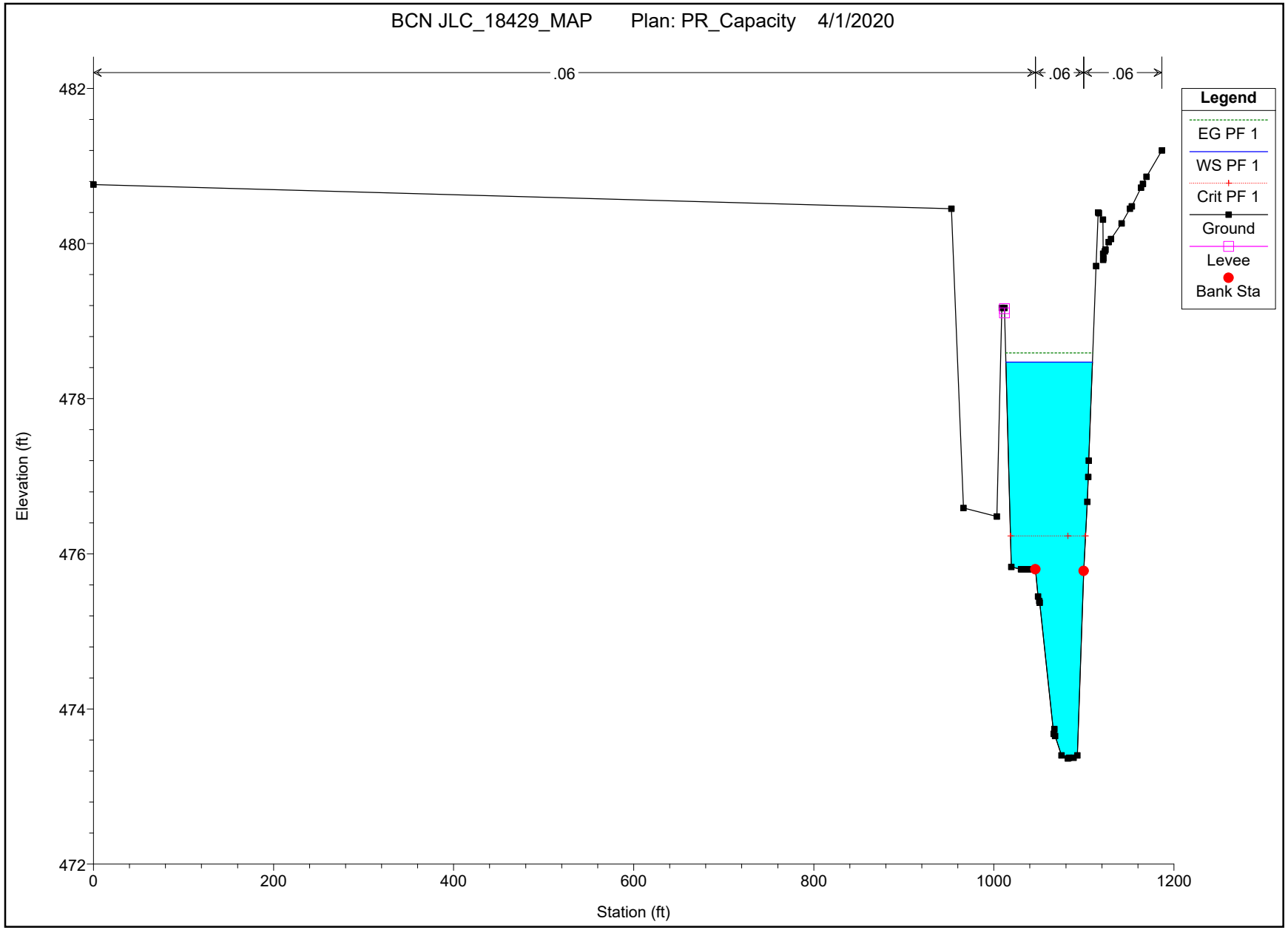
Station (ft)

Q100

HEC-RAS Plan: PR_Capacity River: Otay Mesa Reach: Main Reach Profile: PF 1

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Main Reach	7063.61	PF 1	871.00	473.36	478.47	476.23	478.59	0.002015	2.96	328.27	96.29	0.25
Main Reach	6863.01	PF 1	871.00	473.09	478.13	476.07	478.22	0.001607	2.68	386.90	124.18	0.22
Main Reach	6660.16	PF 1	871.00	472.82	477.66	475.52	477.82	0.002508	3.37	290.51	83.11	0.28
Main Reach	6459.63	PF 1	871.00	472.58	477.02		477.22	0.003539	3.74	251.06	76.96	0.32
Main Reach	6350.00	PF 1	871.00	472.01	476.18		476.39	0.004900	3.70	249.73	107.36	0.37
Main Reach	6305.78	PF 1	871.00	472.00	475.79	473.69	475.96	0.003023	3.31	263.34	69.55	0.30
Main Reach	6255.99		Culvert									
Main Reach	6190.78	PF 1	871.00	471.40	475.17		475.34	0.003016	3.30	264.19	76.62	0.30

Q100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Legend
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WS PF 1
Crit PF 1
Ground
Levee
Bank Sta
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Station (ft)

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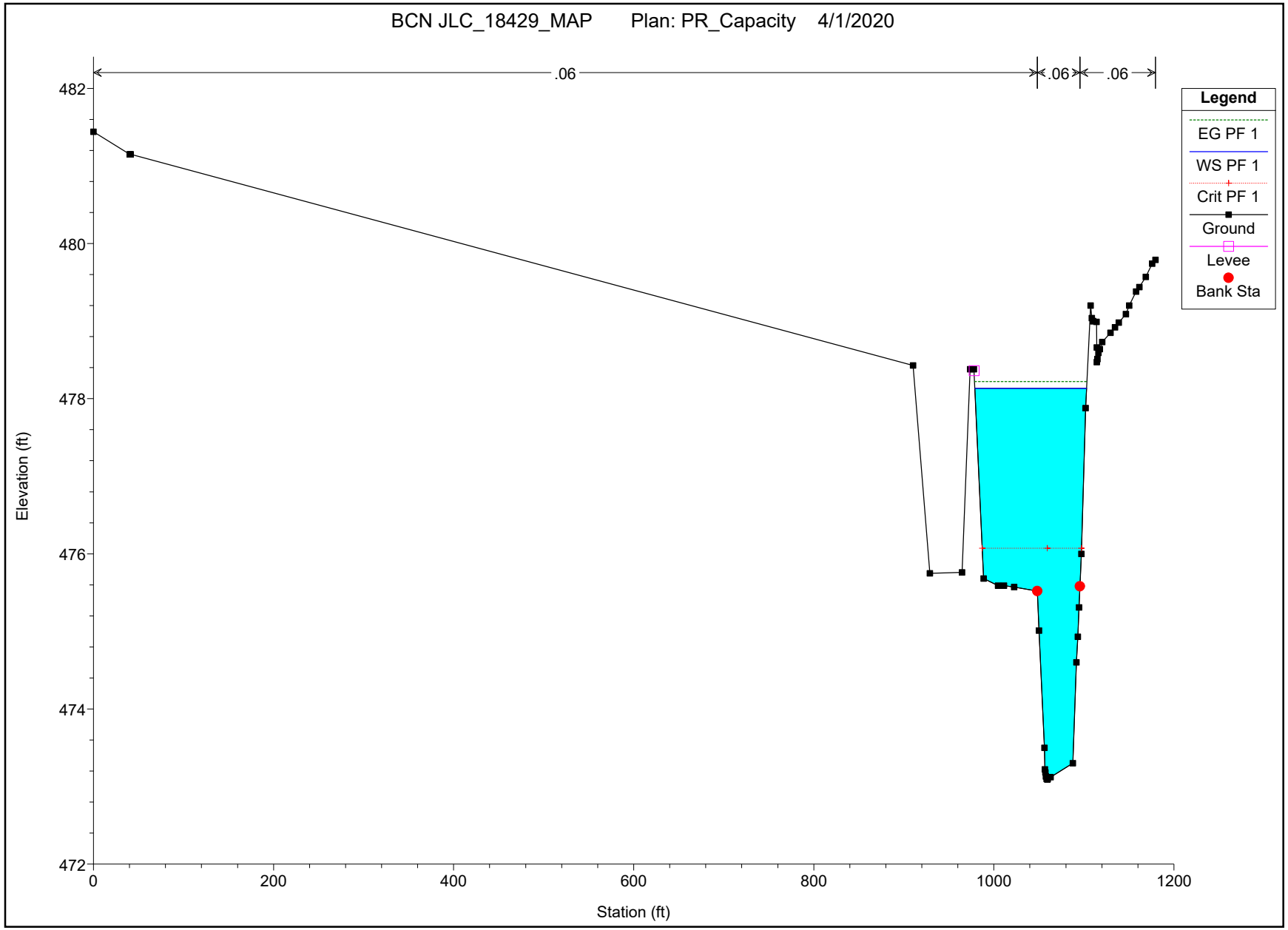
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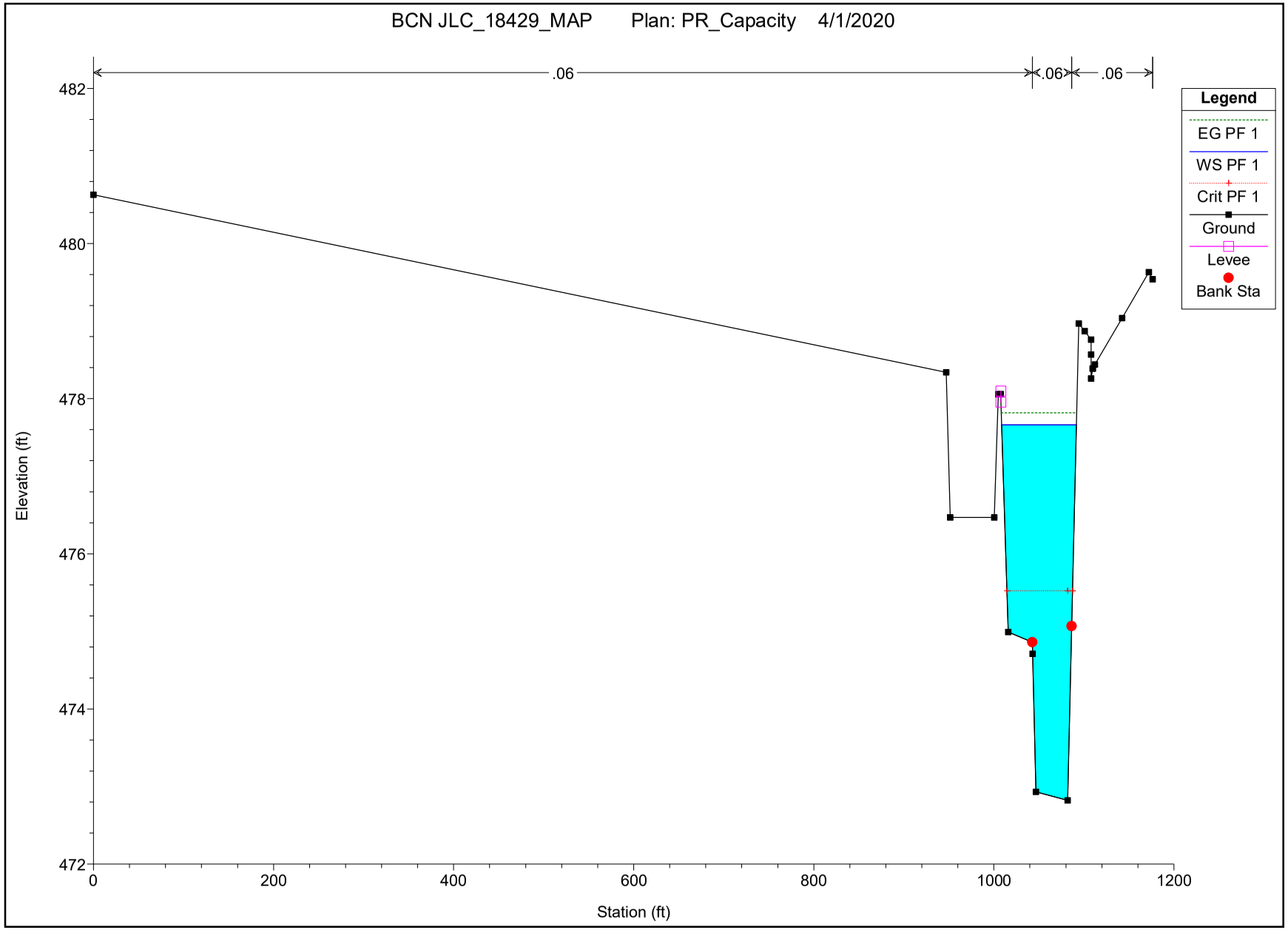
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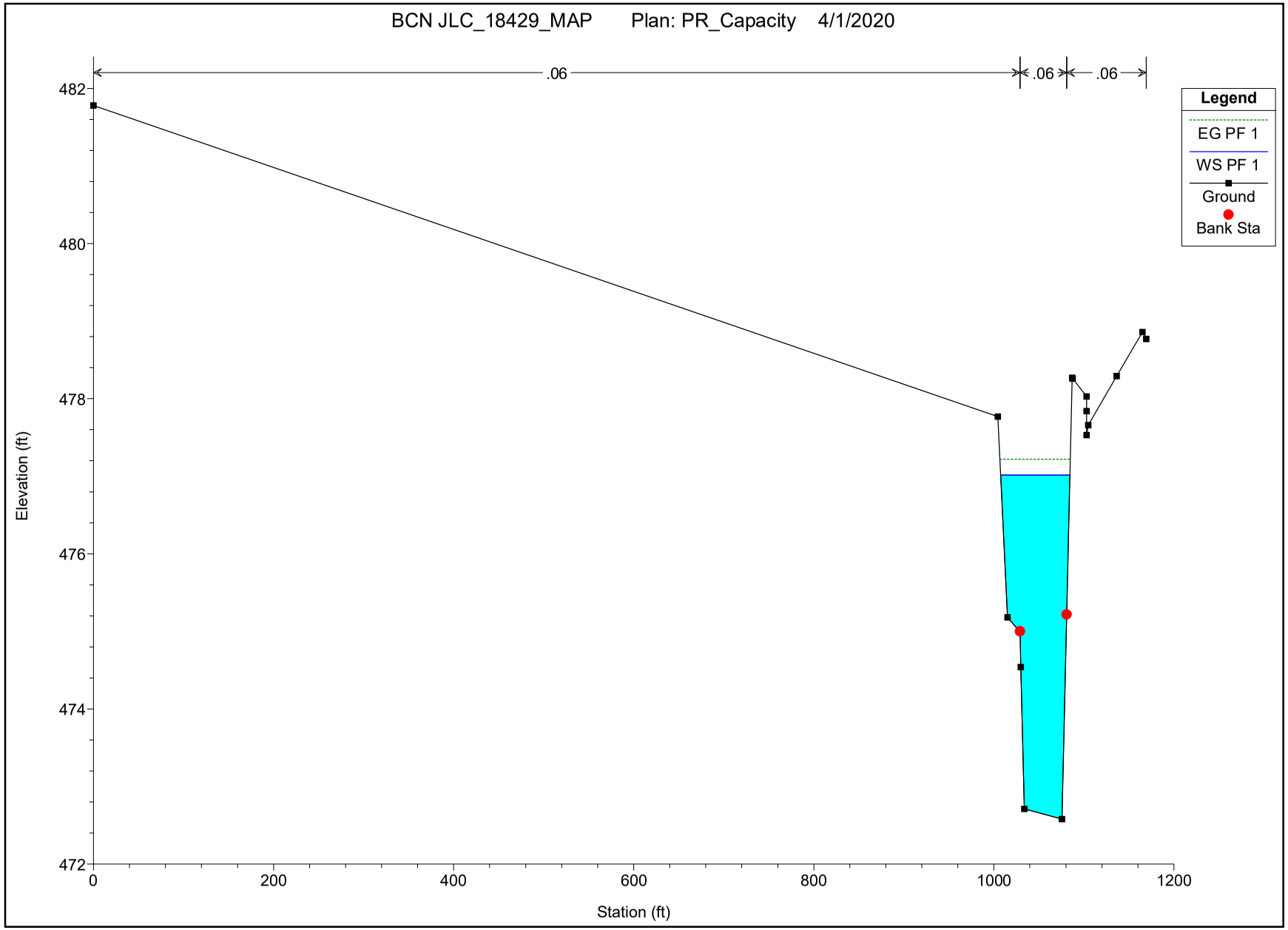
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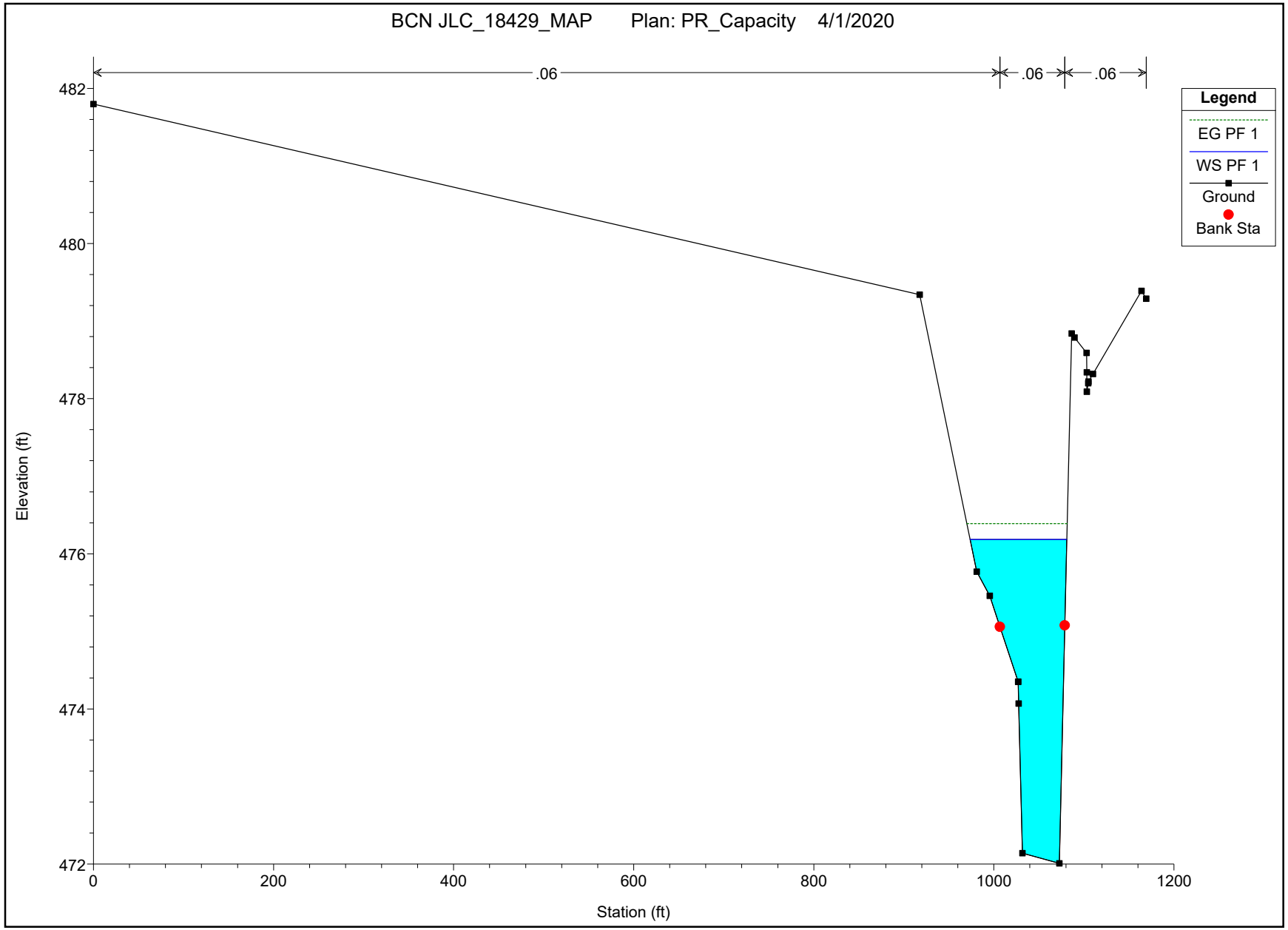
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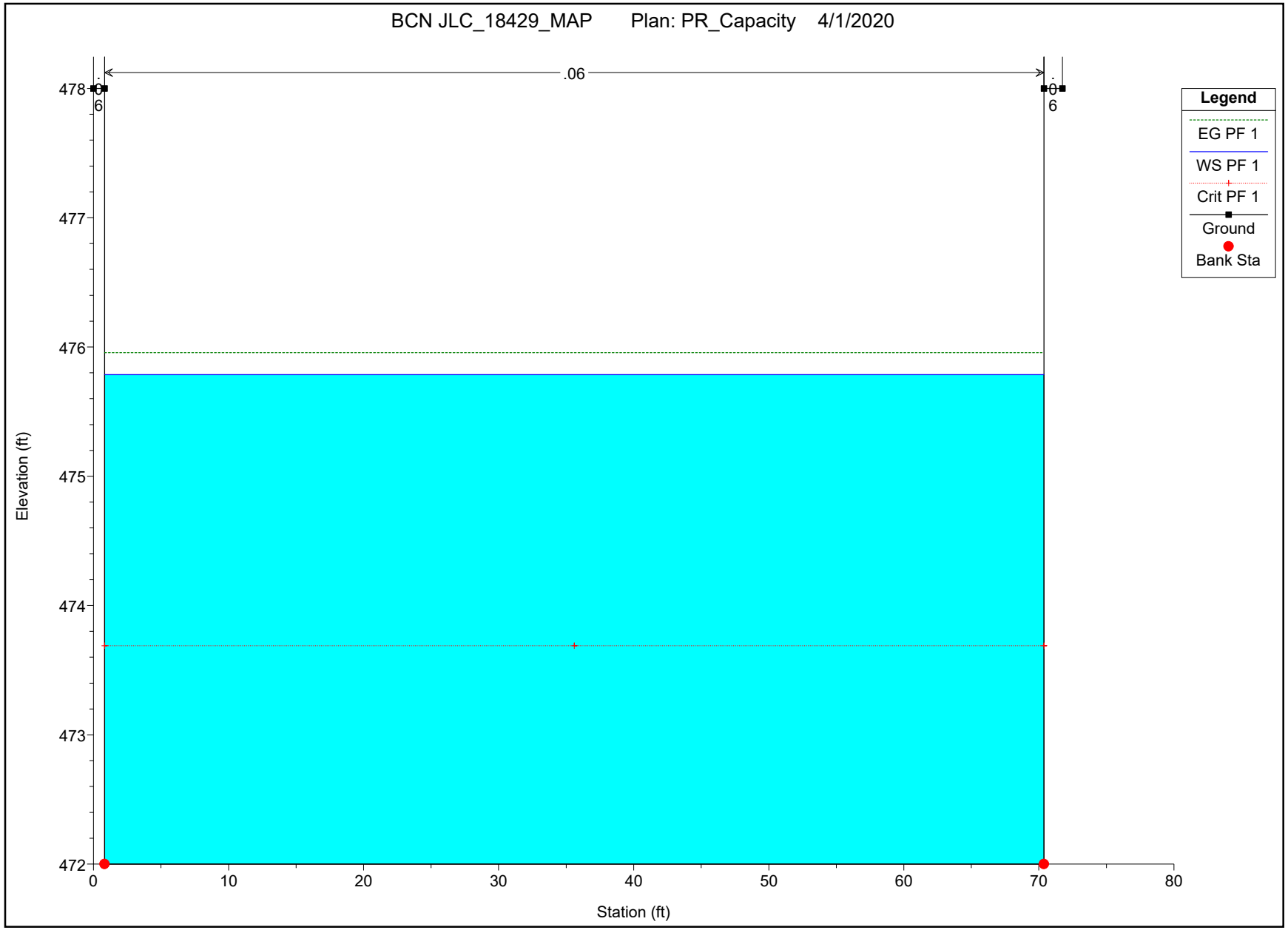
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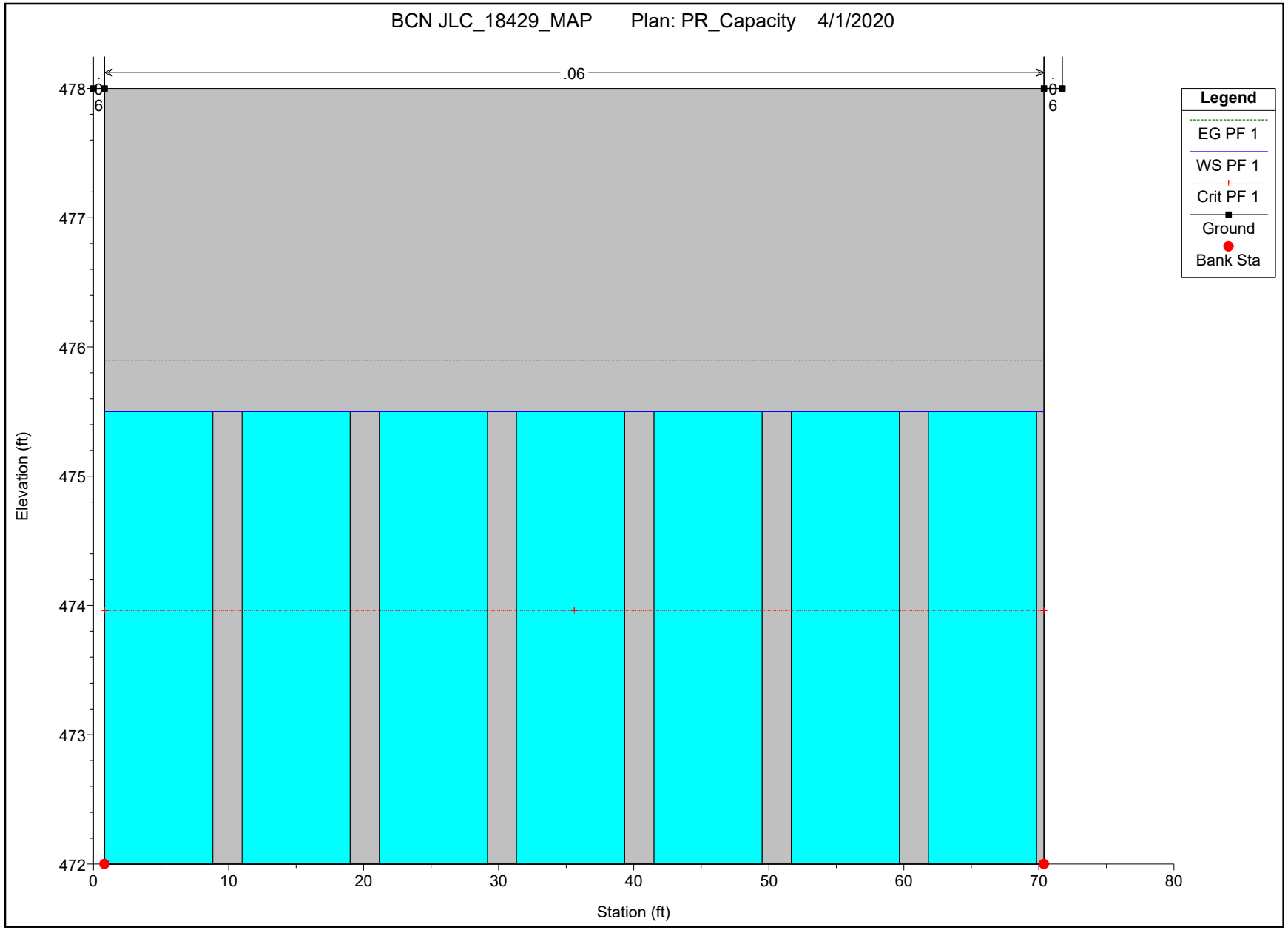
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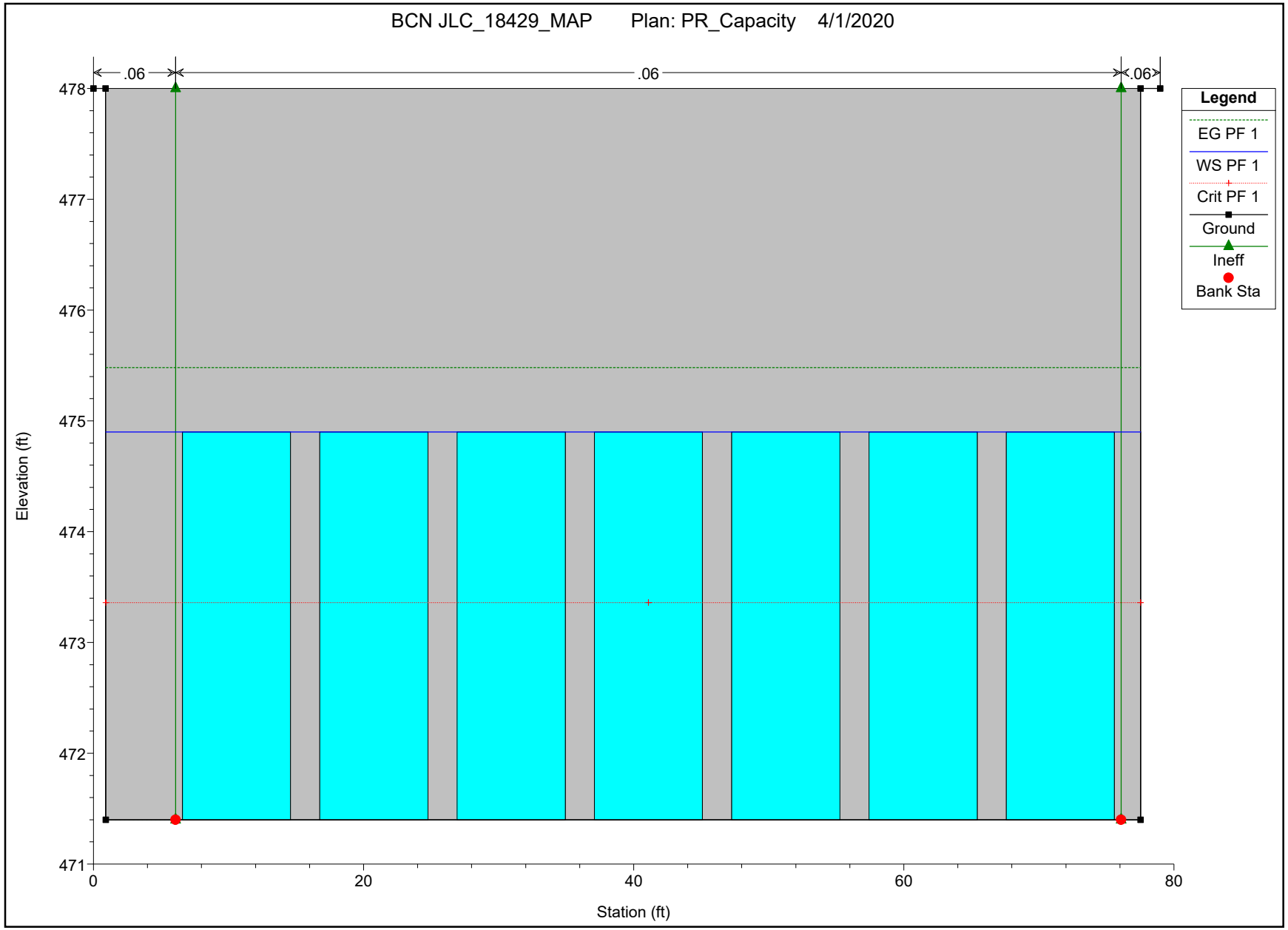
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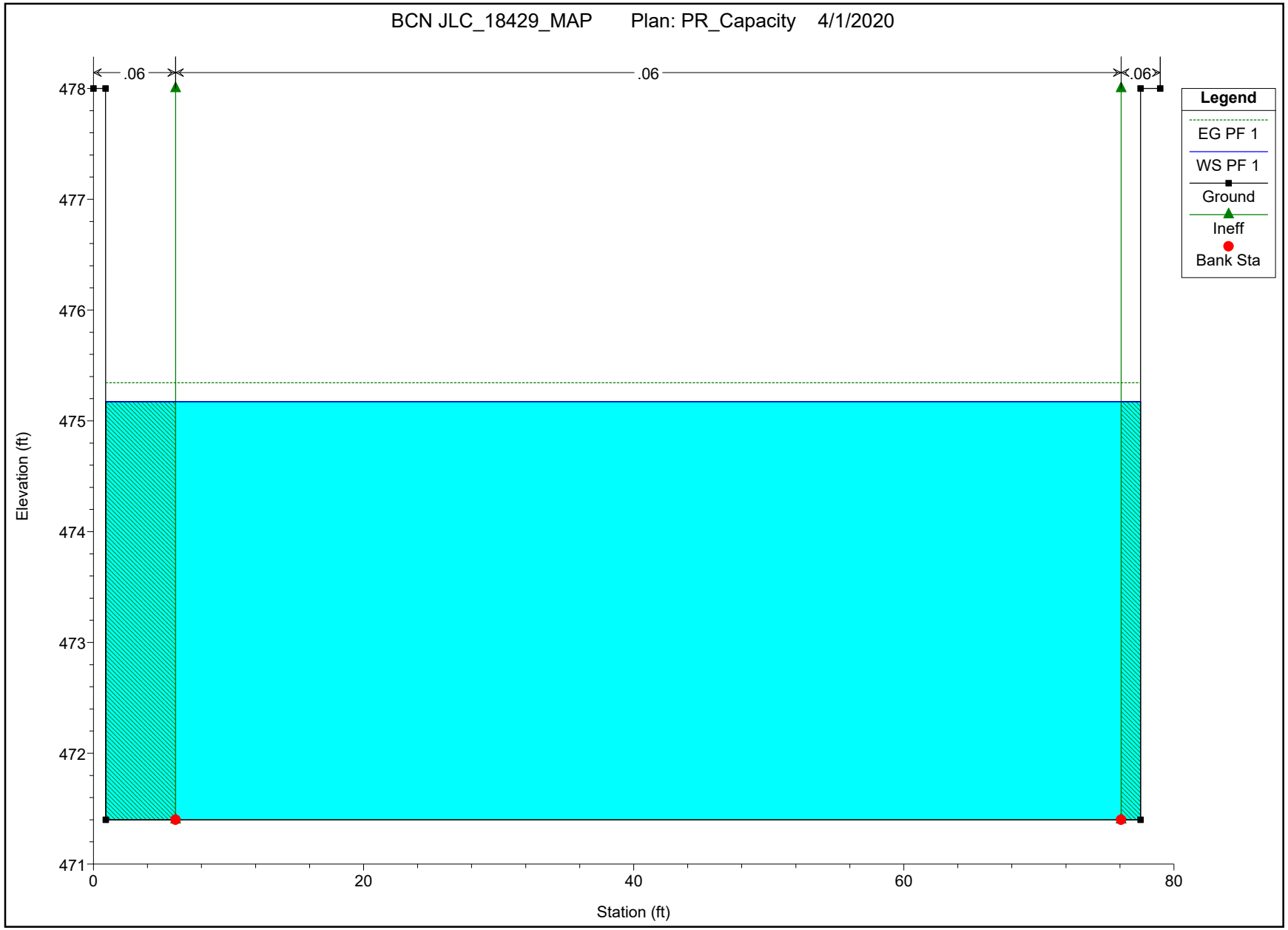
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Ground
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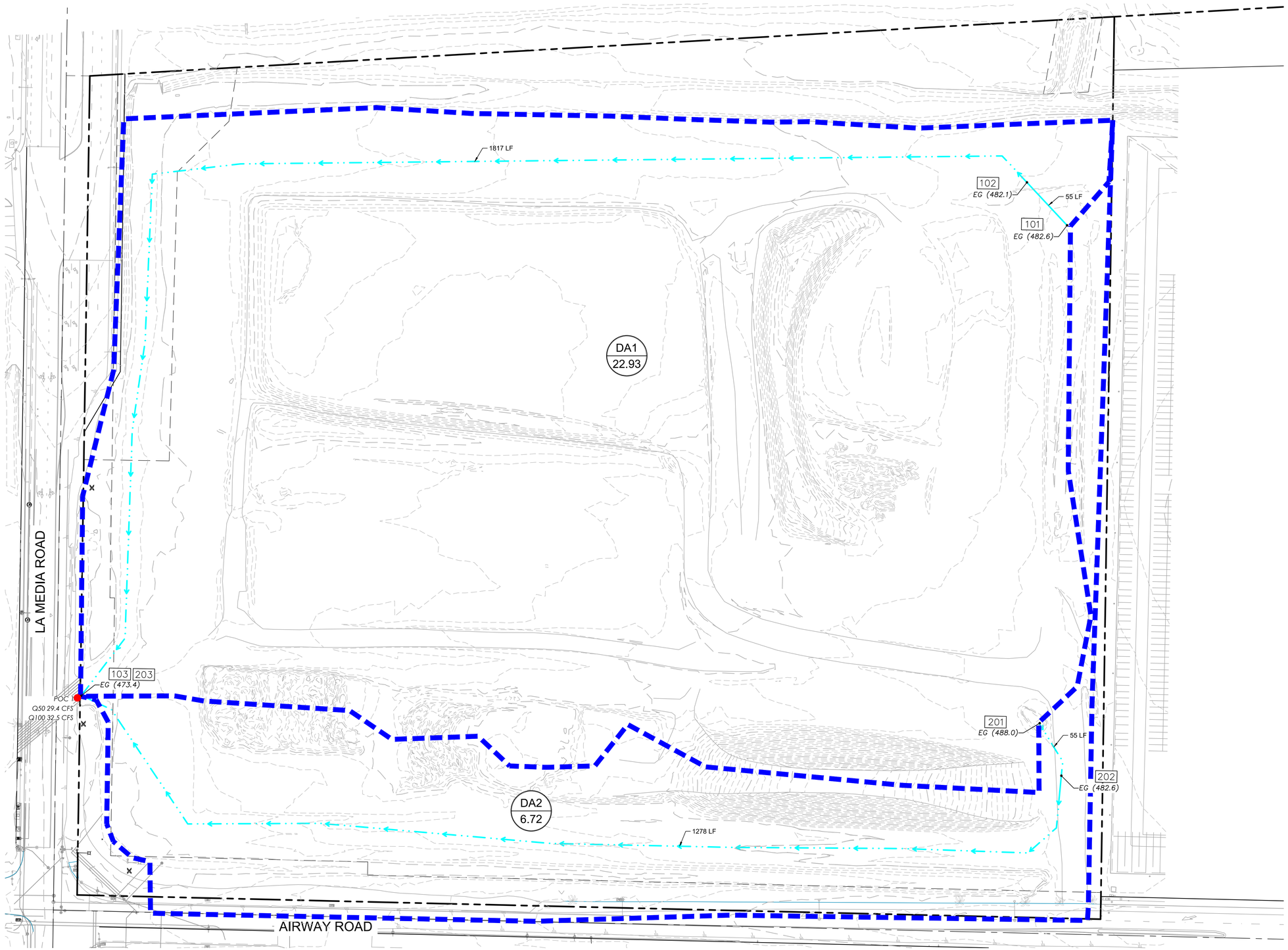
EXHIBIT A

EXISTING DRAINAGE EXHIBIT



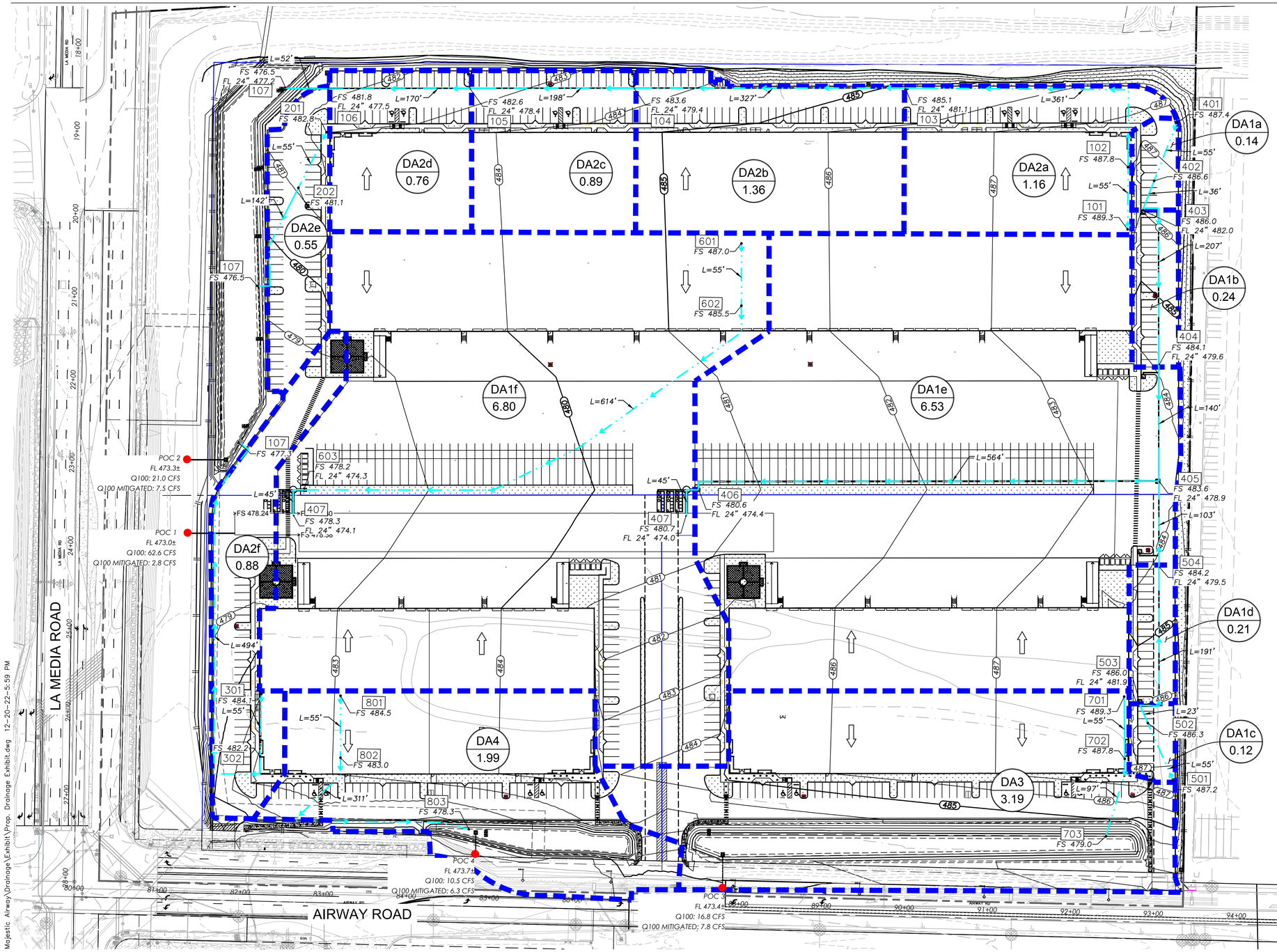
Kimley»Horn

5 May 2021

EXISTING DRAINAGE AREA EXHIBIT
MAJESTIC AIRWAY - SAN DIEGO, CALIFORNIA

EXHIBIT B

PROPOSED DRAINAGE EXHIBIT



LEGEND

- PROJECT BOUNDARY
- DRAINAGE AREA BOUNDARY
- DISCHARGE/POINT OF COMPLIANCE — POC
- NODE — 400
- RUNOFF FLOW PATH
- STORM DRAIN
- EXISTING CONTOUR — XXXX
- PROPOSED CONTOUR — XXXX
- DRAINAGE AREA LABEL — DA / AREA (ACRES)

NORTH

GRAPHIC SCALE IN FEET
0 30 60 120

K:\SND_LDEV\195208002 – Majestic Airway\Drainage\Exhibit\Prop. Drainage Exhibit.dwg 12–20–22–5:59 PM

Kimley»Horn

20 December 2022

PROPOSED DRAINAGE AREA EXHIBIT
MAJESTIC AIRWAY - SAN DIEGO, CALIFORNIA