FUSCOE
ENGINEERING

PRELIMINARY
DRAINAGE STUDY

WEST OAKS

March 2019

City Of Carlsbad, CA

prepared for:

The Carlsbad Westoaks Project Owner, LLC
2235 Encinitas Blvd. Suite 216
Encinitas, CA. 92024
760.944.7511

Fuscoe Engineering, Inc.
6390 Greenwich Drive, Suite 170
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Ken T. Kozlik, P.E.
Job # 02690-005-02

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Preliminary Drainage Study

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PREPARED BY:

_____

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Fuscoe Engineering - San Diego, Inc.

TABLE OF CONTENTS

INTRODUCTION

Project Description

The West Oaks project lies within the City of Carlsbad and consists of 192 multi-family apartment units in a 3 story walk up Type VB construction with surface parking along West Oaks Way and a new internal private loop road. The application reflects 150 market-rate and 42 affordable units on site. Located on APN's: 212-110-01 through 212-110-08 and 212-040-26 on the south side of Palomar Airport Road on West Oaks Way. The project will convert West Oaks Way into a private street and will construct a bridge over a drainage channel for secondary fire access to Palomar Airport Road. The project also contemplates bypassing and abandoning the existing gravity fed sewer line in favor of a new gravity sewer line toward the south boundary of the property.

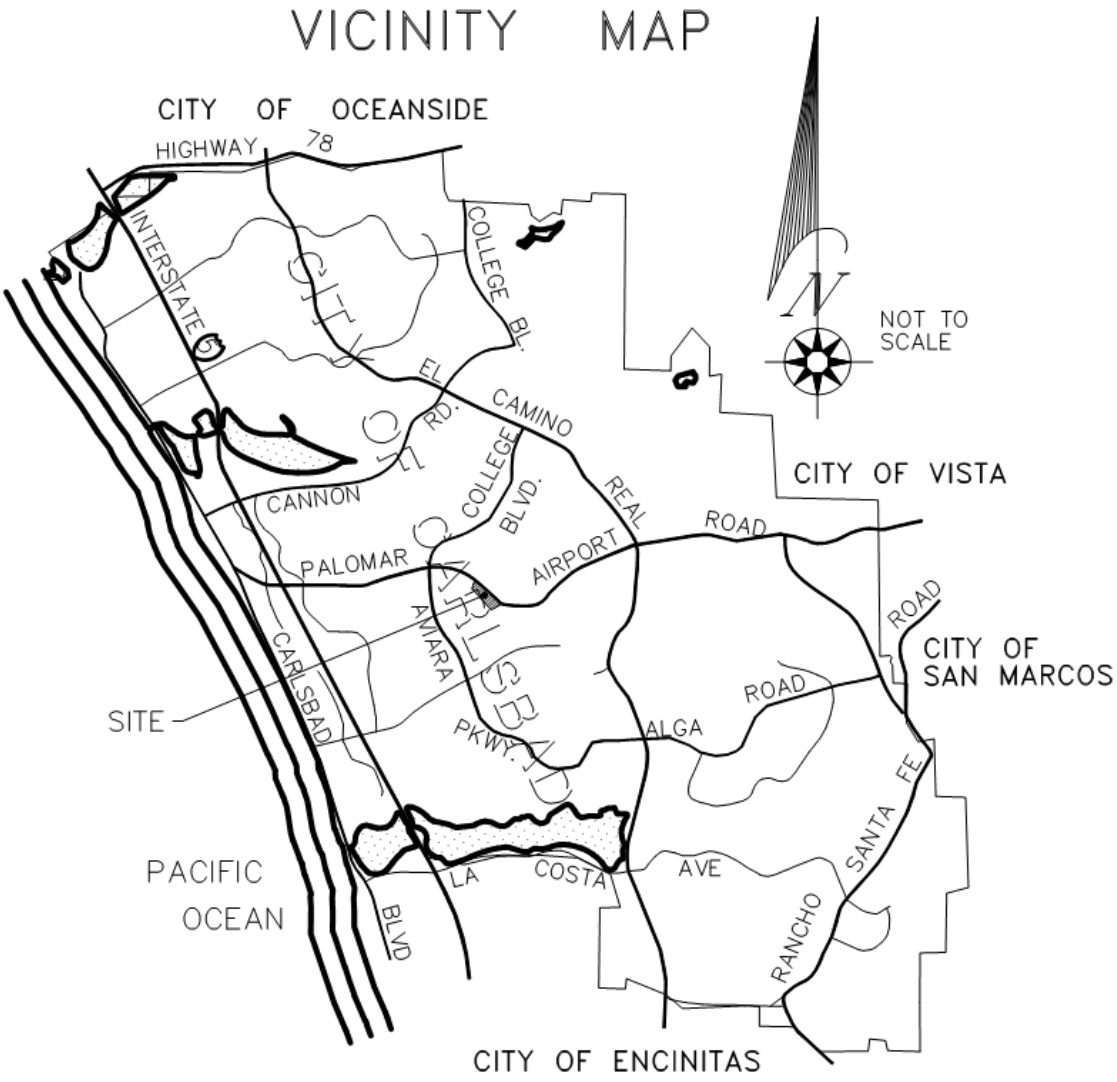


Figure 1: Vicinity Map
(not to scale)

Existing Conditions

The site consists of existing undeveloped pads that lie adjacent to West Oaks Way. The site is bounded to the north by Encinas Creek and to the south by natural slopes that rise a couple of hundred feet to a residential neighborhood above. Due to the site's location at the base of a large natural slope, the project receives runoff from off-site areas. Brow ditches along the base of the slope receive that runoff and convey it to Encinas Creek via three storm drain systems that run from south to north.

The easternmost pad has an existing Type F inlet that collects runoff, while the rest of the pads sheet flow to two curb inlets located in West Oaks Way. These inlets collect runoff and discharge to Encinas Creek. Encinas Creek leaves the site from the northwest corner of the project and continues westerly to the Pacific Ocean which lies approximately 2 miles away. Most of that length is through natural channels, although the westernmost portion of the route goes through a combination of box culverts and concrete lined channels. Please refer to **Appendix H** for the **Existing Conditions Hydrology Exhibit**.

Per data obtained from the Natural Resources Conservation Service (NRCS), Hydrologic Soil Groups A, C, and D are present within the area of study. Please refer to **Appendix B** for the **NRCS Soil Information**.

Proposed Conditions

In the proposed condition, on-site grading patterns will generally match existing to the extent feasible. The three north-south storm drain systems will be reused, and internal private storm drain will be constructed to convey stormwater through BMPs and discharge to the existing storm drain system. Biofiltration BMPs will be utilized to treat stormwater runoff. The BMPs will be underlain by storage vaults, which will provide hydromodification and detention storage. Runoff within the pads will be conveyed to the BMPs via surface flow, thus separate "clean" and "dirty" systems will not be necessary. Refer to the **SWQMP** for more information on the water quality treatment BMPs and to **Appendix H** for the **Proposed Conditions Hydrology Exhibit**.

METHODOLOGY

Runoff calculations for the West Oaks project have been performed in accordance with the 2003 County of San Diego Hydrology Manual (Manual). The AES-2014 computer program was used to calculate the peak runoff from the 100-year, 6-hour storm event using the rational method. Please refer to **Appendix C** for the **Hydrology Manual Excerpts**, and **Appendix D** for the **AES Analysis** results.

Rational Method

As mentioned above, runoff on the project site was calculated for the 100-year storm event. Runoff was calculated using the Rational Method which is given by the following equation:

$Q = C \times I \times A$

Where:
Q = Flow rate in cubic feet per second (cfs)
C = Runoff coefficient
I = Rainfall Intensity in inches per hour (in/hr)
A = Drainage basin area in acres, (ac)

Rational Method calculations were performed using the AES-2014 computer program. To perform the hydrology routing, the total watershed area is divided into sub-areas which discharge at designated nodes. The procedure for the sub-area summation model is as follows:

(1) Subdivide the watershed into an initial sub-area (generally 1 lot) and subsequent sub-areas, which are generally less than 10 acres in size. Assign upstream and downstream node numbers to each sub-area.

(2) Estimate an initial T_c by using the appropriate nomograph or overland flow velocity estimation. The minimum T_c considered is 5.0 minutes.

(3) Using the initial T_c, determine the corresponding values of I. Then Q = CIA.

(4) Using Q, estimate the travel time between this node and the next by Manning's equation as applied to particular channel or conduit linking the two nodes. Then, repeat the calculation for Q based on the revised intensity (which is a function of the revised time of concentration)

The nodes are joined together by links, which may be street gutter flows, drainage swales, drainage ditches, pipe flow, or various channel flows. The AES-2014 computer sub-area menu is as follows:

SUBAREA HYDROLOGIC PROCESS

1. Confluence analysis at node.
2. Initial sub-area analysis (including time of concentration calculation).
3. Pipe flow travel time (computer estimated).
4. Pipe flow travel time (user specified).
5. Trapezoidal channel travel time.
6. Street flow analysis through sub-area.
7. User-specified information at node.
8. Addition of sub-area runoff to main line.
9. V-gutter flow through area.
10. Copy main stream data to memory bank
11. Confluence main stream data with a memory bank
12. Clear a memory bank

At the confluence point of two or more basins, the following procedure is used to combine peak flow rates to account for differences in the basin's times of concentration. This adjustment is based on the assumption that each basin's hydrographs are triangular in shape.

(1). If the collection streams have the same times of concentration, then the Q values are directly summed to obtain Q_{peak},

$$Q_p = Q_1 + Q_2; \text{ when } T_1 = T_2; \text{ and } T_c = T_1 = T_2$$

(2). If the collection streams have different times of concentration, the independent drainage systems are combined using the following equations:

Junction Equation: $T_1 < T_2 < T_3$

$Q_{T1} = Q_1 + Q_2(T_1/T_2) + Q_3(T_1/T_3)$

$Q_{T2} = Q_2 + Q_1(I_2/I_1) + Q_3(T_2/T_3)$

$Q_{T3} = Q_3 + Q_1(I_3/I_1) + Q_2(I_3/I_2)$

Runoff Coefficient

C-factor runoff coefficients are determined for existing and proposed conditions by calculating a weighted average for each sub-basin. The proposed density of the project is 31 du/ac, thus the High Density Residential (43 du/ac or less) factors were selected for all proposed pad areas.

Impervious cover is assigned a C factor of 0.90 and Pervious cover is assigned a C-factor based on the existing underlying soil. Hydrologic Soil Groups A, C, and D are present within the area of study.

The following table summarizes the C-Factors used in the analysis:

C-FACTORS			
	SOIL TYPE A	SOIL TYPE C	SOIL TYPE D
PERVIOUS AREAS	0.20	0.30	0.35
HIGH DENSITY RESIDENTIAL	0.76	N/A	0.79

Table 1: Runoff Coefficients

See **Appendix C** for San Diego County Runoff Coefficients reference (Table 3-1).

Rainfall Intensity

Rainfall intensity was calculated using the following equation, which is given in the Manual:

$I = 7.44 \times P_6 \times (Tc^{-0.645})$

Where:
I = Rainfall Intensity in inches per hour (in/hr)
P_6 = Rainfall in inches for the 6-hour storm event = 2.7 inches
Tc = Time of concentration in minutes

Travel times between hydrology nodes were calculated by the AES-2014 computer program. For pipe flow, a Manning's N value of 0.013 was used to reflect the use of RCP pipe. For flows in concrete ditches and streets, an N value of 0.015 was used.

CALCULATIONS/RESULTS

Hydrologic Basin Peak Flows

Three points of ultimate confluence (POC) are analyzed for this project: POC A (Node 100), POC B (Node 200), and POC C (Node 300). Each POC represents an existing storm drain discharge into Encinas Creek. The proposed development layout slightly modifies the basin boundaries, but the overall study area remains constant. The proposed project increases peak flows by a total of 11 cfs, and 100-year detention is required to attenuate this increase. The proposed detention facilities will attenuate the project's proposed peak flows by a total of 12 cfs, which results in a net decrease of 1.1 cfs in total peak flow from Existing to Detained scenarios.

The following table summarizes Existing, Proposed (pre-detention), and Detained (post-detention) peak flows for the 100-year 6-hour rainfall event:

100-YEAR HYDROLOGY SUMMARY					
POC	BASIN AREA (AC)		100 YR PEAK FLOW (CFS)		
	EXISTING	PROPOSED	EXISTING	PROPOSED	DETAINED
A	9.49	9.96	16.8	20.4	20.4
B	11.00	11.32	21.8	27.1	18.5
C	15.52	14.73	24.0	26.1	22.6
TOTAL	**36.01**	**36.01**	**62.6**	**73.6**	**61.5**

Table 2: 100-Year Peak Flow Rate Comparison

100-Year Detention Design

As shown on the DMA Exhibit in Appendix H, eight detention BMPs are designed to mitigate the 100-Year Proposed Peak Flow. Typical BMP configuration consists of a biofiltration basin underlain by an underground storage vault (RainStore3 or approved equivalent). The basins are typically 1.5' deep (12" ponding + 6" freeboard). Low flows will filter through the biofiltration basin layers and into the detention chambers. An overflow riser bypasses high flows directly to the detention chamber. Vertical orifice(s) on the riser provide additional hydromodification draw-down. Detention chamber depths vary from ~19" to ~39". A typically 12" outlet pipe will discharge treated and detained stormwater to the storm drain system. The ponding depth accommodates pollutant control, hydromodification management, and, as necessary, 100-Year detention storage. Detention chambers are sized for stacked hydromodification and 100-Year detention storage.

Hydromodification analysis was performed using SDHM 3.1. SDHM analyzes existing and proposed conditions at a specified POC, and the same POCs used in the detention analysis were specified for the hydromodification analysis. The SDHM Results for POCs A, B, and C are included in Appendix E and more information regarding hydromodification design can be found in the Storm Water Quality Management Plan prepared for this project.

Hydraflow was used to model the 100-Year detention analysis for each detention vault. A Hydraflow model consisting of an inflow hydrograph, basin sizing, and outlet parameters, was created for each detention BMP. Hydraflow model inputs were gathered from both the AES and SDHM analyses. Design storm inflow hydrographs were generated using RickRat Hydro using values calculated by the

Proposed AES scenario. The optimized SDHM models provide the ponding depth and corresponding water surface elevation required to provide hydromodification control. This hydromodification water surface elevation is input as the ponding datum for the Hydraflow model. This conservative approach provides storage for the potential scenario of back-to-back rainstorms where the hydromodification volume is still being held within the basin when the 100-Year rainstorm begins. The RickRat Hydrographs and Hydraflow Results are included in Appendix F.

The detention BMPs detain a total of 12.1 cfs, which will mitigate the increase in peak flow due to the proposed improvements. Upstream POCs B and C will over-detain for POC A. POC A is the most downstream point of confluence and over-detaining at the upstream POCs will result in a mitigated 100-Year flow at the final point of confluence.

The 100-Year Detention Analysis is summarized in Table 3.

100-YEAR DETENTION ANALYSIS			
BMP	PRE-DETENTION (CFS)	POST-DETENTION (CFS)	Δ (CFS)
1	4.8	1.4	-3.4
2A	1.9	1.1	-0.8
2B	0.6	0.4	-0.2
2C	1.0	0.4	-0.6
3	6.5	2.9	-3.6
4	2.0	1.3	-0.7
5	3.1	1.8	-1.3
6	4.0	2.5	-1.5
7	6.8	6.8	-0
8	6.0	6.0	-0
TOTAL	**36.7**	**24.6**	**-12.1**

Table 3: 100-Year Detention Analysis

Refer to the DMA Exhibit in Appendix G for additional details on the detention BMPs.

100 Year Floodplain Analysis

A HEC-RAS analysis was completed to see if the existing channel will adequately contain a 100 year storm. Cross sections were modeled in HEC-RAS 5.0.6 for both the existing and proposed conditions. A 100-year storm event flow of Q_{100}=922 cfs was used, per the City's master drainage study.

A high channel roughness run was conducted to check for flood elevations in the proposed condition. For this run, the roughness factor of earthen portions was set to 0.15. This roughness factor simulates a channel that has not been well maintained and has become overgrown. In this worst-case condition, 100 year flows near station 24+00 would rise to 125.5. The existing retaining wall at that location is at elevation 125, thus it will be overtopped. A broad crested weir calculation determined that there would be approximately 43 cfs spilling over the wall into the roadway due to the overtopping. A split

flow was defined in the HEC-RAS analysis to account for the overtopped amount. Once water surface elevations were determined for both runs, the finished floor elevations were adjusted to ensure that all buildings were at least one foot higher than the 100 year flood elevations.

A low channel roughness run was conducted to check for erosive velocities in the channel. For this run the roughness factor was set to 0.03 in earthen channel areas. The highest resulting velocities were found near the exits of the large box culvert between stations 20+20 and 21+40 which are already lined in concrete. The station near the exit of the eastern culvert also reported a higher velocity (13.5 ft/sec) however it quickly drops to 6.1 ft/sec at the adjacent section, 28+00. Velocities in the remaining portions of the channel vary. Rip rap energy dissipaters are proposed for sections of the channel with velocities exceeding ~5 ft/s. These energy dissipaters are designed per SDRSD D-40. See the Grading Plan (Sheets 5 – 7 of the Tentative Map) for more detailed design.

CONCLUSION

The three hydrologic basins within the area of study were modeled in AES for both the 100-year Existing and Proposed conditions. As shown in the analyses, the proposed peak flow increase of 11 cfs will be mitigated by the proposed on-site detention facilities, and no adverse impacts are anticipated downstream. The proposed facilities will provide pollutant control, hydromodification flow control, and 100-Year detention storage before discharging stormwater to Encinas Creek. Please refer to **Appendix D** for the **AES Analysis** and **Appendix F** for the **Detention Analysis**. All proposed storm water facilities will be privately maintained by the project's homeowner's association.

A HEC-RAS study was conducted for Encinas Creek as it runs adjacent to the project. It was determined that the existing box culvert is adequate to convey the majority of flows, but larger storm events such as a 100 year storm will cause flows to spill out onto the roadway up to a depth of about 7". Please refer to **Appendix G** for the **HEC-RAS Analysis**.

Appendix A

Declaration of Responsible Charge

"DECLARATION OF RESPONSIBLE CHARGE"

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

FUSCOE ENGINEERING, INC.
6390 GREENWICH DRIVE, SUITE 170
SAN DIEGO, CALIFORNIA 92122
(858) 554–1500

BY: _____

KENNETH T. KOZLIK, P.E.
R.C.E. NO.: 71883
REGISTRATION EXPIRATION DATE: DECEMBER 31, 2019

Appendix B

NRCS Soil Information

Soil Map—San Diego County Area, California
(West Oaks)

Map Scale: 1:5,610 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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 12, Sep 13, 2017

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

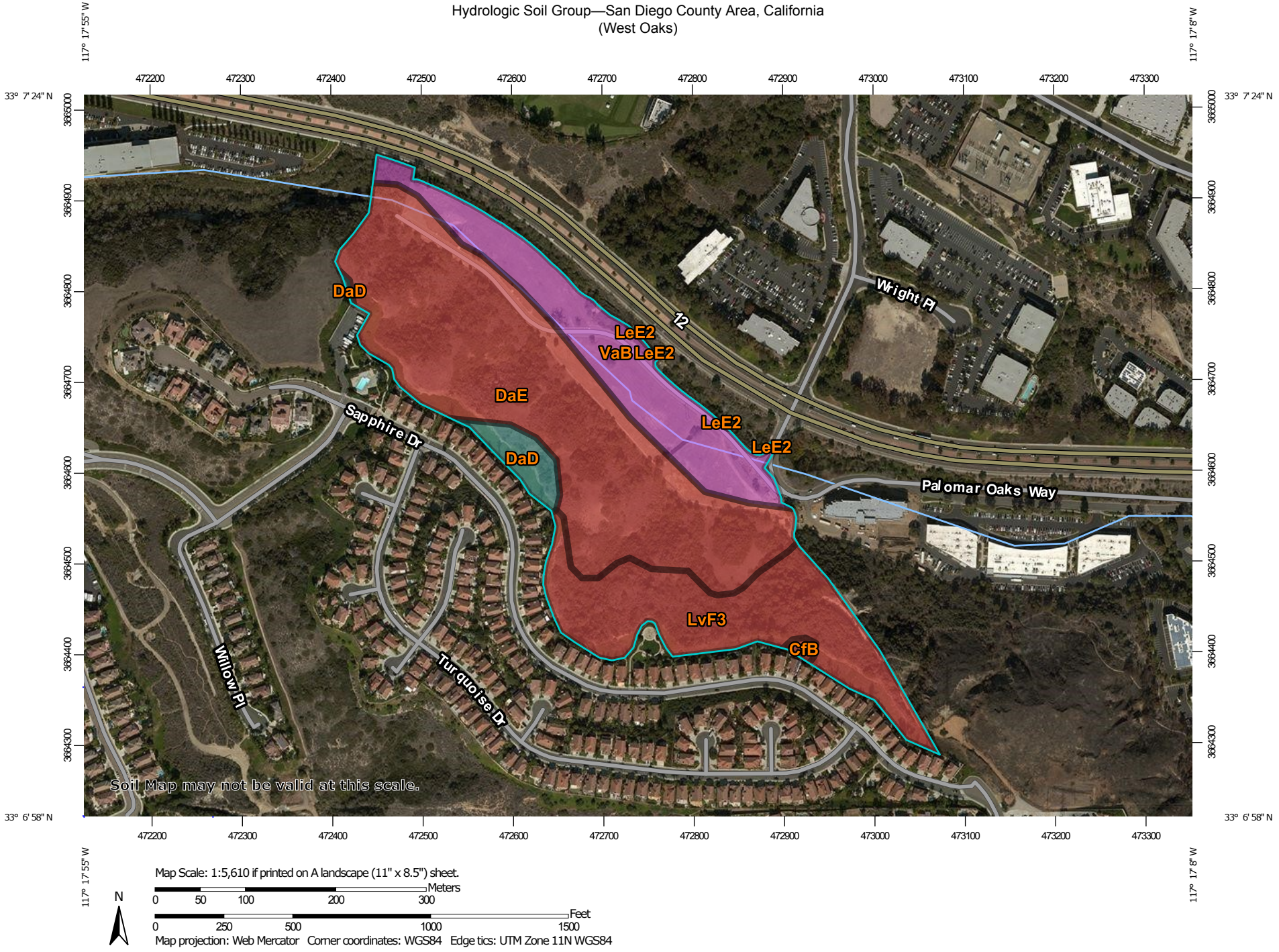
Date(s) aerial images were photographed: Nov 3, 2014—Nov 22, 2014

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
CfB	Chesterton fine sandy loam, 2 to 5 percent slopes	0.1	0.4%
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT, MLRA 20	1.2	3.3%
DaE	Diablo clay, 15 to 30 percent slopes	19.1	53.2%
LeE2	Las Flores loamy fine sand, 15 to 30 percent slopes, eroded	0.0	0.1%
LvF3	Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded	8.5	23.6%
VaB	Visalia sandy loam, 2 to 5 percent slopes	7.0	19.5%
Totals for Area of Interest		**36.0**	**100.0%**

Hydrologic Soil Group—San Diego County Area, California
(West Oaks)



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N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

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 Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

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.

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Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

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Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CfB	Chesterton fine sandy loam, 2 to 5 percent slopes	D	0.1	0.4%
DaD	Diablo clay, 9 to 15 percent slopes, warm MAAT, MLRA 20	C	1.2	3.3%
DaE	Diablo clay, 15 to 30 percent slopes	D	19.1	53.2%
LeE2	Las Flores loamy fine sand, 15 to 30 percent slopes, eroded	D	0.0	0.1%
LvF3	Loamy alluvial land-Huerhuero complex, 9 to 50 percent slopes, severely eroded	D	8.5	23.6%
VaB	Visalia sandy loam, 2 to 5 percent slopes	A	7.0	19.5%
Totals for Area of Interest			**36.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) 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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

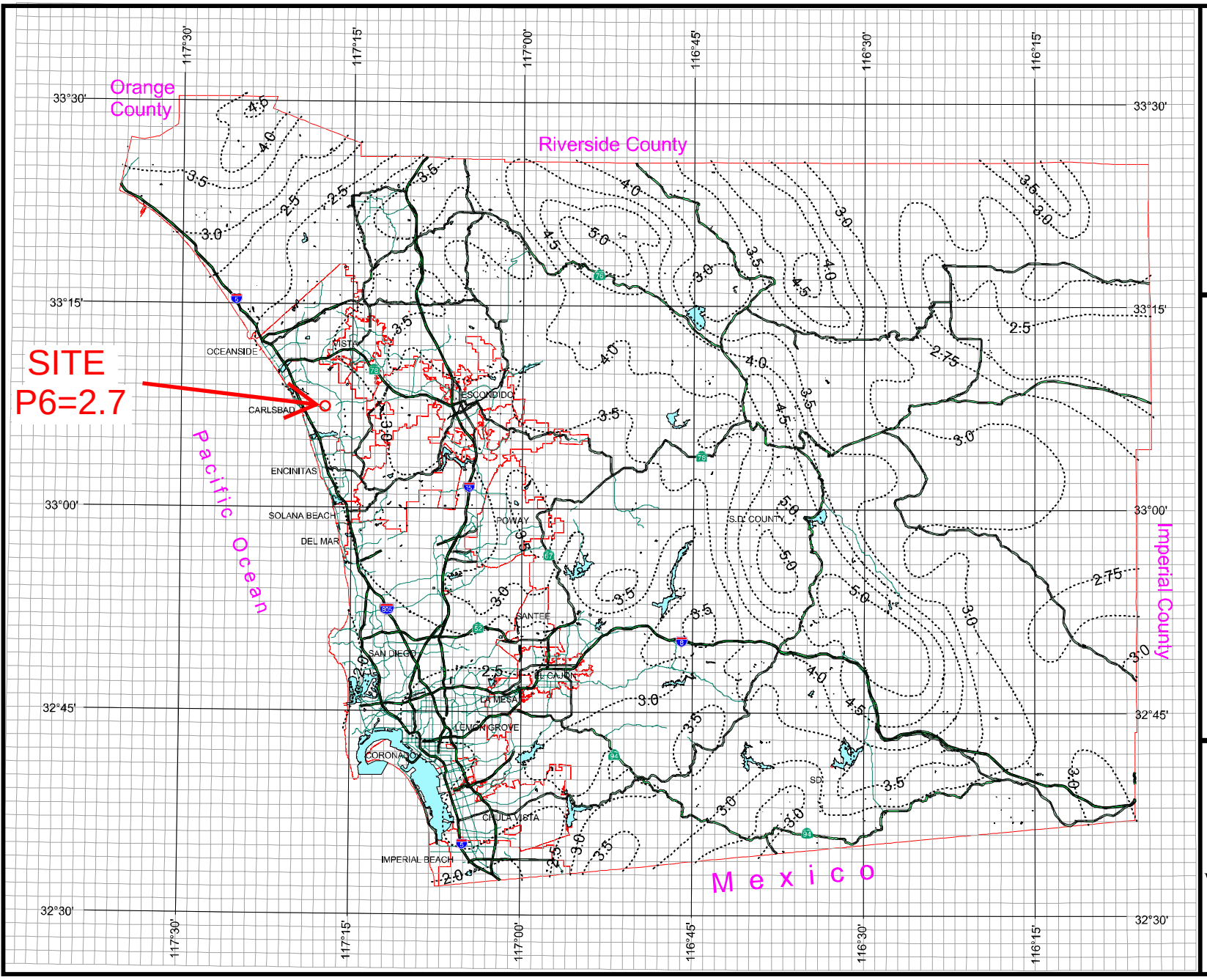
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Appendix C

Hydrology Manual Excerpts
100 Year, 6 Hour Isopluvial Map
100 Year, 24 Hour Isopluvial Map
Table 3-1
Excerpt from "Carlsbad Drainage Master Plan, Appendix A"
Pages 126-128
Pages 144-151



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

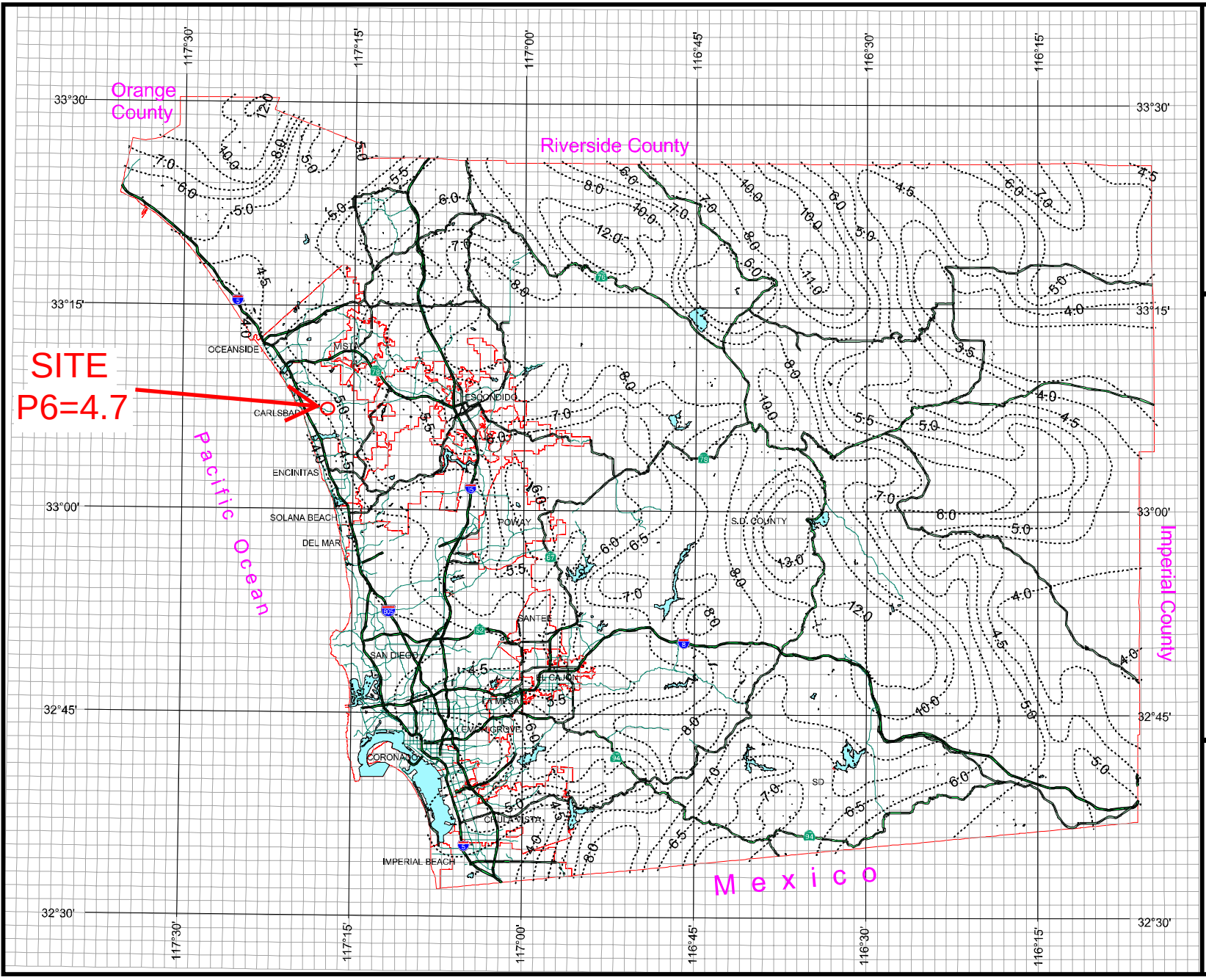
Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

Isopluvial (inches)

DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!

N
W E
S

3 0 3 Miles

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

Excerpts from "Carlsbad Drainage Master Plan, Appendix A"

Project C – 1
Carlsbad Boulevard South Project

Project C – 2
Paseo Del Norte Project

LEGEND

- JUNCTIONS
- FLOWLINE
- CONCRETE CULVERT
- GUTTER
- RCP
- SUBCATCHMENTS
- ROADS

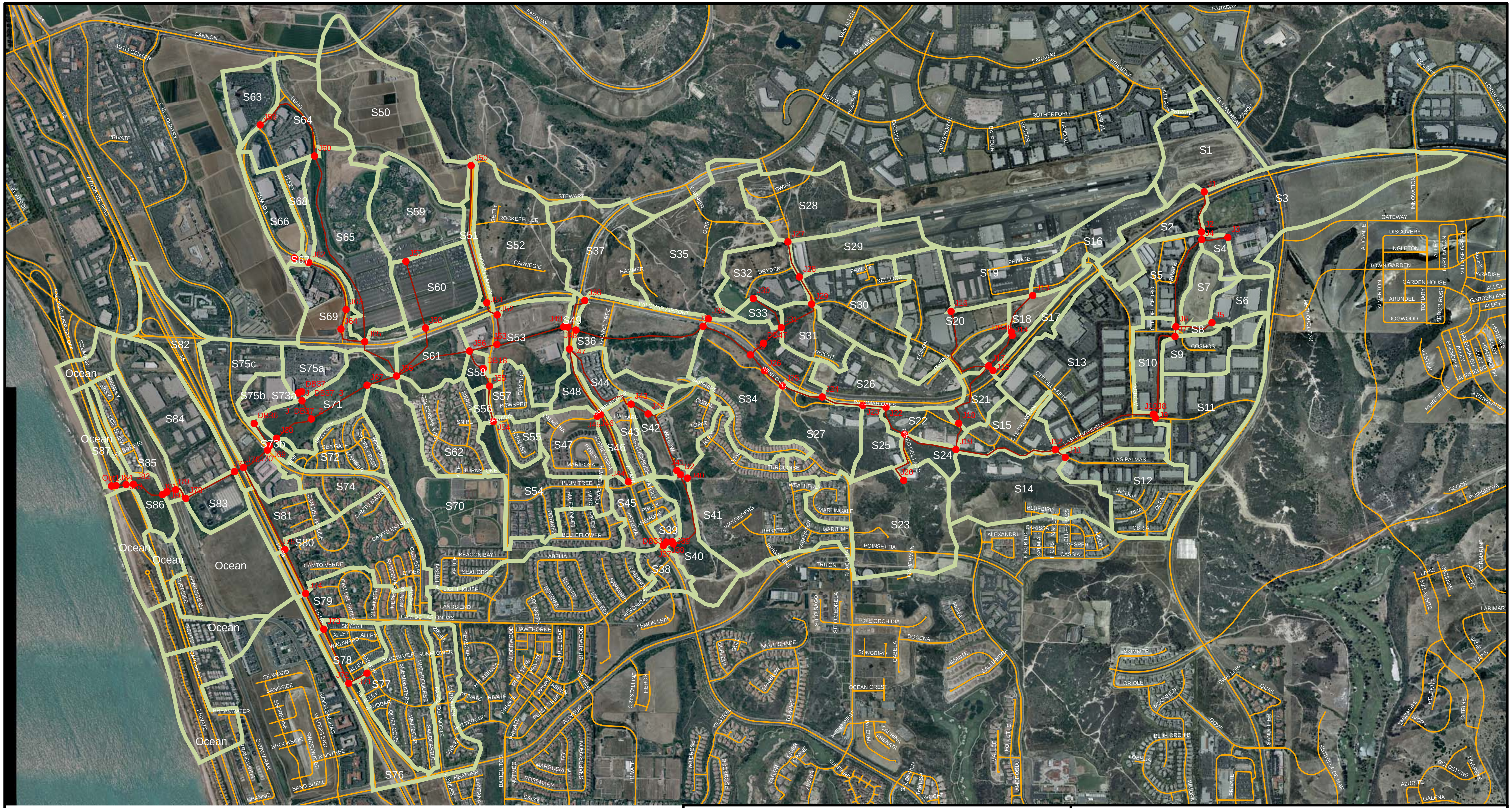
PROJECTS C1 AND C2

BASIN C

WATERSHED MODEL

PROJECT LOCATION	DATE	PROJECT NUMBER
CARLSBAD, CALIFORNIA	NOV 2007	128290

BROWN AND CALDWELL
SAN DIEGO, CALIFORNIA



N
W E
S

0 0.375 0.75 1.5 Miles

LEGEND

- JUNCTIONS
- FLOWLINE
- CONCRETE CULVERT
- GUTTER
- RCP
- SUBCATCHMENTS
- ROADS

PROJECTS C1 AND C2
BASIN C
WATERSHED MODEL

PROJECT LOCATION	DATE	PROJECT NUMBER
CARLSBAD, CALIFORNIA	NOV 2007	128290

BROWN AND CALDWELL
SAN DIEGO, CALIFORNIA

Project C – 1

Project C – 2

SWMM 5.0 – Output

100 Year 6 Hour Storm

Basin C Model including Sedimentation Basins

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.0 (Build 5.0.009)

Basin C Model including Sedimentation Basins

****
Analysis Options
****

Flow Units	CFS
Infiltration Method	GREEN_AMPT
Flow Routing Method	KINWAVE
Starting Date	SEP-30-2005 22:00:00
Ending Date	OCT-03-2005 00:00:00
Antecedent Dry Days	0.0
Report Time Step	00:15:00
Wet Time Step	00:15:00
Dry Time Step	01:00:00
Routing Time Step	30.00 sec

Runoff Quantity Continuity	Volume acre-feet	Depth inches
Total Precipitation	527.376	2.655
Evaporation Loss	0.000	0.000
Infiltration Loss	146.647	0.738
Surface Runoff	384.957	1.938
Final Surface Storage	0.046	0.000
Continuity Error (%)	-0.810	

Flow Routing Continuity	Volume acre-feet	Volume Mgallons
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	386.152	125.834
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	300.200	97.825
Surface Flooding	49.141	16.013
Evaporation Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.533	0.174
Continuity Error (%)	9.395	

****
Subcatchment Runoff Summary
****

Subcatchment	Total Precip in	Total Runon in	Total Evap in	Total Infil in	Total Runoff in	Peak Runoff CFS	Runoff Coeff
S1	2.800	0.000	0.000	0.136	2.397	67.63	0.856
S2	2.800	0.000	0.000	0.136	2.686	45.11	0.959
S3	2.800	0.000	0.000	0.074	2.745	144.45	0.980
S4	2.800	0.000	0.000	0.300	2.526	9.73	0.902
S5	2.800	0.000	0.000	0.378	2.453	45.81	0.876
S6	2.800	0.000	0.000	0.388	2.443	21.93	0.872
S7	2.800	0.000	0.000	0.382	2.451	22.73	0.875
S8	2.800	0.000	0.000	0.133	2.676	4.14	0.956
S9	2.800	0.000	0.000	0.136	2.686	38.97	0.959
S10	2.800	0.000	0.000	0.382	2.450	30.24	0.875
S11	2.800	0.000	0.000	0.135	2.686	100.84	0.959
S12	2.800	0.000	0.000	0.872	1.965	86.81	0.702
S13	2.800	0.000	0.000	0.296	2.530	179.68	0.904
S14	2.800	0.000	0.000	1.311	1.527	88.55	0.545
S15	2.800	0.000	0.000	0.134	2.684	41.37	0.958

Basin C Model including Sedimentation Basins

S16	2.800	0.000	0.000	0.137	2.680	49.50	0.957
S17	2.800	0.000	0.000	0.391	2.429	22.36	0.867
S18	2.800	0.000	0.000	0.136	2.685	22.44	0.959
S19	2.800	0.000	0.000	0.127	2.694	59.16	0.962
S20	2.800	0.000	0.000	0.154	2.666	101.01	0.952
S21	2.800	0.000	0.000	0.226	2.593	24.67	0.926
S22	2.600	0.000	0.000	0.282	2.340	22.47	0.900
S23	2.600	0.000	0.000	1.490	1.149	102.57	0.442
S24	2.600	0.000	0.000	0.342	2.272	17.01	0.874
S25	2.600	0.000	0.000	0.528	2.097	23.64	0.807
S26	2.800	0.000	0.000	0.226	2.594	67.77	0.926
S27	2.600	0.000	0.000	0.776	1.857	59.79	0.714
S28	2.600	0.000	0.000	0.135	2.484	74.32	0.955
S29	2.600	0.000	0.000	0.134	2.484	47.90	0.955
S30	2.600	0.000	0.000	0.144	2.475	74.63	0.952
S31	2.600	0.000	0.000	0.675	1.959	25.66	0.753
S32	2.600	0.000	0.000	0.301	2.321	46.73	0.893
S33	2.600	0.000	0.000	0.965	1.673	7.30	0.644
S34	2.600	0.000	0.000	0.311	2.310	110.85	0.888
S35	2.600	0.000	0.000	0.385	2.243	121.44	0.863
S36	2.600	0.000	0.000	0.232	2.387	85.92	0.918
S37	2.600	0.000	0.000	0.481	2.149	69.55	0.827
S38	2.600	0.000	0.000	1.433	1.206	15.71	0.464
S39	2.600	0.000	0.000	1.418	1.226	4.84	0.472
S40	2.600	0.000	0.000	1.478	1.157	33.41	0.445
S41	2.600	0.000	0.000	1.456	1.172	105.79	0.451
S42	2.600	0.000	0.000	0.380	2.239	54.27	0.861
S43	2.600	0.000	0.000	0.371	2.247	18.90	0.864
S44	2.600	0.000	0.000	0.282	2.337	32.15	0.899
S45	2.600	0.000	0.000	1.425	1.216	28.74	0.468
S46	2.600	0.000	0.000	1.676	0.961	7.79	0.369
S47	2.600	0.000	0.000	1.825	0.792	18.85	0.305
S48	2.600	0.000	0.000	0.374	2.244	15.13	0.863
S49	2.600	0.000	0.000	0.944	1.690	5.17	0.650
S50	2.600	0.000	0.000	0.934	1.690	94.02	0.650
S51	2.600	0.000	0.000	0.410	2.219	13.77	0.853
S52	2.600	0.000	0.000	0.393	2.233	85.48	0.859
S53	2.600	0.000	0.000	0.987	1.649	64.83	0.634
S54	2.600	0.000	0.000	1.386	1.244	56.17	0.479
S55	2.600	0.000	0.000	1.318	1.317	13.09	0.507
S56	2.600	0.000	0.000	1.692	0.963	3.29	0.370
S57	2.600	0.000	0.000	1.436	1.199	18.55	0.461
S58	2.600	0.000	0.000	1.972	0.692	4.80	0.266
S59	2.600	0.000	0.000	0.364	2.264	63.72	0.871
S60	2.600	0.000	0.000	0.356	2.269	52.83	0.873
S61	2.600	0.000	0.000	1.493	1.155	26.09	0.444
S62	2.600	0.000	0.000	1.646	0.979	38.76	0.377
S63	2.600	0.000	0.000	0.481	2.149	28.85	0.827
S64	2.600	0.000	0.000	1.034	1.590	49.90	0.612
S65	2.600	0.000	0.000	0.356	2.269	49.32	0.873
S66	2.600	0.000	0.000	0.484	2.147	13.51	0.826
S67	2.600	0.000	0.000	0.330	2.288	1.77	0.880
S68	2.600	0.000	0.000	0.240	2.385	16.12	0.917
S69	2.600	0.000	0.000	0.868	1.770	46.85	0.681
S70	2.600	0.000	0.000	1.858	0.760	88.03	0.292
S71	2.600	0.000	0.000	0.309	2.310	36.80	0.888
S72	2.600	0.000	0.000	1.748	0.877	20.22	0.337
S73b	2.600	0.000	0.000	1.604	1.050	2.73	0.404
S74	2.600	0.000	0.000	1.462	1.163	22.03	0.447
S75a	2.600	0.000	0.000	1.558	1.089	7.41	0.419
S75b_S73a	2.600	0.000	0.000	0.390	2.201	9.13	0.846
S75c	2.600	0.000	0.000	0.397	2.227	66.11	0.857
S76	2.600	0.000	0.000	1.155	1.461	42.48	0.562
S77	2.600	0.000	0.000	1.741	0.879	39.81	0.338
S78	2.600	0.000	0.000	0.974	1.660	28.72	0.639
S79	2.600	0.000	0.000	1.483	1.142	34.87	0.439
S80	2.600	0.000	0.000	1.299	1.330	80.84	0.511
S81	2.600	0.000	0.000	0.838	1.796	31.17	0.691
S82	2.600	0.000	0.000	0.047	2.569	59.39	0.988
S83	2.600	0.000	0.000	1.039	1.593	20.23	0.613
S84	2.600	0.000	0.000	0.462	2.163	83.37	0.832
S85	2.600	0.000	0.000	0.945	1.693	32.54	0.651

S86	2.600	0.000	0.000	1.640	1.003	13.74	0.386
S87	2.600	0.000	0.000	1.701	0.924	4.91	0.355
System	2.655	0.000	0.000	0.738	1.938	3971.66	0.730

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Node Depth Summary
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Node	Type	Average Depth Feet	Maximum Depth Feet	Maximum HGL Feet	Time of Max Occurrence days hr:min	Total Flooding acre-in	Total Minutes Flooded
J1	JUNCTION	0.06	1.00	261.50	0 14:25	7.37	30
J2	JUNCTION	0.07	1.00	247.00	0 14:24	12.57	35
J3	JUNCTION	0.12	1.98	277.09	0 14:45	0	0
J4	JUNCTION	0.12	1.98	244.98	0 14:45	0	0
J5	JUNCTION	0.04	0.66	274.97	0 14:45	0	0
J6	JUNCTION	0.08	3.00	219.00	0 14:28	16.97	25
J7	JUNCTION	0.08	1.22	214.12	0 14:45	0	0
J8	JUNCTION	0.08	1.41	199.41	0 14:31	0	0
J9	JUNCTION	0.05	1.08	200.88	0 14:45	0	0
J10	JUNCTION	0.09	1.67	196.37	0 14:31	0	0
J11	JUNCTION	0.12	3.00	182.42	0 14:27	2.85	23
J12	JUNCTION	0.13	3.00	180.45	0 14:29	0	0
J13	JUNCTION	0.07	1.04	277.04	0 14:45	0	0
J15	JUNCTION	0.02	0.42	213.42	0 14:45	0	0
J16	JUNCTION	0.07	1.24	280.24	0 14:45	0	0
J17	JUNCTION	0.15	3.00	192.00	0 14:26	23.08	31
J18	JUNCTION	0.43	5.00	162.54	0 14:23	35.60	57
J19	JUNCTION	0.42	5.00	162.00	0 14:26	0	7
J20	JUNCTION	0.06	1.77	194.77	0 14:45	0	0
J21	JUNCTION	0.13	2.14	145.48	0 14:46	0	0
J22	JUNCTION	0.37	9.00	143.13	0 14:28	163.96	38
J23	JUNCTION	0.31	4.00	132.00	0 14:41	0	0
J24	JUNCTION	0.18	2.73	128.73	0 14:28	0	0
J25	JUNCTION	0.47	9.00	126.65	0 14:28	33.04	29
J26	JUNCTION	0.44	5.60	121.47	0 14:29	0	0
J27	JUNCTION	0.09	1.65	225.53	0 14:45	0	0
J28	JUNCTION	0.15	9.00	211.90	0 14:38	0.25	9
J29	JUNCTION	0.19	9.00	199.30	0 14:25	15.13	27
J30	JUNCTION	0.07	1.22	158.25	0 14:45	0	0
J31	JUNCTION	0.23	9.00	139.50	0 14:21	39.86	37
J32	JUNCTION	0.33	4.24	118.84	0 15:01	0	0
J33	JUNCTION	0.11	2.14	105.72	0 14:45	0	0
J34	JUNCTION	0.48	9.00	106.00	0 14:29	64.26	42
J35	JUNCTION	0.41	5.00	79.20	0 14:29	0	0
J36	JUNCTION	0.09	1.71	86.01	0 14:45	0	0
J37	JUNCTION	0.07	9.00	280.00	0 14:29	0.77	22
J39	JUNCTION	0.13	9.00	253.00	0 14:21	4.21	38
J41	JUNCTION	0.34	5.50	169.50	0 15:39	0	0
J42	JUNCTION	0.09	1.79	142.13	0 14:45	0	0
J43	JUNCTION	0.11	2.15	125.15	0 14:45	0	0
J44	JUNCTION	0.03	0.84	227.69	0 14:45	0	0
J45	JUNCTION	0.06	9.00	168.67	0 14:32	0.81	19
J46	JUNCTION	0.24	9.00	163.41	0 14:20	14.19	40
J47	JUNCTION	0.16	3.00	82.05	0 14:59	0	0
J48	JUNCTION	0.36	5.21	77.91	0 14:35	0	0
J49	JUNCTION	0.49	9.00	79.00	0 14:30	19.37	19
J50	JUNCTION	0.11	9.00	244.00	0 14:22	15.51	35
J51	JUNCTION	0.11	9.00	85.80	0 14:26	5.52	34
J52	JUNCTION	0.20	2.80	67.80	0 14:45	0	0
J53	JUNCTION	0.54	9.00	72.00	0 14:31	7.35	18
J54	JUNCTION	0.06	1.52	122.60	0 14:45	0	0
J55	JUNCTION	0.06	1.58	99.46	0 14:45	0	0
J56	JUNCTION	0.53	9.00	70.00	0 14:33	1.88	6
J57	JUNCTION	0.08	1.31	135.31	0 14:45	0	0
J58	JUNCTION	0.17	9.00	80.00	0 14:24	13.65	30
J59	JUNCTION	0.08	1.33	150.33	0 14:45	0	0
J60	JUNCTION	0.09	1.53	143.60	0 14:45	0	0

J61	JUNCTION	0.05	0.85	144.54	0	14:45	0	0
J62	JUNCTION	0.06	0.94	142.12	0	14:45	0	0
J63	JUNCTION	0.06	0.94	102.61	0	14:45	0	0
J64	JUNCTION	0.08	1.36	80.16	0	14:45	0	0
J65	JUNCTION	0.21	9.00	84.00	0	14:22	44.09	38
J66	JUNCTION	0.51	6.00	61.00	0	14:34	0	0
J67	JUNCTION	0.50	9.00	59.00	0	14:40	5.16	6
J68	JUNCTION	0.37	4.29	38.29	0	14:56	0	0
J69	JUNCTION	0.34	3.94	30.64	0	14:56	0	0
J70	JUNCTION	0.50	5.76	31.86	0	14:56	0	0
J71	JUNCTION	0.08	1.69	71.80	0	14:45	0	0
J72	JUNCTION	0.21	9.00	76.00	0	14:21	17.35	39
J73	JUNCTION	0.16	9.00	69.41	0	14:38	0.50	12
J74	JUNCTION	0.22	9.00	64.28	0	14:31	7.41	29
J75	JUNCTION	0.22	9.00	58.55	0	14:28	7.27	28
J76	JUNCTION	0.52	6.72	30.72	0	14:58	0	0
J77	JUNCTION	0.71	8.08	30.08	0	14:58	0	0
J78	JUNCTION	0.72	7.75	28.75	0	15:04	0	0
J79	JUNCTION	0.37	4.00	23.00	0	15:04	0	0
J80	JUNCTION	0.37	3.99	21.99	0	15:05	0	0
J81	JUNCTION	0.38	9.00	26.00	0	15:04	0.29	2
J82	JUNCTION	0.38	4.00	19.00	0	15:06	0	0
J83	JUNCTION	0.27	3.03	15.03	0	15:06	0	0
J84	JUNCTION	0.27	2.79	12.79	0	15:08	0	0
J_DB37_1	JUNCTION	0.02	0.52	53.06	0	14:46	0	0
J_DB37_2	JUNCTION	0.02	0.48	50.48	0	14:46	0	0
J_DB37_3	JUNCTION	0.49	6.00	48.00	0	14:41	0	2
OUT1	OUTFALL	4.51	6.00	6.00	0	12:24	0	0
DB2	STORAGE	0.41	8.00	172.00	0	14:34	9.39	39
DB18	STORAGE	0.06	1.42	85.42	0	14:46	0	0
DB33	STORAGE	0.00	0.12	254.12	0	14:45	0	0
DB36	STORAGE	0.00	0.08	46.08	0	14:45	0	0
DB37	STORAGE	0.02	0.52	64.52	0	14:45	0	0
DB46	STORAGE	0.07	0.84	218.84	0	14:57	0	0
DB47	STORAGE	0.12	1.57	125.57	0	15:01	0	0

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Node Flow Summary
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Node	Type	Maximum Lateral Inflow CFS	Maximum Total Inflow CFS	Time of Max Occurrence days	hr:min	Maximum Flooding Overflow CFS	Time of Max Occurrence days	hr:min
J1	JUNCTION	67.63	67.63	0	14:45	24.04	0	14:45
J2	JUNCTION	45.11	88.45	0	14:45	34.47	0	14:45
J3	JUNCTION	144.45	144.45	0	14:45	0.00		
J4	JUNCTION	9.73	207.77	0	14:45	0.00		
J5	JUNCTION	21.93	21.93	0	14:45	0.00		
J6	JUNCTION	68.55	294.16	0	14:45	66.55	0	14:45
J7	JUNCTION	43.11	270.68	0	14:45	0.00		
J8	JUNCTION	30.24	371.68	0	14:31	0.00		
J9	JUNCTION	100.84	100.84	0	14:45	0.00		
J10	JUNCTION	0.00	463.82	0	14:31	0.00		
J11	JUNCTION	86.81	86.81	0	14:45	13.83	0	14:45
J12	JUNCTION	179.68	645.15	0	14:45	0.00		
J13	JUNCTION	49.50	49.50	0	14:45	0.00		
J15	JUNCTION	22.44	22.44	0	14:45	0.00		
J16	JUNCTION	59.16	59.16	0	14:45	0.00		
J17	JUNCTION	123.37	225.35	0	14:45	76.36	0	14:45
J18	JUNCTION	24.67	172.23	0	14:45	73.19	0	14:45
J19	JUNCTION	129.91	866.88	0	14:45	0.00		
J20	JUNCTION	102.57	102.57	0	14:45	0.00		
J21	JUNCTION	17.01	983.57	0	14:45	0.00		
J22	JUNCTION	22.47	1004.11	0	14:46	444.63	0	14:46
J23	JUNCTION	23.64	582.54	0	14:45	0.00		
J24	JUNCTION	67.77	769.20	0	14:28	0.00		
J25	JUNCTION	59.79	733.28	0	14:28	103.26	0	14:45
J26	JUNCTION	0.00	606.55	0	14:29	0.00		

Basin C Model including Sedimentation Basins

J27	JUNCTION	74.32	74.32	0	14:45	0.00		
J28	JUNCTION	47.90	122.07	0	14:45	3.61	0	14:45
J29	JUNCTION	74.63	187.98	0	14:34	47.64	0	14:34
J30	JUNCTION	46.73	46.73	0	14:45	0.00		
J31	JUNCTION	32.96	218.35	0	14:45	98.33	0	14:45
J32	JUNCTION	0.00	718.77	0	15:01	0.00		
J33	JUNCTION	121.44	121.44	0	14:45	0.00		
J34	JUNCTION	110.85	921.59	0	14:33	188.46	0	14:45
J35	JUNCTION	85.92	809.78	0	14:35	0.00		
J36	JUNCTION	69.55	69.55	0	14:45	0.00		
J37	JUNCTION	15.71	15.71	0	14:45	4.03	0	14:45
J39	JUNCTION	0.00	16.44	0	14:45	9.22	0	14:45
J41	JUNCTION	105.79	117.38	0	14:45	0.00		
J42	JUNCTION	0.00	116.82	0	14:45	0.00		
J43	JUNCTION	73.17	186.16	0	14:45	0.00		
J44	JUNCTION	28.74	28.74	0	14:45	0.00		
J45	JUNCTION	18.85	18.85	0	14:45	5.14	0	14:45
J46	JUNCTION	7.79	49.90	0	14:45	33.84	0	14:45
J47	JUNCTION	47.28	247.46	0	14:45	0.00		
J48	JUNCTION	0.00	1157.24	0	14:35	0.00		
J49	JUNCTION	5.17	1130.54	0	14:35	236.32	0	14:35
J50	JUNCTION	94.02	94.02	0	14:45	47.11	0	14:45
J51	JUNCTION	13.77	60.35	0	14:45	13.00	0	14:45
J52	JUNCTION	85.48	132.79	0	14:45	0.00		
J53	JUNCTION	0.00	1008.15	0	14:39	82.02	0	14:39
J54	JUNCTION	69.26	69.26	0	14:45	0.00		
J55	JUNCTION	21.85	90.73	0	14:45	0.00		
J56	JUNCTION	69.63	1072.23	0	14:40	40.79	0	14:41
J57	JUNCTION	63.72	63.72	0	14:45	0.00		
J58	JUNCTION	52.83	116.15	0	14:45	42.04	0	14:45
J59	JUNCTION	28.85	28.85	0	14:45	0.00		
J60	JUNCTION	49.90	78.33	0	14:45	0.00		
J61	JUNCTION	13.51	13.51	0	14:45	0.00		
J62	JUNCTION	17.89	31.36	0	14:45	0.00		
J63	JUNCTION	0.00	31.31	0	14:45	0.00		
J64	JUNCTION	0.00	31.25	0	14:45	0.00		
J65	JUNCTION	96.17	203.34	0	14:45	113.03	0	14:45
J66	JUNCTION	26.09	1217.64	0	14:44	0.00		
J67	JUNCTION	126.78	1448.10	0	14:40	104.36	0	14:40
J68	JUNCTION	57.01	1181.03	0	14:56	0.00		
J69	JUNCTION	2.73	1184.18	0	14:56	0.00		
J70	JUNCTION	88.14	1229.62	0	14:56	0.00		
J71	JUNCTION	39.81	39.81	0	14:45	0.00		
J72	JUNCTION	42.48	81.96	0	14:45	49.93	0	14:45
J73	JUNCTION	28.72	59.25	0	14:45	4.83	0	14:45
J74	JUNCTION	34.87	81.14	0	14:49	28.60	0	14:50
J75	JUNCTION	80.84	121.79	0	14:38	40.35	0	14:38
J76	JUNCTION	31.17	1287.09	0	14:58	0.00		
J77	JUNCTION	59.39	1308.74	0	14:58	0.00		
J78	JUNCTION	20.23	1223.86	0	15:04	0.00		
J79	JUNCTION	83.37	1253.52	0	15:04	0.00		
J80	JUNCTION	32.54	1257.43	0	15:05	0.00		
J81	JUNCTION	0.00	1257.77	0	15:05	15.22	0	15:05
J82	JUNCTION	13.74	1243.63	0	15:06	0.00		
J83	JUNCTION	0.00	1395.67	0	15:06	0.00		
J84	JUNCTION	4.91	1217.85	0	15:08	0.00		
J_DB37_1	JUNCTION	0.00	7.27	0	14:46	0.00		
J_DB37_2	JUNCTION	0.00	7.27	0	14:46	0.00		
J_DB37_3	JUNCTION	0.00	1259.84	0	14:49	0.00		
OUT1	OUTFALL	0.00	1216.94	0	15:09	0.00		
DB2	STORAGE	33.41	40.36	0	14:45	28.61	0	14:45
DB18	STORAGE	0.00	90.48	0	14:45	0.00		
DB33	STORAGE	4.84	4.84	0	14:45	0.00		
DB36	STORAGE	9.13	9.13	0	14:45	0.00		
DB37	STORAGE	7.41	7.41	0	14:45	0.00		
DB46	STORAGE	0.00	49.25	0	14:45	0.00		
DB47	STORAGE	0.00	119.76	0	14:25	0.00		

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 ft3	Avg Pcnt Full	Maximum Volume 1000 ft3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CFS
DB2	0.634	5	13.608	100	0 14:34	12.51
DB18	1.225	1	27.173	17	0 14:46	87.64
DB33	0.004	0	0.132	2	0 14:45	4.83
DB36	0.011	0	0.246	2	0 14:45	9.12
DB37	0.099	0	2.290	6	0 14:45	7.28
DB46	5.733	1	71.045	7	0 14:57	30.71
DB47	7.932	1	103.873	9	0 15:01	113.34

****
Outfall Loading Summary
****

Outfall Node	Flow Freq. Pcnt.	Avg. Flow CFS	Max. Flow CFS
OUT1	75.13	96.70	1216.94
System	75.13	96.70	1216.94

****
Link Flow Summary
****

Link	Type	Maximum Flow CFS	Time of Max Occurrence days hr:min	Maximum Velocity ft/sec	Max/ Full Flow	Max/ Full Depth	Total Minutes Surcharged
C1	CONDUIT	43.44	0 14:54	1.51	1.00	11.77	32
C2	CONDUIT	53.90	0 14:25	1.77	1.00	13.60	35
C3	CONDUIT	144.14	0 14:45	29.26	0.77	0.66	0
C4	CONDUIT	206.96	0 14:46	6.30	0.29	0.47	0
C5	CONDUIT	21.83	0 14:45	19.21	0.10	0.22	0
C6	CONDUIT	227.58	0 14:29	10.26	1.00	11.75	25
C7	CONDUIT	344.63	0 14:31	9.51	0.29	0.41	0
C8	CONDUIT	369.52	0 14:31	17.03	0.06	0.18	0
C9	CONDUIT	100.71	0 14:45	2.63	0.36	0.54	0
C10	CONDUIT	400.86	0 14:46	6.89	0.33	0.51	0
C11	CONDUIT	70.62	0 14:49	11.20	1.05	1.00	23
C12	CONDUIT	642.88	0 14:46	8.18	0.36	0.54	0
C13	CONDUIT	49.25	0 14:45	22.85	0.26	0.35	0
C14	CONDUIT	30.57	0 15:01	1.80	0.75	0.84	0
C15	CONDUIT	22.39	0 14:45	2.68	0.73	0.83	0
C16	CONDUIT	59.08	0 14:45	21.69	0.35	0.41	0
C17	CONDUIT	148.39	0 14:56	2.55	1.00	16.17	30
C18	CONDUIT	98.96	0 14:46	6.94	1.08	1.00	54
C19	CONDUIT	866.24	0 14:46	9.87	0.36	0.53	0
C20	CONDUIT	102.01	0 14:45	23.84	0.65	0.59	0
C21	CONDUIT	982.69	0 14:46	10.02	0.36	0.53	0
C22	CONDUIT	558.90	0 14:41	2.99	1.00	28.58	39
C23	CONDUIT	710.33	0 14:28	9.16	0.37	0.48	0
C24	CONDUIT	682.05	0 14:28	9.46	0.28	0.45	0
C25	CONDUIT	606.55	0 14:29	2.20	1.00	26.16	28
C26	CONDUIT	606.55	0 15:00	21.66	0.60	0.57	0
C27	CONDUIT	74.17	0 14:45	18.73	0.58	0.55	0
C28	CONDUIT	116.39	0 14:48	18.13	1.06	1.00	18
C29	CONDUIT	140.14	0 14:38	4.36	1.00	12.19	28
C30	CONDUIT	46.69	0 14:45	17.42	0.35	0.41	0
C31a	CONDUIT	119.76	0 14:25	2.37	1.00	16.17	35
C31b	CONDUIT	113.23	0 15:03	2.36	0.67	0.78	0
C32	CONDUIT	718.17	0 15:03	5.21	0.91	0.94	0
C33	CONDUIT	121.36	0 14:45	22.52	0.86	0.71	0

C34	CONDUIT	726.58	0	14:29	3.11	1.00	32.96	46
C35	CONDUIT	875.86	0	14:35	22.09	0.71	0.63	0
C36	CONDUIT	69.37	0	14:45	15.01	0.48	0.49	0
C37	CONDUIT	11.62	0	14:29	15.20	1.00	0.99	21
C38	CONDUIT	4.82	0	14:45	8.03	0.59	0.72	0
C39	CONDUIT	7.21	0	14:58	1.62	1.00	3.00	40
C40	CONDUIT	12.44	0	15:43	0.60	1.07	1.00	74
C41	CONDUIT	116.82	0	14:45	17.53	0.23	0.32	0
C42	CONDUIT	115.96	0	14:46	2.79	0.53	0.68	0
C43	CONDUIT	185.73	0	14:46	21.66	0.32	0.39	0
C44	CONDUIT	28.67	0	14:45	18.00	0.17	0.28	0
C45	CONDUIT	13.61	0	14:32	10.26	1.00	1.17	19
C46	CONDUIT	16.02	0	14:58	2.72	1.08	1.00	32
C47	CONDUIT	247.34	0	14:45	19.57	0.43	0.46	0
C48	CONDUIT	1125.48	0	14:35	4.98	0.85	0.91	0
C49	CONDUIT	883.13	0	14:31	2.93	1.00	32.90	21
C50	CONDUIT	46.57	0	14:57	9.68	1.00	3.00	36
C51	CONDUIT	47.32	0	15:00	9.29	1.00	3.83	34
C52	CONDUIT	132.47	0	14:45	10.49	0.38	0.43	0
C53	CONDUIT	925.81	0	14:33	3.23	1.00	35.70	20
C54	CONDUIT	68.88	0	14:45	19.42	0.51	0.50	0
C55a	CONDUIT	90.48	0	14:45	21.59	0.42	0.45	0
C55b	CONDUIT	87.60	0	14:46	23.97	0.34	0.41	0
C56	CONDUIT	1029.13	0	14:34	3.71	1.00	37.59	11
C57	CONDUIT	63.52	0	14:45	21.60	0.39	0.44	0
C58	CONDUIT	73.93	0	14:54	1.78	1.00	14.43	33
C59	CONDUIT	28.92	0	14:46	6.71	0.13	0.24	0
C60	CONDUIT	77.83	0	14:46	15.62	0.20	0.30	0
C61	CONDUIT	13.48	0	14:45	7.52	0.13	0.24	0
C62	CONDUIT	31.31	0	14:45	15.16	0.16	0.27	0
C63	CONDUIT	31.25	0	14:45	18.90	0.11	0.23	0
C64	CONDUIT	31.20	0	14:46	8.35	0.25	0.34	0
C65	CONDUIT	89.86	0	14:59	2.04	1.00	14.43	39
C66	CONDUIT	1338.21	0	14:40	4.77	1.00	0.92	1
C_DB37_1	CONDUIT	7.27	0	14:46	11.32	0.15	0.26	0
C_DB37_2	CONDUIT	7.27	0	14:46	7.29	0.02	0.10	0
C_DB37_3	CONDUIT	7.25	0	14:49	0.77	0.05	0.16	0
C67a	CONDUIT	1252.59	0	14:41	3.71	1.00	49.60	7
C67b	CONDUIT	1151.92	0	14:56	6.65	0.58	0.71	0
C_DB36_1	CONDUIT	9.12	0	14:45	5.92	0.01	0.05	0
C68	CONDUIT	1178.80	0	14:56	5.28	0.68	0.79	0
C69	CONDUIT	1184.45	0	14:56	19.17	0.69	0.62	0
C70	CONDUIT	1202.75	0	14:58	2.50	0.91	0.94	0
C71	CONDUIT	39.53	0	14:45	9.78	0.60	0.56	0
C72	CONDUIT	31.65	0	14:59	1.08	1.00	9.95	40
C73	CONDUIT	54.29	0	14:49	1.32	1.00	11.15	12
C74	CONDUIT	52.09	0	14:38	1.46	1.00	11.16	31
C75	CONDUIT	79.99	0	14:31	2.10	1.00	11.15	27
C76	CONDUIT	1286.77	0	14:58	23.94	0.73	0.67	0
C77	CONDUIT	1219.86	0	15:04	1.44	0.65	0.75	0
C78	CONDUIT	1222.36	0	15:04	16.69	0.51	0.51	0
C79	CONDUIT	1247.49	0	15:05	2.04	0.99	1.00	0
C80	CONDUIT	1257.77	0	15:05	19.62	0.42	0.45	0
C81	CONDUIT	1240.90	0	15:06	1.56	1.00	90.40	3
C82	CONDUIT	1395.67	0	15:06	13.17	0.02	0.07	0
C83	CONDUIT	1216.99	0	15:08	3.89	0.55	0.70	0
C84	CONDUIT	1216.94	0	15:09	11.43	0.02	0.07	0

```
**************************
Routing Time Step Summary
**************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    28.81 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00


Analysis begun on:  Sun Nov 26 23:30:37 2006
Total elapsed time: 00:00:03
```

Appendix D

AES Analysis
Existing Conditions Coding Summary & AES Output
Proposed Conditions Coding Summary & AES Output

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-E1.dat
Date: 8/30/2018

Existing Hydrology - 100 Year - BASIN A

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
198	196	2	115.00	113.50	66	0.90	0.03	Initial Area A-3			
196	194	6	113.50	108.00	655	0.38	5.00	Street Flow (1 Side)			
194	188	3	105.45	105.10	34			Pipe Flow			
188	**188**	**1**						**Node 188 Confluence (1 of 2)**			
192	190	2	116.50	115.00	75	0.90	0.03	Initial Area A-2			
190	188	6	115.00	107.90	735	0.25	3.22	Street Flow (1 Side)			
188	**188**	**1**						**Node 188 Confluence (2 of 2)**			
188	150	3	105.10	103.60	135			Pipe Flow			
150	100	5	103.60	100.50	140			Overland Flow (5.2)			
100	**100**	**1**						**Node 100 Confluence (1 of 2)**			
142	141	2	225.00	205.00	80	0.35	0.11	Initial Area A-1			
141	140	5	205.00	105.00	230	0.35	0.54	Overland Flow (5.1)			
140	100	5	105.00	100.50	170	0.27	0.56	Overland Flow (5.1)			
100	**100**	**1**						**Node 100 Confluence (2 of 2)**			
							9.49	**Total Area**			

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                             Analysis prepared by:

                                Fuscoe Engineering
                              6390 Greenwich Suite 170
                                  San Diego, 92122
                                        CA

 ************************* DESCRIPTION OF STUDY *************************
* WEST OAKS                                                             *
* EXISTING HYDROLOGY                                                    *
* BASIN A                                                               *
 *************************************************************************

  FILE NAME: WO-E1.DAT
  TIME/DATE OF STUDY: 08:12 08/30/2018
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   16.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0312 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 =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    198.00 TO NODE    196.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    66.00
  UPSTREAM ELEVATION(FEET) =    115.00
  DOWNSTREAM ELEVATION(FEET) =    113.50
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.225
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    196.00 TO NODE    194.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  113.50  DOWNSTREAM ELEVATION(FEET) =  108.00
  STREET LENGTH(FEET) =   655.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 16.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       6.15
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.43
    HALFSTREET FLOOD WIDTH(FEET) =   14.97
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.61
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    1.11
  STREET FLOW TRAVEL TIME(MIN.) =   4.19   Tc(MIN.) =    6.41
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.058
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3800
```

```
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.383
  SUBAREA AREA(ACRES) =    5.00      SUBAREA RUNOFF(CFS) =   11.51
  TOTAL AREA(ACRES) =        5.0        PEAK FLOW RATE(CFS) =      11.67

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.45   HALFSTREET FLOOD WIDTH(FEET) =  16.00
  FLOW VELOCITY(FEET/SEC.) =  2.70   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    194.00 =     721.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    194.00 TO NODE    188.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.50  DOWNSTREAM(FEET) =   105.10
  FLOW LENGTH(FEET) =    34.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.1 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.37
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.67
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    6.49
  LONGEST FLOWPATH FROM NODE    198.00 TO NODE    188.00 =     755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    188.00 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.) =    6.49
  RAINFALL INTENSITY(INCH/HR) =   6.01
  TOTAL STREAM AREA(ACRES) =     5.03
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.67

****************************************************************************
  FLOW PROCESS FROM NODE    192.00 TO NODE    190.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    116.50
  DOWNSTREAM ELEVATION(FEET) =    115.00
```

```
  ELEVATION DIFFERENCE(FEET) =      1.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.475
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    190.00 TO NODE    188.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  115.00  DOWNSTREAM ELEVATION(FEET) =  107.90
  STREET LENGTH(FEET) =   735.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 16.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.56
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.33
    HALFSTREET FLOOD WIDTH(FEET) =   10.16
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.23
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.73
  STREET FLOW TRAVEL TIME(MIN.) =   5.50   Tc(MIN.) =    7.97
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.266
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2500
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.256
  SUBAREA AREA(ACRES) =    3.22      SUBAREA RUNOFF(CFS) =    4.24
  TOTAL AREA(ACRES) =        3.2        PEAK FLOW RATE(CFS) =       4.38

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.38   HALFSTREET FLOOD WIDTH(FEET) =  12.72
  FLOW VELOCITY(FEET/SEC.) =  2.52   DEPTH*VELOCITY(FT*FT/SEC.) =   0.96
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    188.00 =     810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    188.00 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.97
  RAINFALL INTENSITY(INCH/HR) =   5.27
  TOTAL STREAM AREA(ACRES) =     3.25
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.38

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.67     6.49        6.012          5.03
      2        4.38     7.97        5.266          3.25

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       15.24     6.49       6.012
      2       14.61     7.97       5.266

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      15.24   Tc(MIN.) =    6.49
  TOTAL AREA(ACRES) =        8.3
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    188.00 =     810.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    188.00 TO NODE    150.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.10  DOWNSTREAM(FEET) =   103.60
  FLOW LENGTH(FEET) =   135.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.50
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      15.24
  PIPE TRAVEL TIME(MIN.) =   0.30    Tc(MIN.) =    6.79
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    150.00 =     945.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    150.00 TO NODE    100.00 IS CODE =  52
```

```
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    103.60  DOWNSTREAM(FEET) =    100.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0221
  CHANNEL FLOW THRU SUBAREA(CFS) =      15.24
  FLOW VELOCITY(FEET/SEC) =   4.15 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.56   Tc(MIN.) =    7.35
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    100.00 =    1085.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 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.) =    7.35
  RAINFALL INTENSITY(INCH/HR) =   5.55
  TOTAL STREAM AREA(ACRES) =     8.28
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     15.24

****************************************************************************
  FLOW PROCESS FROM NODE    142.00 TO NODE    141.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    225.00
  DOWNSTREAM ELEVATION(FEET) =    205.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.605
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.609
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    141.00 TO NODE    140.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    205.00  DOWNSTREAM(FEET) =    105.00
```

```
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.4348
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.057
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.83
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.73
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.81
  Tc(MIN.) =    6.42
  SUBAREA AREA(ACRES) =     0.54       SUBAREA RUNOFF(CFS) =    1.14
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.38

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   5.51
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    140.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    140.00 TO NODE    100.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    100.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.0265
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.985
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.25
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.26
  Tc(MIN.) =    8.68
  SUBAREA AREA(ACRES) =     0.56       SUBAREA RUNOFF(CFS) =    0.75
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.313
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       1.89

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.23
  LONGEST FLOWPATH FROM NODE    142.00 TO NODE    100.00 =     480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.68
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =     1.21
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.89

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       15.24     7.35        5.547          8.28
      2        1.89     8.68        4.985          1.21

  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       16.84     7.35       5.547
      2       15.59     8.68       4.985

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.84   Tc(MIN.) =    7.35
  TOTAL AREA(ACRES) =        9.5
  LONGEST FLOWPATH FROM NODE    192.00 TO NODE    100.00 =    1085.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =        9.5  TC(MIN.) =      7.35
  PEAK FLOW RATE(CFS)   =      16.84
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-E2.dat
Date: 8/28/2018

Existing Hydrology - 100 Year - BASIN B

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
298	296	2	230.00	210.00	90	0.31	0.21	Initial Area B-3			
296	295	5	210.00	120.00	330	0.32	9.73	Overland Flow (5.1)			
295	294	5	120.00	112.50	335			Brow Ditch (5.2)			
294	288	3	109.00	108.36	64			Pipe Flow			
288	**288**	**1**						**Node 288 Confluence (1 of 2)**			
292	290	2	147.10	142.50	90	0.90	0.05	Initial Area B-2			
290	288	6	142.50	113.90	825	0.90	0.34	Street Flow			
288	**288**	**1**						**Node 288 Confluence (2 of 2)**			
288	282	3	108.36	107.40	97			Pipe Flow			
282	**282**	**1**						**Node 282 Confluence (1 of 2)**			
286	284	2	147.80	143.40	75	0.90	0.07	Initial Area B-1			
284	282	6	143.40	116.00	785	0.80	0.60	Street Flow			
282	**282**	**1**						**Node 282 Confluence (2 of 2)**			
282	**200**	**3**	107.40	106.60	125			**POC B**			
							11.00	Total Area			

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                             Analysis prepared by:

                                Fuscoe Engineering
                              6390 Greenwich Suite 170
                                  San Diego, 92122
                                        CA

 ************************* DESCRIPTION OF STUDY *************************
* WEST OAKS                                                             *
* EXISTING HYDROLOGY                                                    *
* BASIN B                                                               *
 *************************************************************************

  FILE NAME: WO-E2.DAT
  TIME/DATE OF STUDY: 14:46 08/28/2018
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   16.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    298.00 TO NODE    296.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    230.00
  DOWNSTREAM ELEVATION(FEET) =    210.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.262
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.153
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    296.00 TO NODE    295.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    210.00  DOWNSTREAM(FEET) =    120.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.2727
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.488
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       8.94
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.53
  AVERAGE FLOW DEPTH(FEET) =   0.13   TRAVEL TIME(MIN.) =   1.21
  Tc(MIN.) =    7.48
  SUBAREA AREA(ACRES) =     9.73       SUBAREA RUNOFF(CFS) =   17.09
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.320
  TOTAL AREA(ACRES) =        9.9         PEAK FLOW RATE(CFS) =      17.45

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOW VELOCITY(FEET/SEC.) =   5.14
  LONGEST FLOWPATH FROM NODE    298.00 TO NODE    295.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    295.00 TO NODE    294.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    120.00  DOWNSTREAM(FEET) =    112.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0224
  CHANNEL FLOW THRU SUBAREA(CFS) =      17.45
  FLOW VELOCITY(FEET/SEC) =   4.32 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.29   Tc(MIN.) =    8.77
  LONGEST FLOWPATH FROM NODE    298.00 TO NODE    294.00 =     755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    294.00 TO NODE    288.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   109.00  DOWNSTREAM(FEET) =   108.36
  FLOW LENGTH(FEET) =    64.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  16.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.61
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      17.45
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.91
  LONGEST FLOWPATH FROM NODE    298.00 TO NODE    288.00 =     819.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    288.00 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.) =    8.91
  RAINFALL INTENSITY(INCH/HR) =   4.90
  TOTAL STREAM AREA(ACRES) =     9.94
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     17.45

****************************************************************************
  FLOW PROCESS FROM NODE    292.00 TO NODE    290.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    147.10
  DOWNSTREAM ELEVATION(FEET) =    142.50
```

```
  ELEVATION DIFFERENCE(FEET) =      4.60
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.983
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    290.00 TO NODE    288.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  142.50  DOWNSTREAM ELEVATION(FEET) =  113.90
  STREET LENGTH(FEET) =   825.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 16.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.26
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.23
    HALFSTREET FLOOD WIDTH(FEET) =    5.28
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.18
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.74
  STREET FLOW TRAVEL TIME(MIN.) =   4.32   Tc(MIN.) =    6.31
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.125
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.34      SUBAREA RUNOFF(CFS) =    1.87
  TOTAL AREA(ACRES) =        0.4        PEAK FLOW RATE(CFS) =       2.15

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.27   HALFSTREET FLOOD WIDTH(FEET) =   7.01
  FLOW VELOCITY(FEET/SEC.) =  3.53   DEPTH*VELOCITY(FT*FT/SEC.) =   0.94
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    288.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    288.00 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.) =    6.31
  RAINFALL INTENSITY(INCH/HR) =   6.13
  TOTAL STREAM AREA(ACRES) =     0.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.15

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       17.45     8.91        4.902          9.94
      2        2.15     6.31        6.125          0.39

  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       14.50     6.31       6.125
      2       19.17     8.91       4.902

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.17   Tc(MIN.) =    8.91
  TOTAL AREA(ACRES) =       10.3
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    288.00 =     915.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    288.00 TO NODE    282.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   108.36  DOWNSTREAM(FEET) =   107.40
  FLOW LENGTH(FEET) =    97.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.69
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.17
  PIPE TRAVEL TIME(MIN.) =   0.21    Tc(MIN.) =    9.12
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    282.00 =    1012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
```

```
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.12
  RAINFALL INTENSITY(INCH/HR) =   4.83
  TOTAL STREAM AREA(ACRES) =    10.33
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     19.17

****************************************************************************
  FLOW PROCESS FROM NODE    286.00 TO NODE    284.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    147.80
  DOWNSTREAM ELEVATION(FEET) =    143.40
  ELEVATION DIFFERENCE(FEET) =      4.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.729
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    284.00 TO NODE    282.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  143.40  DOWNSTREAM ELEVATION(FEET) =  116.00
  STREET LENGTH(FEET) =   785.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 16.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =   8.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  STREET PARKWAY CROSSFALL(DECIMAL)  =  0.020
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0150
  Manning's FRICTION FACTOR for Back-of-Walk Flow Section =   0.0200

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.08
```

```
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.26
    HALFSTREET FLOOD WIDTH(FEET) =    6.91
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    3.49
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.92
  STREET FLOW TRAVEL TIME(MIN.) =   3.75   Tc(MIN.) =    5.48
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.706
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.810
  SUBAREA AREA(ACRES) =    0.60      SUBAREA RUNOFF(CFS) =    3.22
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.64

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.31   HALFSTREET FLOOD WIDTH(FEET) =   8.97
  FLOW VELOCITY(FEET/SEC.) =  3.95   DEPTH*VELOCITY(FT*FT/SEC.) =   1.21
  LONGEST FLOWPATH FROM NODE    286.00 TO NODE    282.00 =     860.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    282.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.48
  RAINFALL INTENSITY(INCH/HR) =   6.71
  TOTAL STREAM AREA(ACRES) =     0.67
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       19.17     9.12        4.828         10.33
      2        3.64     5.48        6.706          0.67

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.44     5.48       6.706
      2       21.79     9.12       4.828

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
```

```
  PEAK FLOW RATE(CFS) =      21.79   Tc(MIN.) =    9.12
  TOTAL AREA(ACRES) =       11.0
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    282.00 =    1012.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    282.00 TO NODE    200.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   107.40  DOWNSTREAM(FEET) =   106.60
  FLOW LENGTH(FEET) =   125.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  27.0 INCH PIPE IS  20.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.71
  ESTIMATED PIPE DIAMETER(INCH) =  27.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      21.79
  PIPE TRAVEL TIME(MIN.) =   0.31    Tc(MIN.) =    9.43
  LONGEST FLOWPATH FROM NODE    292.00 TO NODE    200.00 =    1137.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.0  TC(MIN.) =      9.43
  PEAK FLOW RATE(CFS)   =      21.79
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-E3.dat
Date: 1/16/2019

Existing Hydrology - 100 Year - BASIN C

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
398	396	2	320.00	315.00	90	0.35	0.07	Initial Area C-4			
396	394	5	315.00	143.00	950	0.35	4.61	Overland Flow (5.1)			
394	393	3	143.00	129.00	22			Pipe Flow			
393	376	3	129.00	123.00	391			Pipe Flow			
376	**376**	**10**						**Store in Memory Bank #1**	X		
392	390	2	300.00	290.00	90	0.35	0.15	Initial Area C-3	X		
390	388	5	290.00	136.00	515	0.35	3.36	Overland Flow (5.1)	X		
388	382	5	136.00	134.00	175			Brow Ditch (5.2)	X		
382	**382**	**1**						**Node 382 Confluence (1 of 2)**	X		
386	384	2	280.00	265.00	90	0.35	0.33	Initial Area C-2	X		
384	382	5	265.00	134.00	685	0.35	5.21	Overland Flow (5.1)	X		
382	**382**	**1**						**Node 382 Confluence (2 of 2)**	X		
382	376	3	127.20	123.00	220			Pipe Flow	X		
376	**376**	**11**						**Confluence w/ Memory Bank #1**	X		
376	**376**	**12**						**Clear Memory Bank #1**			
376	**376**	**1**						**Node 376 Confluence (1 of 2)**			
380	378	2	148.00	138.00	75	0.33	0.11	Initial Area C-1			
378	376	5	138.00	133.50	418	0.23	1.68	Overland Flow (5.1)			
376	**376**	**1**						**Node 376 Confluence (2 of 2)**			
376	**300**	**3**	123.00	119.00	76			**POC C**			
							15.52	Total Area			

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2014 Advanced Engineering Software (aes)
              Ver. 21.0 Release Date: 06/01/2014  License ID 1355

                              Analysis prepared by:

                                Fuscoe Engineering
                               6390 Greenwich Drive
                                    Suite 200
                               San Diego, CA 92122

 ************************* DESCRIPTION OF STUDY *************************
* WEST OAKS                                                             *
* EXISTING HYDROLOGY                                                    *
* BASIN C                                                               *
 *************************************************************************

  FILE NAME: WO-E3.DAT
  TIME/DATE OF STUDY: 11:02 01/14/2019
--------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
--------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.90
  SAN DIEGO HYDROLOGY MANUAL "C"-VALUES USED FOR RATIONAL METHOD
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)    SIDE / SIDE/ WAY    (FT)    (FT)  (FT)  (FT)    (n)
===  =====  =========  =================  ======  ===== ====== ===== =======
  1   16.0      8.0    0.020/0.020/0.020   0.50    1.50 0.0313 0.125 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.50 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    398.00 TO NODE    396.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    320.00
  DOWNSTREAM ELEVATION(FEET) =    315.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.232
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.607
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    396.00 TO NODE    394.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    315.00  DOWNSTREAM(FEET) =    143.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   950.00   CHANNEL SLOPE =  0.1811
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.618
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.24
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   2.54
  Tc(MIN.) =    9.77
  SUBAREA AREA(ACRES) =     4.61       SUBAREA RUNOFF(CFS) =    7.45
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        4.7         PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   7.85
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    394.00 =    1040.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    394.00 TO NODE    393.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
```

```
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   143.00  DOWNSTREAM(FEET) =   129.00
  FLOW LENGTH(FEET) =    22.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS   3.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  28.35
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.01    Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    393.00 =    1062.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    393.00 TO NODE    376.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
================================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   129.00  DOWNSTREAM(FEET) =   123.00
  FLOW LENGTH(FEET) =   391.00   MANNING'S N =  0.013
  ESTIMATED PIPE DIAMETER(INCH) INCREASED TO 18.000
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  10.2 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.34
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.89    Tc(MIN.) =   10.67
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    376.00 =    1453.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
================================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    392.00 TO NODE    390.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
================================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    300.00
  DOWNSTREAM ELEVATION(FEET) =    290.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
```

```
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.362
SUBAREA RUNOFF(CFS) =      0.33
TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
FLOW PROCESS FROM NODE    390.00 TO NODE    388.00 IS CODE =  51
----------------------------------------------------------------------------
>>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    290.00  DOWNSTREAM(FEET) =    136.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   515.00   CHANNEL SLOPE =  0.2990
CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
 100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.649
*USER SPECIFIED(SUBAREA):
USER-SPECIFIED RUNOFF COEFFICIENT = .3500
S.C.S. CURVE NUMBER (AMC II) =   0
TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.67
TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.14
AVERAGE FLOW DEPTH(FEET) =   0.16   TRAVEL TIME(MIN.) =   1.20
Tc(MIN.) =    7.15
SUBAREA AREA(ACRES) =     3.36       SUBAREA RUNOFF(CFS) =    6.64
AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       6.94

END OF SUBAREA CHANNEL FLOW HYDRAULICS:
DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   8.98
LONGEST FLOWPATH FROM NODE    392.00 TO NODE    388.00 =     605.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    388.00 TO NODE    382.00 IS CODE =  52
----------------------------------------------------------------------------
>>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
>>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
ELEVATION DATA: UPSTREAM(FEET) =    136.00  DOWNSTREAM(FEET) =    134.00
CHANNEL LENGTH THRU SUBAREA(FEET) =   175.00   CHANNEL SLOPE =  0.0114
CHANNEL FLOW THRU SUBAREA(CFS) =       6.94
FLOW VELOCITY(FEET/SEC) =   2.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
TRAVEL TIME(MIN.) =   1.20   Tc(MIN.) =    8.34
LONGEST FLOWPATH FROM NODE    392.00 TO NODE    382.00 =     780.00 FEET.

****************************************************************************
FLOW PROCESS FROM NODE    382.00 TO NODE    382.00 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.) =    8.34
  RAINFALL INTENSITY(INCH/HR) =   5.11
  TOTAL STREAM AREA(ACRES) =     3.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.94

****************************************************************************
  FLOW PROCESS FROM NODE    386.00 TO NODE    384.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    280.00
  DOWNSTREAM ELEVATION(FEET) =    265.00
  ELEVATION DIFFERENCE(FEET) =     15.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.362
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    384.00 TO NODE    382.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    265.00  DOWNSTREAM(FEET) =    134.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   685.00   CHANNEL SLOPE =  0.1912
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.479
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.75
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.37
  AVERAGE FLOW DEPTH(FEET) =   0.23   TRAVEL TIME(MIN.) =   1.55
  Tc(MIN.) =    7.49
  SUBAREA AREA(ACRES) =     5.21       SUBAREA RUNOFF(CFS) =    9.99
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      10.62

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
```

```
  DEPTH(FEET) =  0.33   FLOW VELOCITY(FEET/SEC.) =   8.95
  LONGEST FLOWPATH FROM NODE    386.00 TO NODE    382.00 =     775.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    382.00 TO NODE    382.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.49
  RAINFALL INTENSITY(INCH/HR) =   5.48
  TOTAL STREAM AREA(ACRES) =     5.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.62

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        6.94     8.34        5.113          3.51
      2       10.62     7.49        5.479          5.54

  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       16.86     7.49       5.479
      2       16.85     8.34       5.113

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.86   Tc(MIN.) =    7.49
  TOTAL AREA(ACRES) =        9.1
  LONGEST FLOWPATH FROM NODE    392.00 TO NODE    382.00 =     780.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    382.00 TO NODE    376.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   127.20  DOWNSTREAM(FEET) =   123.00
  FLOW LENGTH(FEET) =   220.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.62
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.86
```

```
  PIPE TRAVEL TIME(MIN.) =   0.38    Tc(MIN.) =    7.88
  LONGEST FLOWPATH FROM NODE    392.00 TO NODE    376.00 =    1000.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       16.86     7.88        5.307        9.05
  LONGEST FLOWPATH FROM NODE    392.00 TO NODE    376.00 =    1000.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF       Tc       INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        7.56    10.67        4.362        4.68
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    376.00 =    1453.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc       INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      22.44       7.88        5.307
      2      21.42      10.67        4.362

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      22.44   Tc(MIN.) =    7.88
  TOTAL AREA(ACRES) =       13.7

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 IS CODE =  12
----------------------------------------------------------------------------
  >>>>>CLEAR MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 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.) =    7.88
  RAINFALL INTENSITY(INCH/HR) =   5.31
  TOTAL STREAM AREA(ACRES) =    13.73
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     22.44
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    380.00 TO NODE    378.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    148.00
  DOWNSTREAM ELEVATION(FEET) =    138.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.572
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.634
  SUBAREA RUNOFF(CFS) =      0.24
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
  FLOW PROCESS FROM NODE    378.00 TO NODE    376.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    138.00  DOWNSTREAM(FEET) =    133.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   418.00   CHANNEL SLOPE =  0.0108
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.608
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2300
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.18
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.65
  AVERAGE FLOW DEPTH(FEET) =   0.21   TRAVEL TIME(MIN.) =   4.23
  Tc(MIN.) =    9.80
  SUBAREA AREA(ACRES) =     1.68       SUBAREA RUNOFF(CFS) =    1.78
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.236
  TOTAL AREA(ACRES) =        1.8         PEAK FLOW RATE(CFS) =       1.95

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.28   FLOW VELOCITY(FEET/SEC.) =   1.96
  LONGEST FLOWPATH FROM NODE    380.00 TO NODE    376.00 =     493.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    376.00 IS CODE =   1
----------------------------------------------------------------------------
```

```
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.80
  RAINFALL INTENSITY(INCH/HR) =   4.61
  TOTAL STREAM AREA(ACRES) =     1.79
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.95

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       22.44     7.88        5.307         13.73
      2        1.95     9.80        4.608          1.79

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       24.01     7.88       5.307
      2       21.44     9.80       4.608

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      24.01   Tc(MIN.) =    7.88
  TOTAL AREA(ACRES) =       15.5
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    376.00 =    1453.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    376.00 TO NODE    300.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.00  DOWNSTREAM(FEET) =   119.00
  FLOW LENGTH(FEET) =    76.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.50
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      24.01
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    7.96
  LONGEST FLOWPATH FROM NODE    398.00 TO NODE    300.00 =    1529.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       15.5  TC(MIN.) =      7.96
  PEAK FLOW RATE(CFS)   =      24.01
```

==========

==========

END OF RATIONAL METHOD ANALYSIS

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-P1.dat
Date: 8/30/2018

Proposed Hydrology - 100 Year - BASIN A

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
116	115	2	111.00	110.30	85	0.82	0.10	Initial Area A-6			
115	111	9	110.30	108.20	395	0.82	1.00	V-Gutter Flow			
111	**111**	**1**						**Node 111 Confluence (1 of 2)**			
114	113	2	111.50	110.70	50	0.90	0.03	Initial Area A-5			
113	112	6	110.70	108.85	120	0.87	0.07	Street Flow 2 (1 Side)			
112	111	3	106.77	104.37	65			Pipe Flow			
111	**111**	**1**						**Node 111 Confluence (2 of 2)**			
111	**111**	**10**						**Store in Memory Bank #1**	X		
123	122	2	125.40	124.00	80	0.90	0.04	Initial Area A-4	X		
122	121	6	124.00	115.90	470	0.90	0.27	Street Flow 1 (1 Side)	X		
121	120	9	115.90	110.50	495	0.82	1.29	V-Gutter Flow	X		
120	111	3	105.95	104.37	365			Pipe Flow	X		
111	**111**	**11**						**Confluence with Memory Bank #1**	X		
111	110	3	104.37	104.13	45			Pipe Flow	X		
110	**110**	**1**						**Node 110 Confluence (1 of 2)**	X		
133	132	2	239.00	230.00	90	0.35	0.12	Initial Area A-3	X		
132	131	5	230.00	110.80	450	0.35	4.62	Overland Flow (5.1)	X		
131	130	5	110.80	108.48	280			Brow Ditch (5.2)	X		
130	110	3	105.45	104.13	110			Pipe Flow	X		
110	**110**	**1**						**Node 110 Confluence (2 of 2)**	X		
110	105	3	104.13	103.60	65			Pipe Flow	X		
105	**105**	**1**						**Node 105 Confluence (1 of 2)**	X		
107	106	2	131.00	115.00	80	0.20	0.16	Initial Area A-2	X		
106	105	5	115.00	103.60	755	0.20	1.11	Overland Flow (5.1)	X		
105	**105**	**1**						**Node 105 Confluence (2 of 2)**	X		
105	100	5	103.60	100.50	140			Channel Flow (5.2)	X		
100	**100**	**1**						**Node 100 Confluence (1 of 2)**	X		
103	102	2	225.00	205.00	80	0.35	0.11	Initial Area A-1	X		
102	101	5	205.00	105.00	230	0.35	0.55	Overland Flow (5.1)	X		
101	100	5	105.00	100.50	170	0.27	0.49	Overland Flow (5.1)	X		
100	**100**	**1**						**Node 100 Confluence (2 of 2)**	X		
							9.96	**Total Area**			

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                             Analysis prepared by:

                                Fuscoe Engineering
                              6390 Greenwich Suite 170
                                  San Diego, 92122
                                        CA

 ************************* DESCRIPTION OF STUDY *************************
* WEST OAKS                                                             *
* PROPOSED HYDROLOGY 100 YEAR STORM                                     *
* BASIN A                                                               *
 *************************************************************************

  FILE NAME: WO-P1.DAT
  TIME/DATE OF STUDY: 08:14 08/30/2018
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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   20.5     15.5    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0180
  2   28.0     23.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0180

  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 =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    116.00 TO NODE    115.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    85.00
  UPSTREAM ELEVATION(FEET) =    111.00
  DOWNSTREAM ELEVATION(FEET) =    110.30
  ELEVATION DIFFERENCE(FEET) =      0.70
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    4.155
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    59.71
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.58
  TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.58

****************************************************************************
  FLOW PROCESS FROM NODE    115.00 TO NODE    111.00 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    110.30
  DOWNSTREAM NODE ELEVATION(FEET) =    108.20
  CHANNEL LENGTH THRU SUBAREA(FEET) =   395.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.031   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.50
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  10.53
  AVERAGE FLOW DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =    4.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.63   Tc(MIN.) =    4.78
  SUBAREA AREA(ACRES) =    1.00       SUBAREA RUNOFF(CFS) =    5.83
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.820
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       6.42
```

```
  ** PIPE SIZED TO MAXIMIZE V-GUTTER FLOW AT DOWNSTREAM NODE **
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   4.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   2.66
  PIPE-FLOW(CFS) =       0.58
  PIPEFLOW TRAVEL TIME(MIN.) =   2.48    Tc(MIN.) =   6.63
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.929
  SUBAREA AREA(ACRES) =    1.00      SUBAREA RUNOFF(CFS) =    4.86
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       5.35
  *NOTE: V-GUTTER CAPACITY MAY BE EXCEEDED*
  V-GUTTER HYDRAULICS BASED ON MAINLINE Tc :
  V-GUTTER HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) =    4.76

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =    4.40
  FLOW VELOCITY(FEET/SEC.) =  14.34   DEPTH*VELOCITY(FT*FT/SEC) =   2.44
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    111.00 =     480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    4.78
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     1.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      5.35

****************************************************************************
  FLOW PROCESS FROM NODE    114.00 TO NODE    113.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    111.50
  DOWNSTREAM ELEVATION(FEET) =    110.70
  ELEVATION DIFFERENCE(FEET) =      0.80
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.176
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    113.00 TO NODE    112.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  2 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  110.70  DOWNSTREAM ELEVATION(FEET) =  108.85
  STREET LENGTH(FEET) =   120.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 28.00

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  23.00
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.41
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.20
    HALFSTREET FLOOD WIDTH(FEET) =    3.60
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.65
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.33
  STREET FLOW TRAVEL TIME(MIN.) =   1.21   Tc(MIN.) =    3.39
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8700
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.879
  SUBAREA AREA(ACRES) =    0.07      SUBAREA RUNOFF(CFS) =    0.43
  TOTAL AREA(ACRES) =        0.1        PEAK FLOW RATE(CFS) =       0.63

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.23   HALFSTREET FLOOD WIDTH(FEET) =   4.94
  FLOW VELOCITY(FEET/SEC.) =  1.73   DEPTH*VELOCITY(FT*FT/SEC.) =   0.39
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    112.00 =     170.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    112.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   106.77  DOWNSTREAM(FEET) =   104.37
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.59
```

```
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       0.63
  PIPE TRAVEL TIME(MIN.) =   0.19    Tc(MIN.) =    3.58
  LONGEST FLOWPATH FROM NODE    114.00 TO NODE    111.00 =     235.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 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.) =    3.58
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     0.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.63

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        5.35     4.78        7.114          1.10
      2        0.63     3.58        7.114          0.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        4.63     3.58       7.114
      2        5.97     4.78       7.114

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       5.97   Tc(MIN.) =    4.78
  TOTAL AREA(ACRES) =        1.2
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    111.00 =     480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    123.00 TO NODE    122.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
```

BMP 8
DESIGN STORM

```
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    125.40
  DOWNSTREAM ELEVATION(FEET) =    124.00
  ELEVATION DIFFERENCE(FEET) =      1.40
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.609
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    76.25
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    122.00 TO NODE    121.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
==============================================================================
  UPSTREAM ELEVATION(FEET) =  124.00  DOWNSTREAM ELEVATION(FEET) =  115.90
  STREET LENGTH(FEET) =   470.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.25
    HALFSTREET FLOOD WIDTH(FEET) =    6.18
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    1.97
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.49
  STREET FLOW TRAVEL TIME(MIN.) =   3.97   Tc(MIN.) =    6.58
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.960
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.45
```

```
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.66

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.29   HALFSTREET FLOOD WIDTH(FEET) =   8.00
  FLOW VELOCITY(FEET/SEC.) =  2.19   DEPTH*VELOCITY(FT*FT/SEC.) =   0.63
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    121.00 =     550.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    121.00 TO NODE    120.00 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    115.90
  DOWNSTREAM NODE ELEVATION(FEET) =    110.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   495.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.031   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.640
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.66
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  14.02
  AVERAGE FLOW DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =    4.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.59   Tc(MIN.) =    7.17
  SUBAREA AREA(ACRES) =    1.29       SUBAREA RUNOFF(CFS) =    5.97
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.836
  TOTAL AREA(ACRES) =        1.6         PEAK FLOW RATE(CFS) =       7.54
  ** PIPE SIZED TO MAXIMIZE V-GUTTER FLOW AT DOWNSTREAM NODE **
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.36
  PIPE-FLOW(CFS) =       1.66
  PIPEFLOW TRAVEL TIME(MIN.) =   1.89    Tc(MIN.) =   8.47
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.063
  SUBAREA AREA(ACRES) =    1.29      SUBAREA RUNOFF(CFS) =    5.36
  TOTAL AREA(ACRES) =        1.6        PEAK FLOW RATE(CFS) =       6.77
  *NOTE: V-GUTTER CAPACITY MAY BE EXCEEDED*
  V-GUTTER HYDRAULICS BASED ON MAINLINE Tc :
  V-GUTTER HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) =    5.11

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =    4.40
  FLOW VELOCITY(FEET/SEC.) =  15.36   DEPTH*VELOCITY(FT*FT/SEC) =   2.61
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    120.00 =    1045.00 FEET.
```

BMP 7
DESIGN STORM

```
****************************************************************************
  FLOW PROCESS FROM NODE    120.00 TO NODE    111.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.95  DOWNSTREAM(FEET) =   104.37
  FLOW LENGTH(FEET) =   365.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  12.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.52
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       6.77
  PIPE TRAVEL TIME(MIN.) =   1.35    Tc(MIN.) =    8.51
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    111.00 =    1410.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    111.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        6.77     8.51       5.047        1.60
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    111.00 =    1410.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1        5.97     4.78       7.114        1.20
  LONGEST FLOWPATH FROM NODE    116.00 TO NODE    111.00 =     480.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1       9.77       4.78        7.114
      2      11.01       8.51        5.047

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      11.01   Tc(MIN.) =    8.51
  TOTAL AREA(ACRES) =        2.8

****************************************************************************
  FLOW PROCESS FROM NODE    111.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
```

```
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   104.37  DOWNSTREAM(FEET) =   104.13
  FLOW LENGTH(FEET) =    45.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   5.35
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.01
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    8.65
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    110.00 =    1455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 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.) =    8.65
  RAINFALL INTENSITY(INCH/HR) =   4.99
  TOTAL STREAM AREA(ACRES) =     2.80
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     11.01

****************************************************************************
  FLOW PROCESS FROM NODE    133.00 TO NODE    132.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    239.00
  DOWNSTREAM ELEVATION(FEET) =    230.00
  ELEVATION DIFFERENCE(FEET) =      9.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.362
  SUBAREA RUNOFF(CFS) =      0.27
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.27

****************************************************************************
  FLOW PROCESS FROM NODE    132.00 TO NODE    131.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    230.00  DOWNSTREAM(FEET) =    110.80
  CHANNEL LENGTH THRU SUBAREA(FEET) =   450.00   CHANNEL SLOPE =  0.2649
```

```
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.271
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       4.55
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.73
  AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   2.01
  Tc(MIN.) =    7.96
  SUBAREA AREA(ACRES) =     4.62       SUBAREA RUNOFF(CFS) =    8.52
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        4.7         PEAK FLOW RATE(CFS) =       8.75

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.12   FLOW VELOCITY(FEET/SEC.) =   4.37
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    131.00 =     540.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    131.00 TO NODE    130.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    110.80  DOWNSTREAM(FEET) =    108.48
  CHANNEL LENGTH THRU SUBAREA(FEET) =   280.00   CHANNEL SLOPE =  0.0083
  CHANNEL FLOW THRU SUBAREA(CFS) =       8.75
  FLOW VELOCITY(FEET/SEC) =   2.20 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.12   Tc(MIN.) =   10.08
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    130.00 =     820.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    130.00 TO NODE    110.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   105.45  DOWNSTREAM(FEET) =   104.13
  FLOW LENGTH(FEET) =   110.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  18.0 INCH PIPE IS  11.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.03
  ESTIMATED PIPE DIAMETER(INCH) =  18.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       8.75
  PIPE TRAVEL TIME(MIN.) =   0.26    Tc(MIN.) =   10.34
  LONGEST FLOWPATH FROM NODE    133.00 TO NODE    110.00 =     930.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 TO NODE    110.00 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.34
  RAINFALL INTENSITY(INCH/HR) =   4.45
  TOTAL STREAM AREA(ACRES) =     4.74
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      8.75

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       11.01     8.65        4.995          2.80
      2        8.75    10.34        4.452          4.74

  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       18.32     8.65       4.995
      2       18.56    10.34       4.452

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.56   Tc(MIN.) =   10.34
  TOTAL AREA(ACRES) =        7.5
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    110.00 =    1455.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    110.00 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) =   104.13  DOWNSTREAM(FEET) =   103.60
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  18.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.22
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      18.56
  PIPE TRAVEL TIME(MIN.) =   0.15    Tc(MIN.) =   10.49
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    105.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.49
  RAINFALL INTENSITY(INCH/HR) =   4.41
  TOTAL STREAM AREA(ACRES) =     7.54
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.56

************************************************************************
  FLOW PROCESS FROM NODE    107.00 TO NODE    106.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    131.00
  DOWNSTREAM ELEVATION(FEET) =    115.00
  ELEVATION DIFFERENCE(FEET) =     16.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.726
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.875
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.16   TOTAL RUNOFF(CFS) =      0.19

************************************************************************
  FLOW PROCESS FROM NODE    106.00 TO NODE    105.00 IS CODE =  51
------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
========================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    115.00  DOWNSTREAM(FEET) =    103.60
  CHANNEL LENGTH THRU SUBAREA(FEET) =   755.00   CHANNEL SLOPE =  0.0151
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.505
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.49
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.68
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =  18.50
  Tc(MIN.) =   25.23
  SUBAREA AREA(ACRES) =     1.11       SUBAREA RUNOFF(CFS) =    0.56
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.200
```

```
  TOTAL AREA(ACRES) =        1.3         PEAK FLOW RATE(CFS) =       0.64

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.07   FLOW VELOCITY(FEET/SEC.) =   0.74
  LONGEST FLOWPATH FROM NODE    107.00 TO NODE    105.00 =     835.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    105.00 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.) =   25.23
  RAINFALL INTENSITY(INCH/HR) =   2.50
  TOTAL STREAM AREA(ACRES) =     1.27
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.64

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       18.56    10.49        4.411          7.54
      2        0.64    25.23        2.505          1.27

  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       18.82    10.49       4.411
      2       11.17    25.23       2.505

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      18.82   Tc(MIN.) =   10.49
  TOTAL AREA(ACRES) =        8.8
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    105.00 =    1520.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    105.00 TO NODE    100.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    103.60  DOWNSTREAM(FEET) =    100.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   140.00   CHANNEL SLOPE =  0.0221
  CHANNEL FLOW THRU SUBAREA(CFS) =      18.82
```

```
  FLOW VELOCITY(FEET/SEC) =   4.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   0.53   Tc(MIN.) =   11.02
  LONGEST FLOWPATH FROM NODE    123.00 TO NODE    100.00 =    1660.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   11.02
  RAINFALL INTENSITY(INCH/HR) =   4.27
  TOTAL STREAM AREA(ACRES) =     8.81
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     18.82

****************************************************************************
  FLOW PROCESS FROM NODE    103.00 TO NODE    102.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    80.00
  UPSTREAM ELEVATION(FEET) =    225.00
  DOWNSTREAM ELEVATION(FEET) =    205.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.605
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.609
  SUBAREA RUNOFF(CFS) =      0.25
  TOTAL AREA(ACRES) =      0.11   TOTAL RUNOFF(CFS) =      0.25

****************************************************************************
  FLOW PROCESS FROM NODE    102.00 TO NODE    101.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    205.00  DOWNSTREAM(FEET) =    105.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   230.00   CHANNEL SLOPE =  0.4348
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.046
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
```

```
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.84
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.63
  AVERAGE FLOW DEPTH(FEET) =   0.06   TRAVEL TIME(MIN.) =   0.83
  Tc(MIN.) =    6.43
  SUBAREA AREA(ACRES) =     0.55       SUBAREA RUNOFF(CFS) =    1.16
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        0.7         PEAK FLOW RATE(CFS) =       1.40

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.08   FLOW VELOCITY(FEET/SEC.) =   5.59
  LONGEST FLOWPATH FROM NODE    103.00 TO NODE    101.00 =     310.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    101.00 TO NODE    100.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    105.00  DOWNSTREAM(FEET) =    100.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   170.00   CHANNEL SLOPE =  0.0265
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.965
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2700
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.73
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.23
  AVERAGE FLOW DEPTH(FEET) =   0.10   TRAVEL TIME(MIN.) =   2.30
  Tc(MIN.) =    8.73
  SUBAREA AREA(ACRES) =     0.49       SUBAREA RUNOFF(CFS) =    0.66
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.316
  TOTAL AREA(ACRES) =        1.2         PEAK FLOW RATE(CFS) =       1.80

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.10   FLOW VELOCITY(FEET/SEC.) =   1.29
  LONGEST FLOWPATH FROM NODE    103.00 TO NODE    100.00 =     480.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    100.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    8.73
  RAINFALL INTENSITY(INCH/HR) =   4.96
```

```
 TOTAL STREAM AREA(ACRES) =     1.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.80

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1       18.82    11.02        4.272          8.81
     2        1.80     8.73        4.965          1.15

 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       18.00     8.73       4.965
     2       20.37    11.02       4.272

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      20.37   Tc(MIN.) =   11.02
 TOTAL AREA(ACRES) =       10.0
 LONGEST FLOWPATH FROM NODE    123.00 TO NODE    100.00 =    1660.00 FEET.
============================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)     =       10.0  TC(MIN.) =     11.02
 PEAK FLOW RATE(CFS)   =      20.37
============================================================================
============================================================================
 END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-P2.dat
Date: 8/29/2018

Proposed Hydrology - 100 Year - BASIN B

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
242	241	2	133.50	131.00	65	0.90	0.08	Initial Area B-8			
241	240	9	131.00	126.50	180	0.86	0.23	V-Gutter Flow			
240	235	3	121.95	121.84	20			Pipe Flow			
235	**235**	**1**						**Node 235 Confluence (1 of 2)**			
237	236	2	128.45	127.80	65	0.86	0.10	Initial Area B-7			
236	235	3	123.25	121.84	50			Pipe Flow			
235	**235**	**1**						**Node 235 Confluence (2 of 2)**			
235	230	3	121.84	121.45	60			Pipe Flow			
230	**230**	**1**						**Node 230 Confluence (1 of 2)**			
232	231	2	126.95	126.45	50	0.90	0.03	Initial Area B-6			
231	230	5	126.45	126.00	45	0.56	0.20	Roof Drainage (5.1)			
230	**230**	**1**						**Node 230 Confluence (2 of 2)**			
230	225	3	121.45	117.15	222			Pipe Flow			
225	**225**	**1**						**Node 225 Confluence (1 of 2)**			
228	227	2	147.80	144.90	75	0.90	0.07	Initial Area B-5			
227	226	6	144.90	125.50	250	0.90	0.20	Street Flow 1 (2 Sides)			
226	225	9	125.50	121.70	375	0.78	0.85	V-Gutter Flow			
225	**225**	**1**						**Node 225 Confluence (2 of 2)**			
225	220	3	117.15	113.45	43			Pipe Flow			
220	**220**	**1**						**Node 220 Confluence (1 of 2)**			
222	221	2	120.75	119.85	50	0.90	0.04	Initial Area B-4			
221	220	5	119.85	118.00	125	0.70	0.34	Overland Flow (5.1)			
220	**220**	**1**						**Node 220 Confluence (2 of 2)**			
220	201	3	113.45	107.43	160			Pipe Flow			
201	**201**	**10**						**Store in Memory Bank #1**	X		
207	206	2	230.00	210.00	90	0.31	0.21	Initial Area B-3 (Offsite)	X		
206	205	5	210.00	120.00	330	0.34	7.18	Overland Flow (5.1)	X		
205	204	5	120.00	112.50	335			Brow Ditch (5.2)	X		
204	203	3	109.00	108.36	70			Pipe Flow	X		
203	**203**	**1**						**Node 203 Confluence (1 of 2)**	X		
213	212	2	147.10	145.95	60	0.90	0.04	Initial Area B-1	X		
212	211	6	145.95	133.20	330	0.76	0.27	Street Flow 1 (1 Side)	X		
211	210	9	133.20	114.76	730	0.76	0.53	V-Gutter Flow	X		
210	203	3	110.21	108.36	30			Pipe Flow	X		
203	**203**	**1**						**Node 203 Confluence (2 of 2)**	X		
203	202	3	108.36	108.03	36			Pipe Flow	X		
202	**202**	**1**						**Node 202 Confluence (1 of 2)**	X		
217	216	2	134.30	131.75	90	0.90	0.04	Initial Area B-1	X		
216	215	5	131.75	118.58	540	0.82	0.62	Overland Flow (5.1)	X		
215	214	3	115.58	115.00	60			Pipe Flow	X		
214	202	3	115.00	108.03	80			Pipe Flow	X		
202	**202**	**1**						**Node 202 Confluence (2 of 2)**	X		
202	201	3	108.03	107.43	65			Pipe Flow	X		
201	**201**	**11**						**Confluence w/ Memory Bank #1**	X		
245	**201**	**8**	130.00	107.43	195	0.20	0.29	**Add Offsite Area**	X		
201	**200**	**3**	107.43	106.51	130			**POC B**	X		
							11.32	**Total Area**			

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

            RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
            Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                         2003,1985,1981 HYDROLOGY MANUAL
          (c) Copyright 1982-2016 Advanced Engineering Software (aes)
              Ver. 23.0 Release Date: 07/01/2016  License ID 1355

                              Analysis prepared by:

                                 Fuscoe Engineering
                               6390 Greenwich Suite 170
                                   San Diego, 92122
                                         CA

 ************************* DESCRIPTION OF STUDY *************************
* WEST OAKS                                                             *
* PROPOSED HYDROLOGY 100 YEAR STORM                                     *
* BASIN B                                                               *
 *************************************************************************

  FILE NAME: WO-P2.DAT
  TIME/DATE OF STUDY: 11:34 08/29/2018
-------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
-------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   2.700
  SPECIFIED MINIMUM PIPE SIZE(INCH) =   6.00
  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   20.5     15.5    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0180
  2   28.0     23.0    0.020/0.020/ ---    0.50    1.50 0.0313 0.125 0.0180

  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 =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
```

```
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    242.00 TO NODE    241.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
  UPSTREAM ELEVATION(FEET) =    133.50
  DOWNSTREAM ELEVATION(FEET) =    131.00
  ELEVATION DIFFERENCE(FEET) =      2.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.853
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.51
  TOTAL AREA(ACRES) =      0.08   TOTAL RUNOFF(CFS) =      0.51

****************************************************************************
  FLOW PROCESS FROM NODE    241.00 TO NODE    240.00 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    131.00
  DOWNSTREAM NODE ELEVATION(FEET) =    126.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   180.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.031   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      1.22
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.66
  AVERAGE FLOW DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =    4.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.82   Tc(MIN.) =    2.67
  SUBAREA AREA(ACRES) =    0.23       SUBAREA RUNOFF(CFS) =    1.41
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.870
  TOTAL AREA(ACRES) =        0.3          PEAK FLOW RATE(CFS) =       1.92
  ** PIPE SIZED TO MAXIMIZE V-GUTTER FLOW AT DOWNSTREAM NODE **
  ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
  DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.58
```

```
  PIPE-FLOW(CFS) =       0.51
  PIPEFLOW TRAVEL TIME(MIN.) =   0.66    Tc(MIN.) =    2.51
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA AREA(ACRES) =    0.23      SUBAREA RUNOFF(CFS) =    1.41
  TOTAL AREA(ACRES) =        0.3       PEAK FLOW RATE(CFS) =       1.92
  *NOTE: V-GUTTER CAPACITY MAY BE EXCEEDED*
  V-GUTTER HYDRAULICS BASED ON MAINLINE Tc :
  V-GUTTER HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) =    1.41

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =    4.40
  FLOW VELOCITY(FEET/SEC.) =   4.23   DEPTH*VELOCITY(FT*FT/SEC) =   0.72
  LONGEST FLOWPATH FROM NODE    242.00 TO NODE    240.00 =     245.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    240.00 TO NODE    235.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   121.95  DOWNSTREAM(FEET) =   121.84
  FLOW LENGTH(FEET) =    20.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   3.59
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       1.92
  PIPE TRAVEL TIME(MIN.) =   0.09    Tc(MIN.) =    2.77
  LONGEST FLOWPATH FROM NODE    242.00 TO NODE    235.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 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.) =    2.77
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     0.31
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.92

****************************************************************************
  FLOW PROCESS FROM NODE    237.00 TO NODE    236.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
```

BMP 2a
DESIGN STORM

```
 USER-SPECIFIED RUNOFF COEFFICIENT = .8600
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =    65.00
 UPSTREAM ELEVATION(FEET) =    128.45
 DOWNSTREAM ELEVATION(FEET) =    127.80
 ELEVATION DIFFERENCE(FEET) =      0.65
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    3.483
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    65.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 SUBAREA RUNOFF(CFS) =      0.61
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.61

****************************************************************************
 FLOW PROCESS FROM NODE    236.00 TO NODE    235.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   123.25  DOWNSTREAM(FEET) =   121.84
 FLOW LENGTH(FEET) =    50.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN   6.0 INCH PIPE IS   3.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   4.99
 ESTIMATED PIPE DIAMETER(INCH) =   6.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       0.61
 PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    3.65
 LONGEST FLOWPATH FROM NODE    237.00 TO NODE    235.00 =     115.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    235.00 TO NODE    235.00 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.) =    3.65
 RAINFALL INTENSITY(INCH/HR) =   7.11
 TOTAL STREAM AREA(ACRES) =     0.10
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.61

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        1.92     2.77        7.114          0.31
```

BMP 2b
DESIGN STORM

```
     2        0.61     3.65        7.114          0.10

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        2.38     2.77       7.114
      2        2.53     3.65       7.114

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       2.53   Tc(MIN.) =    3.65
  TOTAL AREA(ACRES) =        0.4
  LONGEST FLOWPATH FROM NODE    242.00 TO NODE    235.00 =     265.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    235.00 TO NODE    230.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   121.84  DOWNSTREAM(FEET) =   121.45
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   8.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.04
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       2.53
  PIPE TRAVEL TIME(MIN.) =   0.25    Tc(MIN.) =    3.90
  LONGEST FLOWPATH FROM NODE    242.00 TO NODE    230.00 =     325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    3.90
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     0.41
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      2.53

****************************************************************************
  FLOW PROCESS FROM NODE    232.00 TO NODE    231.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    126.95
  DOWNSTREAM ELEVATION(FEET) =    126.45
  ELEVATION DIFFERENCE(FEET) =      0.50
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.546
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.19
  TOTAL AREA(ACRES) =      0.03   TOTAL RUNOFF(CFS) =      0.19

****************************************************************************
  FLOW PROCESS FROM NODE    231.00 TO NODE    230.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    126.45  DOWNSTREAM(FEET) =    126.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =    45.00   CHANNEL SLOPE =  0.0100
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .5600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.59
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   0.66
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   1.14
  Tc(MIN.) =    3.69
  SUBAREA AREA(ACRES) =     0.20       SUBAREA RUNOFF(CFS) =    0.80
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.604
  TOTAL AREA(ACRES) =        0.2         PEAK FLOW RATE(CFS) =       0.99

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   0.73
  LONGEST FLOWPATH FROM NODE    232.00 TO NODE    230.00 =      95.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 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.) =    3.69
RAINFALL INTENSITY(INCH/HR) =   7.11
TOTAL STREAM AREA(ACRES) =     0.23
PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.99

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        2.53     3.90        7.114          0.41
     2        0.99     3.69        7.114          0.23

 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        3.52     3.69       7.114
     2        3.52     3.90       7.114

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =       3.52   Tc(MIN.) =    3.90
 TOTAL AREA(ACRES) =        0.6
 LONGEST FLOWPATH FROM NODE    242.00 TO NODE    230.00 =     325.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    225.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   121.45  DOWNSTREAM(FEET) =   117.15
 FLOW LENGTH(FEET) =   222.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.6 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   6.72
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       3.52
 PIPE TRAVEL TIME(MIN.) =   0.55    Tc(MIN.) =    4.45
 LONGEST FLOWPATH FROM NODE    242.00 TO NODE    225.00 =     547.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =    4.45
```

BMP 2c
DESIGN STORM

```
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     0.64
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.52

****************************************************************************
  FLOW PROCESS FROM NODE    228.00 TO NODE    227.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    147.80
  DOWNSTREAM ELEVATION(FEET) =    144.90
  ELEVATION DIFFERENCE(FEET) =      2.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    1.986
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.45
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.45

****************************************************************************
  FLOW PROCESS FROM NODE    227.00 TO NODE    226.00 IS CODE =  62
----------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
============================================================================
  UPSTREAM ELEVATION(FEET) =  144.90  DOWNSTREAM ELEVATION(FEET) =  125.50
  STREET LENGTH(FEET) =   250.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  2
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.09
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.16
    HALFSTREET FLOOD WIDTH(FEET) =    1.50
    AVERAGE FLOW VELOCITY(FEET/SEC.) =    4.38
    PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.68
  STREET FLOW TRAVEL TIME(MIN.) =   0.95   Tc(MIN.) =    2.94
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
```

```
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.900
  SUBAREA AREA(ACRES) =    0.20      SUBAREA RUNOFF(CFS) =    1.28
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.73

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.19   HALFSTREET FLOOD WIDTH(FEET) =   3.39
  FLOW VELOCITY(FEET/SEC.) =  3.71   DEPTH*VELOCITY(FT*FT/SEC.) =   0.72
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    226.00 =     325.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    226.00 TO NODE    225.00 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    125.50
  DOWNSTREAM NODE ELEVATION(FEET) =    121.70
  CHANNEL LENGTH THRU SUBAREA(FEET) =   375.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.031   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7800
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      4.09
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =  12.30
  AVERAGE FLOW DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =    4.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   0.51   Tc(MIN.) =    3.45
  SUBAREA AREA(ACRES) =    0.85       SUBAREA RUNOFF(CFS) =    4.72
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.809
  TOTAL AREA(ACRES) =        1.1         PEAK FLOW RATE(CFS) =       6.45
  ** PIPE SIZED TO MAXIMIZE V-GUTTER FLOW AT DOWNSTREAM NODE **
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   6.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.44
  PIPE-FLOW(CFS) =       1.73
  PIPEFLOW TRAVEL TIME(MIN.) =   1.41    Tc(MIN.) =   4.34
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA AREA(ACRES) =    0.85      SUBAREA RUNOFF(CFS) =    4.72
  TOTAL AREA(ACRES) =        1.1        PEAK FLOW RATE(CFS) =       6.45
  *NOTE: V-GUTTER CAPACITY MAY BE EXCEEDED*
  V-GUTTER HYDRAULICS BASED ON MAINLINE Tc :
```

```
  V-GUTTER HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) =    4.72

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =    4.40
  FLOW VELOCITY(FEET/SEC.) =  14.19   DEPTH*VELOCITY(FT*FT/SEC) =   2.41
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    225.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    225.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    3.45
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     1.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      6.45

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        3.52     4.45        7.114          0.64
      2        6.45     3.45        7.114          1.12

  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        9.96     3.45       7.114
      2        9.96     4.45       7.114

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       9.96   Tc(MIN.) =    4.45
  TOTAL AREA(ACRES) =        1.8
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    225.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    225.00 TO NODE    220.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   117.15  DOWNSTREAM(FEET) =   113.45
  FLOW LENGTH(FEET) =    43.00   MANNING'S N =  0.013
```

BMP 3
DESIGN STORM

```
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  14.80
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       9.96
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    4.50
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    220.00 =     743.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 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.) =    4.50
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     1.76
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      9.96

****************************************************************************
  FLOW PROCESS FROM NODE    222.00 TO NODE    221.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    120.75
  DOWNSTREAM ELEVATION(FEET) =    119.85
  ELEVATION DIFFERENCE(FEET) =      0.90
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.093
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    221.00 TO NODE    220.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    119.85  DOWNSTREAM(FEET) =    118.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   125.00   CHANNEL SLOPE =  0.0148
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
```

```
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.10
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   2.40
 AVERAGE FLOW DEPTH(FEET) =   0.09   TRAVEL TIME(MIN.) =   0.87
 Tc(MIN.) =    2.96
 SUBAREA AREA(ACRES) =     0.34       SUBAREA RUNOFF(CFS) =    1.69
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.721
 TOTAL AREA(ACRES) =        0.4         PEAK FLOW RATE(CFS) =       1.95

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.13   FLOW VELOCITY(FEET/SEC.) =   2.93
 LONGEST FLOWPATH FROM NODE    222.00 TO NODE    220.00 =     175.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 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.) =    2.96
 RAINFALL INTENSITY(INCH/HR) =   7.11
 TOTAL STREAM AREA(ACRES) =     0.38
 PEAK FLOW RATE(CFS) AT CONFLUENCE =      1.95

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        9.96     4.50        7.114          1.76
     2        1.95     2.96        7.114          0.38

 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       11.91     2.96       7.114
     2       11.91     4.50       7.114

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      11.91   Tc(MIN.) =    4.50
 TOTAL AREA(ACRES) =        2.1
 LONGEST FLOWPATH FROM NODE    228.00 TO NODE    220.00 =     743.00 FEET.
```

BMP 4
DESIGN STORM

```
****************************************************************************
  FLOW PROCESS FROM NODE    220.00 TO NODE    201.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   113.45  DOWNSTREAM(FEET) =   107.43
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  15.0 INCH PIPE IS  12.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.35
  ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      11.91
  PIPE TRAVEL TIME(MIN.) =   0.23    Tc(MIN.) =    4.73
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    201.00 =     903.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  10
----------------------------------------------------------------------------
  >>>>>MAIN-STREAM MEMORY COPIED ONTO MEMORY BANK # 1 <<<<<
============================================================================

****************************************************************************
  FLOW PROCESS FROM NODE    207.00 TO NODE    206.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3100
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    230.00
  DOWNSTREAM ELEVATION(FEET) =    210.00
  ELEVATION DIFFERENCE(FEET) =     20.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.262
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.153
  SUBAREA RUNOFF(CFS) =      0.40
  TOTAL AREA(ACRES) =      0.21   TOTAL RUNOFF(CFS) =      0.40

****************************************************************************
  FLOW PROCESS FROM NODE    206.00 TO NODE    205.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    210.00  DOWNSTREAM(FEET) =    120.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   330.00   CHANNEL SLOPE =  0.2727
```

```
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.420
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3400
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       7.04
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   4.05
  AVERAGE FLOW DEPTH(FEET) =   0.11   TRAVEL TIME(MIN.) =   1.36
  Tc(MIN.) =    7.62
  SUBAREA AREA(ACRES) =     7.18       SUBAREA RUNOFF(CFS) =   13.23
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.339
  TOTAL AREA(ACRES) =        7.4         PEAK FLOW RATE(CFS) =      13.59

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.14   FLOW VELOCITY(FEET/SEC.) =   5.01
  LONGEST FLOWPATH FROM NODE    207.00 TO NODE    205.00 =     420.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    205.00 TO NODE    204.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    120.00  DOWNSTREAM(FEET) =    112.50
  CHANNEL LENGTH THRU SUBAREA(FEET) =   335.00   CHANNEL SLOPE =  0.0224
  CHANNEL FLOW THRU SUBAREA(CFS) =      13.59
  FLOW VELOCITY(FEET/SEC) =   4.05 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   1.38   Tc(MIN.) =    9.00
  LONGEST FLOWPATH FROM NODE    207.00 TO NODE    204.00 =     755.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    204.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   109.00  DOWNSTREAM(FEET) =   108.36
  FLOW LENGTH(FEET) =    70.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      13.59
  PIPE TRAVEL TIME(MIN.) =   0.17    Tc(MIN.) =    9.17
  LONGEST FLOWPATH FROM NODE    207.00 TO NODE    203.00 =     825.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
```

```
------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
========================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.17
  RAINFALL INTENSITY(INCH/HR) =   4.81
  TOTAL STREAM AREA(ACRES) =     7.39
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     13.59

************************************************************************
  FLOW PROCESS FROM NODE    213.00 TO NODE    212.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    60.00
  UPSTREAM ELEVATION(FEET) =    147.10
  DOWNSTREAM ELEVATION(FEET) =    145.95
  ELEVATION DIFFERENCE(FEET) =      1.15
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.245
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.26

************************************************************************
  FLOW PROCESS FROM NODE    212.00 TO NODE    211.00 IS CODE =  62
------------------------------------------------------------------------
  >>>>>COMPUTE STREET FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>(STREET TABLE SECTION #  1 USED)<<<<<
========================================================================
  UPSTREAM ELEVATION(FEET) =  145.95  DOWNSTREAM ELEVATION(FEET) =  133.20
  STREET LENGTH(FEET) =   330.00   CURB HEIGHT(INCHES) =  6.0
  STREET HALFWIDTH(FEET) = 20.50

  DISTANCE FROM CROWN TO CROSSFALL GRADEBREAK(FEET) =  15.50
  INSIDE STREET CROSSFALL(DECIMAL) =  0.020
  OUTSIDE STREET CROSSFALL(DECIMAL)  =  0.020

  SPECIFIED NUMBER OF HALFSTREETS CARRYING RUNOFF =  1
  Manning's FRICTION FACTOR for Streetflow Section(curb-to-curb) =   0.0180

    **TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       0.99
    STREETFLOW MODEL RESULTS USING ESTIMATED FLOW:
    STREET FLOW DEPTH(FEET) =  0.22
```

```
   HALFSTREET FLOOD WIDTH(FEET) =    4.92
   AVERAGE FLOW VELOCITY(FEET/SEC.) =    2.74
   PRODUCT OF DEPTH&VELOCITY(FT*FT/SEC.) =    0.62
  STREET FLOW TRAVEL TIME(MIN.) =   2.01   Tc(MIN.) =    4.25
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.778
  SUBAREA AREA(ACRES) =    0.27      SUBAREA RUNOFF(CFS) =    1.46
  TOTAL AREA(ACRES) =        0.3        PEAK FLOW RATE(CFS) =       1.72

  END OF SUBAREA STREET FLOW HYDRAULICS:
  DEPTH(FEET) = 0.26   HALFSTREET FLOOD WIDTH(FEET) =   6.67
  FLOW VELOCITY(FEET/SEC.) =  3.05   DEPTH*VELOCITY(FT*FT/SEC.) =   0.79
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    211.00 =     390.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    211.00 TO NODE    210.00 IS CODE =  92
----------------------------------------------------------------------------
  >>>>>COMPUTE "V" GUTTER FLOW TRAVEL TIME THRU SUBAREA<<<<<
============================================================================
  UPSTREAM NODE ELEVATION(FEET) =    133.20
  DOWNSTREAM NODE ELEVATION(FEET) =    114.76
  CHANNEL LENGTH THRU SUBAREA(FEET) =   730.00
  "V" GUTTER WIDTH(FEET) =   3.00   GUTTER HIKE(FEET) =  0.125
  PAVEMENT LIP(FEET) =  0.031   MANNING'S N = .0150
  PAVEMENT CROSSFALL(DECIMAL NOTATION) = 0.02000
  MAXIMUM DEPTH(FEET) =   0.17
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.632
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .7600
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =      3.06
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   9.21
  AVERAGE FLOW DEPTH(FEET) =   0.17   FLOOD WIDTH(FEET) =    4.40
  "V" GUTTER FLOW TRAVEL TIME(MIN.) =   1.32   Tc(MIN.) =    5.57
  SUBAREA AREA(ACRES) =    0.53       SUBAREA RUNOFF(CFS) =    2.67
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.767
  TOTAL AREA(ACRES) =        0.8         PEAK FLOW RATE(CFS) =       4.27
  ** PIPE SIZED TO MAXIMIZE V-GUTTER FLOW AT DOWNSTREAM NODE **
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   6.22
  PIPE-FLOW(CFS) =       1.72
  PIPEFLOW TRAVEL TIME(MIN.) =   1.96    Tc(MIN.) =   6.21
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.186
```

BMP 6
DESIGN STORM

```
  SUBAREA AREA(ACRES) =    0.53      SUBAREA RUNOFF(CFS) =    2.49
  TOTAL AREA(ACRES) =        0.8       PEAK FLOW RATE(CFS) =       3.98
  *NOTE: V-GUTTER CAPACITY MAY BE EXCEEDED*
  V-GUTTER HYDRAULICS BASED ON MAINLINE Tc :
  V-GUTTER HYDRAULICS COMPUTED USING ESTIMATED FLOW(CFS) =    2.27

  END OF SUBAREA "V" GUTTER HYDRAULICS:
  DEPTH(FEET) =  0.17   FLOOD WIDTH(FEET) =    4.40
  FLOW VELOCITY(FEET/SEC.) =   6.82   DEPTH*VELOCITY(FT*FT/SEC) =   1.16
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    210.00 =    1120.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    210.00 TO NODE    203.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   110.21  DOWNSTREAM(FEET) =   108.36
  FLOW LENGTH(FEET) =    30.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   7.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  10.34
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.98
  PIPE TRAVEL TIME(MIN.) =   0.05    Tc(MIN.) =    5.62
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    203.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    203.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    5.62
  RAINFALL INTENSITY(INCH/HR) =   6.59
  TOTAL STREAM AREA(ACRES) =     0.84
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.98

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       13.59     9.17        4.811          7.39
      2        3.98     5.62        6.595          0.84

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

BMP 6
DESIGN STORM

```
  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       12.32     5.62       6.595
      2       16.49     9.17       4.811

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      16.49   Tc(MIN.) =    9.17
  TOTAL AREA(ACRES) =        8.2
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    203.00 =    1150.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    203.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   108.36  DOWNSTREAM(FEET) =   108.03
  FLOW LENGTH(FEET) =    36.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  15.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.44
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.49
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    9.25
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    202.00 =    1186.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.25
  RAINFALL INTENSITY(INCH/HR) =   4.78
  TOTAL STREAM AREA(ACRES) =     8.23
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.49

****************************************************************************
  FLOW PROCESS FROM NODE    217.00 TO NODE    216.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    134.30
```

```
  DOWNSTREAM ELEVATION(FEET) =    131.75
  ELEVATION DIFFERENCE(FEET) =      2.55
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.414
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.04   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    216.00 TO NODE    215.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    131.75  DOWNSTREAM(FEET) =    118.58
  CHANNEL LENGTH THRU SUBAREA(FEET) =   540.00   CHANNEL SLOPE =  0.0244
  CHANNEL BASE(FEET) =    5.00   "Z" FACTOR =  99.000
  MANNING'S FACTOR = 0.015   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.715
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .8200
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       1.76
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   1.95
  AVERAGE FLOW DEPTH(FEET) =   0.07   TRAVEL TIME(MIN.) =   4.61
  Tc(MIN.) =    7.02
  SUBAREA AREA(ACRES) =     0.62       SUBAREA RUNOFF(CFS) =    2.91
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.825
  TOTAL AREA(ACRES) =        0.7        PEAK FLOW RATE(CFS) =       3.11

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.09   FLOW VELOCITY(FEET/SEC.) =   2.30
  LONGEST FLOWPATH FROM NODE    217.00 TO NODE    215.00 =     630.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    215.00 TO NODE    214.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   115.58  DOWNSTREAM(FEET) =   115.00
  FLOW LENGTH(FEET) =    60.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   4.93
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.11
  PIPE TRAVEL TIME(MIN.) =   0.20    Tc(MIN.) =    7.22
  LONGEST FLOWPATH FROM NODE    217.00 TO NODE    214.00 =     690.00 FEET.
```

BMP 5
DESIGN STORM

BMP 5
DESIGN STORM

```
****************************************************************************
  FLOW PROCESS FROM NODE    214.00 TO NODE    202.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   115.00  DOWNSTREAM(FEET) =   108.03
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN   9.0 INCH PIPE IS   5.3 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.50
  ESTIMATED PIPE DIAMETER(INCH) =   9.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       3.11
  PIPE TRAVEL TIME(MIN.) =   0.12    Tc(MIN.) =    7.34
  LONGEST FLOWPATH FROM NODE    217.00 TO NODE    202.00 =     770.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    202.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.34
  RAINFALL INTENSITY(INCH/HR) =   5.55
  TOTAL STREAM AREA(ACRES) =     0.66
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      3.11

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.49     9.25        4.784          8.23
      2        3.11     7.34        5.554          0.66

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.32     7.34       5.554
      2       19.17     9.25       4.784

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      19.17   Tc(MIN.) =    9.25
  TOTAL AREA(ACRES) =        8.9
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    202.00 =    1186.00 FEET.
```

```
****************************************************************************
  FLOW PROCESS FROM NODE    202.00 TO NODE    201.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   108.03  DOWNSTREAM(FEET) =   107.43
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  24.0 INCH PIPE IS  17.9 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.64
  ESTIMATED PIPE DIAMETER(INCH) =  24.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      19.17
  PIPE TRAVEL TIME(MIN.) =   0.14    Tc(MIN.) =    9.39
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    201.00 =    1251.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  11
----------------------------------------------------------------------------
  >>>>>CONFLUENCE MEMORY BANK # 1 WITH THE MAIN-STREAM MEMORY<<<<<
============================================================================

  ** MAIN STREAM CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       19.17     9.39       4.737        8.89
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    201.00 =    1251.00 FEET.

  ** MEMORY BANK #  1 CONFLUENCE DATA **
  STREAM     RUNOFF      Tc      INTENSITY     AREA
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)   (ACRE)
      1       11.91     4.73       7.114        2.14
  LONGEST FLOWPATH FROM NODE    228.00 TO NODE    201.00 =     903.00 FEET.

  ** PEAK FLOW RATE TABLE **
  STREAM    RUNOFF       Tc      INTENSITY
  NUMBER     (CFS)     (MIN.)   (INCH/HOUR)
      1      21.57       4.73        7.114
      2      27.11       9.39        4.737

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      27.11   Tc(MIN.) =    9.39
  TOTAL AREA(ACRES) =       11.0

****************************************************************************
  FLOW PROCESS FROM NODE    245.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
  >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
```

```
================================================================================
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.737
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .2000
  S.C.S. CURVE NUMBER (AMC II) =   0
  AREA-AVERAGE RUNOFF COEFFICIENT = 0.4795
  SUBAREA AREA(ACRES) =    0.29   SUBAREA RUNOFF(CFS) =    0.27
  TOTAL AREA(ACRES) =       11.3   TOTAL RUNOFF(CFS) =      27.11
  TC(MIN.) =    9.39
  NOTE: PEAK FLOW RATE DEFAULTED TO UPSTREAM VALUE

****************************************************************************
  FLOW PROCESS FROM NODE    201.00 TO NODE    200.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   107.43  DOWNSTREAM(FEET) =   106.51
  FLOW LENGTH(FEET) =   130.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  30.0 INCH PIPE IS  20.4 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   7.63
  ESTIMATED PIPE DIAMETER(INCH) =  30.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      27.11
  PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    9.67
  LONGEST FLOWPATH FROM NODE    213.00 TO NODE    200.00 =    1381.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       11.3  TC(MIN.) =      9.67
  PEAK FLOW RATE(CFS)   =      27.11
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

FUSCOE ENGINEERING

Job Name: West Oaks
Job #: 2690-005
Run Name: WO-P3.dat
Date: 8/29/2018

Proposed Hydrology - 100 Year - BASIN C

Node to Node		Code	Elev 1 (feet)	Elev 2 (feet)	Length (feet)	Runoff Coeff.	Area (ac.)	Comments	BANK		
									1	2	3
307	306	2	148.00	137.00	75	0.33	0.12	Initial Area C-5 (Offsite)			
306	305	5	137.00	136.00	260			Brow Ditch (5.2)			
305	**305**	**1**						**Node 305 Confluence (1 of 2)**			
331	330	2	300.00	290.00	90	0.35	0.15	Initial Area C-4 (Offsite)			
330	305	5	290.00	136.00	480	0.35	3.36	Overland Flow (5.1)			
305	**305**	**1**						**Node 305 Confluence (2 of 2)**			
305	304	5	136.00	135.85	130			Brow Ditch (5.2)			
304	**304**	**1**						**Node 304 Confluence (1 of 2)**			
321	320	2	280.00	265.00	90	0.35	0.33	Initial Area C-3 (Offsite)			
320	304	5	265.00	135.85	600	0.35	5.14	Overland Flow (5.1)			
304	**304**	**1**						**Node 304 Confluence (2 of 2)**			
304	303	5	135.85	134.50	85			Brow Ditch (5.2)			
303	302	3	127.22	124.21	160			Pipe Flow			
302	**302**	**1**						**Node 302 Confluence (1 of 2)**			
317	316	2	147.10	146.10	50	0.90	0.05	Initial Area C-2			
316	315	5	146.10	134.00	260	0.70	0.90	Overland Flow (5.1)			
315	314	3	129.50	128.40	100			Pipe Flow			
314	302	3	128.40	124.21	120			Pipe Flow			
302	**302**	**1**						**Node 302 Confluence (2 of 2)**			
302	301	3	124.21	123.00	65			Pipe Flow			
301	**301**	**1**						**Node 301 Confluence (1 of 2)**			
312	311	2	320.00	315.00	90	0.35	0.07	Initial Area C-1 (Offsite)			
311	310	5	315.00	143.00	955	0.35	4.61	Overland Flow (5.1)			
310	301	3	143.00	123.00	420			Pipe Flow			
301	**301**	**1**						**Node 301 Confluence (2 of 2)**			
301	**300**	**3**	123.00	119.00	80			**POC C**			
							14.73	Total Area			

****

RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
2003,1985,1981 HYDROLOGY MANUAL

Ver. 23.0 Release Date: 07/01/2016 License ID 1355

Analysis prepared by:

Fuscoe Engineering
6390 Greenwich Suite 170
San Diego, 92122
CA

********** DESCRIPTION OF STUDY **********
* WEST OAKS *
* PROPOSED HYDROLOGY 100 YEAR STORM *
* BASIN C *
****

FILE NAME: WO-P3.DAT
TIME/DATE OF STUDY: 11:08 08/29/2018

USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:

2003 SAN DIEGO MANUAL CRITERIA

USER SPECIFIED STORM EVENT(YEAR) = 100.00
6-HOUR DURATION PRECIPITATION (INCHES) = 2.700
SPECIFIED MINIMUM PIPE SIZE(INCH) = 6.00
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

NO.	HALF-WIDTH (FT)	CROWN TO CROSSFALL (FT)	STREET-CROSSFALL: IN- / OUT-/PARK- SIDE / SIDE/ WAY	CURB HEIGHT (FT)	GUTTER-GEOMETRIES: WIDTH (FT)	LIP	HIKE (FT)	MANNING FACTOR (n)
1	31.0	15.0	0.020/0.020/0.020	0.50	1.50	0.0312	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 = 6.0 (FT*FT/S)
*SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

```
****************************************************************************
  FLOW PROCESS FROM NODE    307.00 TO NODE    306.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3300
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    75.00
  UPSTREAM ELEVATION(FEET) =    148.00
  DOWNSTREAM ELEVATION(FEET) =    137.00
  ELEVATION DIFFERENCE(FEET) =     11.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.572
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.634
  SUBAREA RUNOFF(CFS) =      0.26
  TOTAL AREA(ACRES) =      0.12   TOTAL RUNOFF(CFS) =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    306.00 TO NODE    305.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    137.00  DOWNSTREAM(FEET) =    136.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0038
  NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
  CHANNEL FLOW THRU SUBAREA(CFS) =       0.26
  FLOW VELOCITY(FEET/SEC) =   0.93 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   4.66   Tc(MIN.) =   10.23
  LONGEST FLOWPATH FROM NODE    307.00 TO NODE    305.00 =     335.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.23
  RAINFALL INTENSITY(INCH/HR) =   4.48
  TOTAL STREAM AREA(ACRES) =     0.12
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      0.26

****************************************************************************
  FLOW PROCESS FROM NODE    331.00 TO NODE    330.00 IS CODE =  21
----------------------------------------------------------------------------
```

```
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    300.00
  DOWNSTREAM ELEVATION(FEET) =    290.00
  ELEVATION DIFFERENCE(FEET) =     10.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.362
  SUBAREA RUNOFF(CFS) =      0.33
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.33

****************************************************************************
  FLOW PROCESS FROM NODE    330.00 TO NODE    305.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
==============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    290.00  DOWNSTREAM(FEET) =    136.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   480.00   CHANNEL SLOPE =  0.3208
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.721
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.71
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.51
  AVERAGE FLOW DEPTH(FEET) =   0.15   TRAVEL TIME(MIN.) =   1.07
  Tc(MIN.) =    7.01
  SUBAREA AREA(ACRES) =     3.36       SUBAREA RUNOFF(CFS) =    6.73
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        3.5         PEAK FLOW RATE(CFS) =       7.03

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.22   FLOW VELOCITY(FEET/SEC.) =   9.36
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    305.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    305.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
==============================================================================
  TOTAL NUMBER OF STREAMS =  2
```

```
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =    7.01
  RAINFALL INTENSITY(INCH/HR) =   5.72
  TOTAL STREAM AREA(ACRES) =     3.51
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.03

  ** CONFLUENCE DATA **
  STREAM     RUNOFF        Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1        0.26    10.23        4.483          0.12
      2        7.03     7.01        5.721          3.51

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF       Tc       INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1        7.21     7.01       5.721
      2        5.77    10.23       4.483

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =       7.21   Tc(MIN.) =    7.01
  TOTAL AREA(ACRES) =        3.6
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    305.00 =     570.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    305.00 TO NODE    304.00 IS CODE =  52
----------------------------------------------------------------------------
  >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    136.00  DOWNSTREAM(FEET) =    135.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =   130.00   CHANNEL SLOPE =  0.0012
  CHANNEL FLOW THRU SUBAREA(CFS) =       7.21
  FLOW VELOCITY(FEET/SEC) =   0.78 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
  TRAVEL TIME(MIN.) =   2.77   Tc(MIN.) =    9.78
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    304.00 =     700.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
  TIME OF CONCENTRATION(MIN.) =    9.78
  RAINFALL INTENSITY(INCH/HR) =   4.62
```

```
  TOTAL STREAM AREA(ACRES) =     3.63
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.21

****************************************************************************
  FLOW PROCESS FROM NODE    321.00 TO NODE    320.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    280.00
  DOWNSTREAM ELEVATION(FEET) =    265.00
  ELEVATION DIFFERENCE(FEET) =     15.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    5.945
  WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.362
  SUBAREA RUNOFF(CFS) =      0.73
  TOTAL AREA(ACRES) =      0.33   TOTAL RUNOFF(CFS) =      0.73

****************************************************************************
  FLOW PROCESS FROM NODE    320.00 TO NODE    304.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    265.00  DOWNSTREAM(FEET) =    135.85
  CHANNEL LENGTH THRU SUBAREA(FEET) =   600.00   CHANNEL SLOPE =  0.2152
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.602
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       5.79
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   7.72
  AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.30
  Tc(MIN.) =    7.24
  SUBAREA AREA(ACRES) =     5.14       SUBAREA RUNOFF(CFS) =   10.08
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        5.5         PEAK FLOW RATE(CFS) =      10.73

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.32   FLOW VELOCITY(FEET/SEC.) =   9.36
  LONGEST FLOWPATH FROM NODE    321.00 TO NODE    304.00 =     690.00 FEET.

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

```
 FLOW PROCESS FROM NODE    304.00 TO NODE    304.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =    7.24
 RAINFALL INTENSITY(INCH/HR) =   5.60
 TOTAL STREAM AREA(ACRES) =     5.47
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     10.73

 ** CONFLUENCE DATA **
 STREAM     RUNOFF       Tc      INTENSITY      AREA
 NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
     1        7.21     9.78        4.615          3.63
     2       10.73     7.24        5.602          5.47

 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       16.66     7.24       5.602
     2       16.04     9.78       4.615

 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =      16.66   Tc(MIN.) =    7.24
 TOTAL AREA(ACRES) =        9.1
 LONGEST FLOWPATH FROM NODE    331.00 TO NODE    304.00 =     700.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    304.00 TO NODE    303.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    135.85  DOWNSTREAM(FEET) =    134.50
 CHANNEL LENGTH THRU SUBAREA(FEET) =    85.00   CHANNEL SLOPE =  0.0159
 CHANNEL FLOW THRU SUBAREA(CFS) =      16.66
 FLOW VELOCITY(FEET/SEC) =   3.60 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.39   Tc(MIN.) =    7.63
 LONGEST FLOWPATH FROM NODE    331.00 TO NODE    303.00 =     785.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    303.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
```

```
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   127.22  DOWNSTREAM(FEET) =   124.21
  FLOW LENGTH(FEET) =   160.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  14.0 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.75
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      16.66
  PIPE TRAVEL TIME(MIN.) =   0.27    Tc(MIN.) =    7.91
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    302.00 =     945.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 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.) =    7.91
  RAINFALL INTENSITY(INCH/HR) =   5.29
  TOTAL STREAM AREA(ACRES) =     9.10
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     16.66

****************************************************************************
  FLOW PROCESS FROM NODE    317.00 TO NODE    316.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .9000
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    50.00
  UPSTREAM ELEVATION(FEET) =    147.10
  DOWNSTREAM ELEVATION(FEET) =    146.10
  ELEVATION DIFFERENCE(FEET) =      1.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    2.020
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
  NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.05   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
  FLOW PROCESS FROM NODE    316.00 TO NODE    315.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
```

```
 ELEVATION DATA: UPSTREAM(FEET) =    146.10  DOWNSTREAM(FEET) =    134.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   260.00   CHANNEL SLOPE =  0.0465
 CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
 MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  7.114
 NOTE: RAINFALL INTENSITY IS BASED ON Tc = 5-MINUTE.
 *USER SPECIFIED(SUBAREA):
 USER-SPECIFIED RUNOFF COEFFICIENT = .7000
 S.C.S. CURVE NUMBER (AMC II) =   0
 TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       2.56
 TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   3.45
 AVERAGE FLOW DEPTH(FEET) =   0.22   TRAVEL TIME(MIN.) =   1.26
 Tc(MIN.) =    3.28
 SUBAREA AREA(ACRES) =     0.90       SUBAREA RUNOFF(CFS) =    4.48
 AREA-AVERAGE RUNOFF COEFFICIENT =  0.711
 TOTAL AREA(ACRES) =        0.9         PEAK FLOW RATE(CFS) =       4.80

 END OF SUBAREA CHANNEL FLOW HYDRAULICS:
 DEPTH(FEET) =  0.31   FLOW VELOCITY(FEET/SEC.) =   4.31
 LONGEST FLOWPATH FROM NODE    317.00 TO NODE    315.00 =     310.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    315.00 TO NODE    314.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   129.50  DOWNSTREAM(FEET) =   128.40
 FLOW LENGTH(FEET) =   100.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  15.0 INCH PIPE IS   9.5 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   5.86
 ESTIMATED PIPE DIAMETER(INCH) =  15.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.80
 PIPE TRAVEL TIME(MIN.) =   0.28    Tc(MIN.) =    3.56
 LONGEST FLOWPATH FROM NODE    317.00 TO NODE    314.00 =     410.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    314.00 TO NODE    302.00 IS CODE =  31
----------------------------------------------------------------------------
 >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
 >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   128.40  DOWNSTREAM(FEET) =   124.21
 FLOW LENGTH(FEET) =   120.00   MANNING'S N =  0.013
 DEPTH OF FLOW IN  12.0 INCH PIPE IS   7.7 INCHES
 PIPE-FLOW VELOCITY(FEET/SEC.) =   9.06
 ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
 PIPE-FLOW(CFS) =       4.80
```

BMP 1
DESIGN STORM

BMP 1
DESIGN STORM

```
  PIPE TRAVEL TIME(MIN.) =   0.22    Tc(MIN.) =    3.78
  LONGEST FLOWPATH FROM NODE    317.00 TO NODE    302.00 =     530.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    302.00 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.) =    3.78
  RAINFALL INTENSITY(INCH/HR) =   7.11
  TOTAL STREAM AREA(ACRES) =     0.95
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      4.80

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       16.66     7.91        5.293          9.10
      2        4.80     3.78        7.114          0.95

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

  ** PEAK FLOW RATE TABLE **
  STREAM     RUNOFF      Tc      INTENSITY
  NUMBER      (CFS)    (MIN.)   (INCH/HOUR)
      1       17.20     3.78       7.114
      2       20.24     7.91       5.293

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      20.24   Tc(MIN.) =    7.91
  TOTAL AREA(ACRES) =       10.0
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    302.00 =     945.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    302.00 TO NODE    301.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   124.21  DOWNSTREAM(FEET) =   123.00
  FLOW LENGTH(FEET) =    65.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  16.5 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =   9.97
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      20.24
```

```
  PIPE TRAVEL TIME(MIN.) =   0.11    Tc(MIN.) =    8.02
  LONGEST FLOWPATH FROM NODE    331.00 TO NODE    301.00 =    1010.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 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.) =    8.02
  RAINFALL INTENSITY(INCH/HR) =   5.25
  TOTAL STREAM AREA(ACRES) =    10.05
  PEAK FLOW RATE(CFS) AT CONFLUENCE =     20.24

****************************************************************************
  FLOW PROCESS FROM NODE    312.00 TO NODE    311.00 IS CODE =  21
----------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =    90.00
  UPSTREAM ELEVATION(FEET) =    320.00
  DOWNSTREAM ELEVATION(FEET) =    315.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.232
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  5.607
  SUBAREA RUNOFF(CFS) =      0.14
  TOTAL AREA(ACRES) =      0.07   TOTAL RUNOFF(CFS) =      0.14

****************************************************************************
  FLOW PROCESS FROM NODE    311.00 TO NODE    310.00 IS CODE =  51
----------------------------------------------------------------------------
  >>>>>COMPUTE TRAPEZOIDAL CHANNEL FLOW<<<<<
  >>>>>TRAVELTIME THRU SUBAREA (EXISTING ELEMENT)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =    315.00  DOWNSTREAM(FEET) =    143.00
  CHANNEL LENGTH THRU SUBAREA(FEET) =   955.00   CHANNEL SLOPE =  0.1801
  CHANNEL BASE(FEET) =    3.00   "Z" FACTOR =   2.000
  MANNING'S FACTOR = 0.030   MAXIMUM DEPTH(FEET) =  10.00
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  4.613
  *USER SPECIFIED(SUBAREA):
  USER-SPECIFIED RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  TRAVEL TIME COMPUTED USING ESTIMATED FLOW(CFS) =       3.91
  TRAVEL TIME THRU SUBAREA BASED ON VELOCITY(FEET/SEC.) =   6.23
```

```
  AVERAGE FLOW DEPTH(FEET) =   0.19   TRAVEL TIME(MIN.) =   2.55
  Tc(MIN.) =    9.79
  SUBAREA AREA(ACRES) =     4.61       SUBAREA RUNOFF(CFS) =    7.44
  AREA-AVERAGE RUNOFF COEFFICIENT =  0.350
  TOTAL AREA(ACRES) =        4.7         PEAK FLOW RATE(CFS) =       7.56

  END OF SUBAREA CHANNEL FLOW HYDRAULICS:
  DEPTH(FEET) =  0.27   FLOW VELOCITY(FEET/SEC.) =   7.85
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    310.00 =    1045.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    310.00 TO NODE    301.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   143.00  DOWNSTREAM(FEET) =   123.00
  FLOW LENGTH(FEET) =   420.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  12.0 INCH PIPE IS   9.8 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  11.00
  ESTIMATED PIPE DIAMETER(INCH) =  12.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =       7.56
  PIPE TRAVEL TIME(MIN.) =   0.64    Tc(MIN.) =   10.42
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    301.00 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    301.00 IS CODE =   1
----------------------------------------------------------------------------
  >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
  >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
  TOTAL NUMBER OF STREAMS =  2
  CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
  TIME OF CONCENTRATION(MIN.) =   10.42
  RAINFALL INTENSITY(INCH/HR) =   4.43
  TOTAL STREAM AREA(ACRES) =     4.68
  PEAK FLOW RATE(CFS) AT CONFLUENCE =      7.56

  ** CONFLUENCE DATA **
  STREAM     RUNOFF       Tc      INTENSITY      AREA
  NUMBER      (CFS)     (MIN.)   (INCH/HOUR)    (ACRE)
      1       20.24     8.02        5.246         10.05
      2        7.56    10.42        4.429          4.68

  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       26.05     8.02       5.246
      2       24.64    10.42       4.429

  COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
  PEAK FLOW RATE(CFS) =      26.05   Tc(MIN.) =    8.02
  TOTAL AREA(ACRES) =       14.7
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    301.00 =    1465.00 FEET.

****************************************************************************
  FLOW PROCESS FROM NODE    301.00 TO NODE    300.00 IS CODE =  31
----------------------------------------------------------------------------
  >>>>>COMPUTE PIPE-FLOW TRAVEL TIME THRU SUBAREA<<<<<
  >>>>>USING COMPUTER-ESTIMATED PIPESIZE (NON-PRESSURE FLOW)<<<<<
============================================================================
  ELEVATION DATA: UPSTREAM(FEET) =   123.00  DOWNSTREAM(FEET) =   119.00
  FLOW LENGTH(FEET) =    80.00   MANNING'S N =  0.013
  DEPTH OF FLOW IN  21.0 INCH PIPE IS  13.6 INCHES
  PIPE-FLOW VELOCITY(FEET/SEC.) =  15.77
  ESTIMATED PIPE DIAMETER(INCH) =  21.00    NUMBER OF PIPES =   1
  PIPE-FLOW(CFS) =      26.05
  PIPE TRAVEL TIME(MIN.) =   0.08    Tc(MIN.) =    8.10
  LONGEST FLOWPATH FROM NODE    312.00 TO NODE    300.00 =    1545.00 FEET.
============================================================================
  END OF STUDY SUMMARY:
  TOTAL AREA(ACRES)     =       14.7  TC(MIN.) =      8.10
  PEAK FLOW RATE(CFS)   =      26.05
============================================================================
============================================================================
  END OF RATIONAL METHOD ANALYSIS
```

Appendix E

SDHM Results

SDHM 3.1
PROJECT REPORT

Project Name: POC A
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 1 : 10 Percent of the 2 Year

High Flow Threshold for POC 1: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 100
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,NatVeg,Flat	.31
C,NatVeg,Steep	.05
D,NatVeg,Flat	.28
D,NatVeg,Steep	5.28
A,Urban,Flat	2.36
D,Urban,Flat	.63
Pervious Total	8.91

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.59
Impervious Total	0.59
Basin Total	9.5

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : EXISTING BASIN 100
Bypass: Yes

GroundWater: No

Pervious Land Use	acre
A,NatVeg,Flat	.22
D,NatVeg,Steep	5.29
C,NatVeg,Steep	.05
A,Urban,Flat	.98
D,NatVeg,Flat	.26
Pervious Total	**6.8**

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.02
Impervious Total	**0.02**

Basin Total 6.82

Element Flows To:

Surface	Interflow	Groundwater

Name : DMA 7
Bypass: No

GroundWater: No

Pervious Land Use	acre
D,Urban,Flat	.09
A,Urban,Flat	.1
Pervious Total	**0.19**

Impervious Land Use	acre
IMPERVIOUS-FLAT	1.32
Impervious Total	**1.32**

Basin Total 1.51

Element Flows To:

Surface	Interflow	Groundwater
Surface filtration 7	Surface filtration 7	

Name : DMA 8
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,Urban,Flat	.07
D,Urban,Flat	.06
Pervious Total	**0.13**

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.94
Impervious Total	**0.94**

Basin Total **1.07**

Element Flows To:

Surface	Interflow	Groundwater
Surface filtration 8	Surface filtration 8	

Name : DMA 9
Bypass: No

GroundWater: No

Pervious Land Use	acre
Pervious Total	**0**

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.1
Impervious Total	**0.1**

Basin Total **0.1**

Element Flows To:

Surface	Interflow	Groundwater
Surface filtration 9	Surface filtration 9	

Name : DMA 10
Bypass: No

GroundWater: No

Pervious Land Use	acre
Pervious Total	0

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.04
Impervious Total	0.04

Basin Total	0.04

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 10	Surface iltration 10	

Name : Biofiltration 7
Bottom Length: 175.80 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 2.17
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.67
Orifice Diameter (in.): 1.05
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 43.207
Total Outflow (ac-ft.): 46.868
Percent Through Underdrain: 92.19
Discharge Structure
Riser Height: 2.5 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.
Orifice 2 Diameter: 0.1 in. **Elevation:** 1.5 ft.
Orifice 3 Diameter: 0.25 in. **Elevation:** 2 ft.

Element Flows To:

Outlet 1	Outlet 2

Biofiltration 7 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
106.18	0.0404	0.0000	0.0000	0.0000
106.26	0.0404	0.0009	0.0000	0.0000
106.33	0.0404	0.0019	0.0000	0.0000
106.41	0.0404	0.0028	0.0000	0.0000
106.49	0.0404	0.0037	0.0000	0.0000

106.56	0.0404	0.0047	0.0000	0.0000
106.64	0.0404	0.0056	0.0000	0.0000
106.72	0.0404	0.0065	0.0000	0.0000
106.80	0.0404	0.0075	0.0000	0.0000
106.87	0.0404	0.0084	0.0000	0.0000
106.95	0.0404	0.0093	0.0000	0.0000
107.03	0.0404	0.0102	0.0000	0.0000
107.10	0.0404	0.0112	0.0000	0.0000
107.18	0.0404	0.0121	0.0000	0.0000
107.26	0.0404	0.0130	0.0000	0.0000
107.33	0.0404	0.0140	0.0000	0.0000
107.41	0.0404	0.0149	0.0000	0.0000
107.49	0.0404	0.0158	0.0000	0.0000
107.57	0.0404	0.0168	0.0000	0.0000
107.64	0.0404	0.0177	0.0000	0.0000
107.72	0.0404	0.0190	0.0000	0.0000
107.80	0.0404	0.0203	0.0000	0.0000
107.87	0.0404	0.0216	0.0000	0.0000
107.95	0.0404	0.0229	0.0000	0.0000
108.03	0.0404	0.0241	0.0000	0.0000
108.10	0.0404	0.0254	0.0000	0.0000
108.18	0.0404	0.0267	0.0000	0.0000
108.26	0.0404	0.0280	0.0000	0.0000
108.33	0.0404	0.0293	0.0000	0.0000
108.41	0.0404	0.0306	0.0000	0.0000
108.49	0.0404	0.0319	0.0000	0.0000
108.57	0.0404	0.0332	0.0000	0.0000
108.64	0.0404	0.0345	0.0000	0.0000
108.72	0.0404	0.0357	0.0000	0.0000
108.80	0.0404	0.0370	0.0000	0.0000
108.87	0.0404	0.0383	0.0000	0.0000
108.95	0.0404	0.0396	0.0000	0.0000
109.03	0.0404	0.0409	0.0000	0.0000
109.10	0.0404	0.0422	0.0000	0.0000
109.18	0.0404	0.0435	0.0000	0.0000
109.26	0.0404	0.0448	0.0000	0.0000
109.34	0.0404	0.0461	0.0000	0.0000
109.41	0.0404	0.0473	0.0000	0.0000
109.49	0.0404	0.0486	0.0000	0.0000
109.57	0.0404	0.0499	0.0000	0.0000
109.64	0.0404	0.0512	0.0000	0.0000
109.72	0.0404	0.0525	0.0000	0.0000
109.80	0.0404	0.0538	0.0000	0.0000
109.87	0.0404	0.0551	0.0000	0.0000
109.95	0.0404	0.0564	0.0000	0.0000
110.03	0.0404	0.0577	0.0000	0.0000
110.10	0.0404	0.0589	0.0000	0.0000
110.18	0.0404	0.0602	0.0000	0.0000
110.18	0.0404	0.0603	0.0000	0.0000

Surface filtration 7 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
4.0030	0.0404	0.0603	0.0000	0.2139	0.0000
4.0800	0.0404	0.0634	0.0000	0.2139	0.0000
4.1569	0.0404	0.0665	0.0000	0.2244	0.0000
4.2339	0.0404	0.0696	0.0002	0.2348	0.0000
4.3108	0.0404	0.0727	0.0008	0.2452	0.0000

4.3878	0.0404	0.0758	0.0021	0.2557	0.0000
4.4647	0.0404	0.0789	0.0030	0.2661	0.0000
4.5417	0.0404	0.0820	0.0035	0.2765	0.0000
4.6186	0.0404	0.0851	0.0054	0.2870	0.0000
4.6956	0.0404	0.0882	0.0063	0.2974	0.0000
4.7726	0.0404	0.0913	0.0079	0.3079	0.0000
4.8495	0.0404	0.0944	0.0086	0.3183	0.0000
4.9265	0.0404	0.0975	0.0099	0.3287	0.0000
5.0034	0.0404	0.1006	0.0105	0.3392	0.0000
5.0804	0.0404	0.1037	0.0116	0.3496	0.0000
5.1573	0.0404	0.1068	0.0121	0.3601	0.0000
5.2343	0.0404	0.1100	0.0130	0.3705	0.0000
5.3113	0.0404	0.1131	0.0135	0.3809	0.0000
5.3882	0.0404	0.1162	0.0143	0.3914	0.0000
5.4652	0.0404	0.1193	0.0148	0.4018	0.0000
5.5421	0.0404	0.1224	0.0155	0.4123	0.0000
5.6191	0.0404	0.1255	0.0159	0.4227	0.0000
5.6960	0.0404	0.1286	0.0166	0.4331	0.0000
5.7730	0.0404	0.1317	0.0170	0.4436	0.0000
5.8499	0.0404	0.1348	0.0177	0.4540	0.0000
5.9269	0.0404	0.1379	0.0180	0.4644	0.0000
6.0039	0.0404	0.1410	0.0186	0.4749	0.0000
6.0808	0.0404	0.1441	0.0194	0.4853	0.0000
6.1578	0.0404	0.1472	0.0206	0.4958	0.0000
6.2347	0.0404	0.1503	0.0220	0.5062	0.0000
6.3117	0.0404	0.1534	0.0227	0.5166	0.0000
6.3886	0.0404	0.1565	0.0230	0.5271	0.0000
6.4656	0.0404	0.1596	0.0232	0.5375	0.0000
6.5425	0.0404	0.1628	0.0238	0.5480	0.0000
6.6195	0.0404	0.1659	0.0247	0.5584	0.0000
6.6965	0.0404	0.1690	0.0259	0.5688	0.0000
6.7734	0.0404	0.1721	0.0271	0.5793	0.0000
6.8504	0.0404	0.1752	0.0283	0.5897	0.0000
6.9273	0.0404	0.1783	0.0295	0.6002	0.0000
7.0030	0.0404	0.1813	0.0306	0.6104	0.0000

Name : Surface filtration 7

Element Flows To:
Outlet 1 **Outlet 2**
Biofiltration 7

Name : Biofiltration 8
Bottom Length: 165.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1.52
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.67
Orifice Diameter (in.): 0.95

Offset (in.): 0
Flow Through Underdrain (ac-ft.): 28.445
Total Outflow (ac-ft.): 33.323
Percent Through Underdrain: 85.36
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.33 ft.
Orifice 2 Diameter: 0.125 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 8 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
104.30	0.0379	0.0000	0.0000	0.0000
104.35	0.0379	0.0006	0.0000	0.0000
104.41	0.0379	0.0012	0.0000	0.0000
104.46	0.0379	0.0018	0.0000	0.0000
104.51	0.0379	0.0024	0.0000	0.0000
104.57	0.0379	0.0030	0.0004	0.0000
104.62	0.0379	0.0036	0.0008	0.0000
104.67	0.0379	0.0042	0.0016	0.0000
104.73	0.0379	0.0048	0.0027	0.0000
104.78	0.0379	0.0055	0.0042	0.0000
104.83	0.0379	0.0061	0.0049	0.0000
104.89	0.0379	0.0067	0.0052	0.0000
104.94	0.0379	0.0073	0.0061	0.0000
104.99	0.0379	0.0079	0.0065	0.0000
105.05	0.0379	0.0085	0.0073	0.0000
105.10	0.0379	0.0091	0.0077	0.0000
105.15	0.0379	0.0097	0.0083	0.0000
105.21	0.0379	0.0103	0.0087	0.0000
105.26	0.0379	0.0109	0.0093	0.0000
105.31	0.0379	0.0115	0.0096	0.0000
105.37	0.0379	0.0121	0.0101	0.0000
105.42	0.0379	0.0127	0.0104	0.0000
105.47	0.0379	0.0133	0.0109	0.0000
105.53	0.0379	0.0139	0.0112	0.0000
105.58	0.0379	0.0145	0.0116	0.0000
105.63	0.0379	0.0152	0.0119	0.0000
105.69	0.0379	0.0158	0.0123	0.0000
105.74	0.0379	0.0164	0.0126	0.0000
105.79	0.0379	0.0170	0.0130	0.0000
105.85	0.0379	0.0178	0.0132	0.0000
105.90	0.0379	0.0186	0.0136	0.0000
105.95	0.0379	0.0195	0.0138	0.0000
106.01	0.0379	0.0203	0.0142	0.0000
106.06	0.0379	0.0212	0.0144	0.0000
106.11	0.0379	0.0220	0.0147	0.0000
106.17	0.0379	0.0228	0.0149	0.0000
106.22	0.0379	0.0237	0.0153	0.0000
106.27	0.0379	0.0245	0.0155	0.0000

106.33	0.0379	0.0254	0.0158	0.0000
106.38	0.0379	0.0262	0.0159	0.0000
106.43	0.0379	0.0270	0.0160	0.0000
106.49	0.0379	0.0279	0.0160	0.0000
106.54	0.0379	0.0287	0.0160	0.0000
106.59	0.0379	0.0295	0.0160	0.0000
106.65	0.0379	0.0304	0.0164	0.0000
106.70	0.0379	0.0312	0.0171	0.0000
106.75	0.0379	0.0321	0.0178	0.0000
106.81	0.0379	0.0329	0.0186	0.0000
106.86	0.0379	0.0337	0.0195	0.0000
106.91	0.0379	0.0346	0.0203	0.0000
106.97	0.0379	0.0354	0.0210	0.0000
107.02	0.0379	0.0363	0.0218	0.0000
107.07	0.0379	0.0371	0.0225	0.0000
107.13	0.0379	0.0379	0.0232	0.0000
107.18	0.0379	0.0388	0.0239	0.0000
107.23	0.0379	0.0396	0.0246	0.0000
107.29	0.0379	0.0404	0.0252	0.0000
107.34	0.0379	0.0413	0.0259	0.0000
107.39	0.0379	0.0421	0.0265	0.0000
107.45	0.0379	0.0430	0.0271	0.0000
107.50	0.0379	0.0438	0.0277	0.0000
107.55	0.0379	0.0446	0.0283	0.0000
107.61	0.0379	0.0455	0.0289	0.0000
107.65	0.0379	0.0462	0.0295	0.0000

Surface filtration 8 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.3530	0.0379	0.0462	0.0000	0.1978	0.0000
3.4063	0.0379	0.0482	0.0000	0.1978	0.0000
3.4597	0.0379	0.0502	0.0000	0.2046	0.0000
3.5130	0.0379	0.0523	0.0000	0.2113	0.0000
3.5663	0.0379	0.0543	0.0000	0.2181	0.0000
3.6196	0.0379	0.0563	0.0000	0.2249	0.0000
3.6730	0.0379	0.0583	0.0000	0.2317	0.0000
3.7263	0.0379	0.0603	0.0000	0.2385	0.0000
3.7796	0.0379	0.0624	0.0000	0.2453	0.0000
3.8330	0.0379	0.0644	0.0000	0.2521	0.0000
3.8863	0.0379	0.0664	0.0001	0.2589	0.0000
3.9396	0.0379	0.0684	0.0002	0.2657	0.0000
3.9930	0.0379	0.0704	0.0002	0.2724	0.0000
4.0463	0.0379	0.0725	0.0003	0.2792	0.0000
4.0996	0.0379	0.0745	0.0003	0.2860	0.0000
4.1529	0.0379	0.0765	0.0003	0.2928	0.0000
4.2063	0.0379	0.0785	0.0003	0.2996	0.0000
4.2596	0.0379	0.0805	0.0004	0.3064	0.0000
4.3129	0.0379	0.0826	0.0004	0.3132	0.0000
4.3663	0.0379	0.0846	0.0166	0.3200	0.0000
4.4196	0.0379	0.0866	0.1823	0.3268	0.0000
4.4729	0.0379	0.0886	0.4367	0.3336	0.0000
4.5263	0.0379	0.0906	0.7436	0.3403	0.0000
4.5796	0.0379	0.0927	1.0736	0.3471	0.0000
4.6329	0.0379	0.0947	1.3964	0.3539	0.0000
4.6862	0.0379	0.0967	1.6835	0.3607	0.0000
4.7396	0.0379	0.0987	1.9131	0.3675	0.0000
4.7929	0.0379	0.1007	2.0775	0.3743	0.0000

4.8462	0.0379	0.1028	2.1912	0.3811	0.0000
4.8530	0.0379	0.1030	2.3291	0.3819	0.0000

Name : Surface filtration 8

Element Flows To:
Outlet 1 **Outlet 2**
Biofiltration 8

Name : Biofiltration 9
Bottom Length: 19.80 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.6
Offset (in.): 3
Flow Through Underdrain (ac-ft.): 3.124
Total Outflow (ac-ft.): 3.325
Percent Through Underdrain: 93.95
Discharge Structure
Riser Height: 1.5 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.2 ft.
Orifice 2 Diameter: 0.125 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 9 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
106.27	0.0045	0.0000	0.0000	0.0000
106.32	0.0045	0.0001	0.0000	0.0000
106.38	0.0045	0.0001	0.0000	0.0000
106.43	0.0045	0.0002	0.0000	0.0000
106.48	0.0045	0.0003	0.0000	0.0000
106.54	0.0045	0.0004	0.0000	0.0000
106.59	0.0045	0.0004	0.0000	0.0000
106.64	0.0045	0.0005	0.0000	0.0000
106.69	0.0045	0.0006	0.0000	0.0000
106.75	0.0045	0.0007	0.0000	0.0000
106.80	0.0045	0.0007	0.0000	0.0000
106.85	0.0045	0.0008	0.0000	0.0000
106.91	0.0045	0.0009	0.0000	0.0000
106.96	0.0045	0.0009	0.0000	0.0000

107.01	0.0045	0.0010	0.0000	0.0000
107.07	0.0045	0.0011	0.0000	0.0000
107.12	0.0045	0.0012	0.0000	0.0000
107.17	0.0045	0.0012	0.0000	0.0000
107.23	0.0045	0.0013	0.0000	0.0000
107.28	0.0045	0.0014	0.0000	0.0000
107.33	0.0045	0.0014	0.0000	0.0000
107.39	0.0045	0.0015	0.0000	0.0000
107.44	0.0045	0.0016	0.0000	0.0000
107.49	0.0045	0.0017	0.0000	0.0000
107.54	0.0045	0.0017	0.0000	0.0000
107.60	0.0045	0.0018	0.0000	0.0000
107.65	0.0045	0.0019	0.0000	0.0000
107.70	0.0045	0.0020	0.0000	0.0000
107.76	0.0045	0.0020	0.0000	0.0000
107.81	0.0045	0.0021	0.0000	0.0000
107.86	0.0045	0.0022	0.0000	0.0000
107.92	0.0045	0.0023	0.0000	0.0000
107.97	0.0045	0.0024	0.0000	0.0000
108.02	0.0045	0.0025	0.0000	0.0000
108.08	0.0045	0.0026	0.0000	0.0000
108.13	0.0045	0.0027	0.0000	0.0000
108.18	0.0045	0.0028	0.0000	0.0000
108.24	0.0045	0.0029	0.0000	0.0000
108.29	0.0045	0.0030	0.0000	0.0000
108.34	0.0045	0.0031	0.0000	0.0000
108.39	0.0045	0.0032	0.0000	0.0000
108.45	0.0045	0.0033	0.0000	0.0000
108.50	0.0045	0.0034	0.0000	0.0000
108.55	0.0045	0.0035	0.0000	0.0000
108.61	0.0045	0.0036	0.0000	0.0000
108.66	0.0045	0.0037	0.0000	0.0000
108.71	0.0045	0.0038	0.0000	0.0000
108.77	0.0045	0.0039	0.0000	0.0000
108.82	0.0045	0.0040	0.0000	0.0000
108.87	0.0045	0.0041	0.0000	0.0000
108.93	0.0045	0.0042	0.0000	0.0000
108.98	0.0045	0.0043	0.0000	0.0000
109.03	0.0045	0.0044	0.0000	0.0000
109.08	0.0045	0.0045	0.0000	0.0000
109.10	0.0045	0.0046	0.0000	0.0000

Surface filtration 9 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
2.8330	0.0045	0.0046	0.0000	0.0237	0.0000
2.8861	0.0045	0.0048	0.0000	0.0237	0.0000
2.9392	0.0045	0.0050	0.0000	0.0245	0.0000
2.9923	0.0045	0.0053	0.0000	0.0254	0.0000
3.0454	0.0045	0.0055	0.0000	0.0262	0.0000
3.0985	0.0045	0.0058	0.0000	0.0270	0.0000
3.1517	0.0045	0.0060	0.0000	0.0278	0.0000
3.2048	0.0045	0.0063	0.0000	0.0286	0.0000
3.2579	0.0045	0.0065	0.0000	0.0294	0.0000
3.3110	0.0045	0.0067	0.0000	0.0302	0.0000
3.3641	0.0045	0.0070	0.0000	0.0310	0.0000
3.4172	0.0045	0.0072	0.0000	0.0318	0.0000
3.4703	0.0045	0.0075	0.0000	0.0327	0.0000

3.5234	0.0045	0.0077	0.0000	0.0335	0.0000
3.5765	0.0045	0.0079	0.0000	0.0343	0.0000
3.6296	0.0045	0.0082	0.0000	0.0351	0.0000
3.6828	0.0045	0.0084	0.0000	0.0359	0.0000
3.7359	0.0045	0.0087	0.0000	0.0367	0.0000
3.7890	0.0045	0.0089	0.0000	0.0375	0.0000
3.8421	0.0045	0.0092	0.0000	0.0383	0.0000
3.8952	0.0045	0.0094	0.0000	0.0391	0.0000
3.9483	0.0045	0.0096	0.0008	0.0400	0.0000
4.0014	0.0045	0.0099	0.0011	0.0408	0.0000
4.0545	0.0045	0.0101	0.0017	0.0416	0.0000
4.1076	0.0045	0.0104	0.0019	0.0424	0.0000
4.1607	0.0045	0.0106	0.0023	0.0432	0.0000
4.2139	0.0045	0.0108	0.0025	0.0440	0.0000
4.2670	0.0045	0.0111	0.0028	0.0448	0.0000
4.3201	0.0045	0.0113	0.0030	0.0456	0.0000
4.3732	0.0045	0.0116	0.0033	0.0464	0.0000
4.4263	0.0045	0.0118	0.0034	0.0473	0.0000
4.4794	0.0045	0.0121	0.0037	0.0481	0.0000
4.5325	0.0045	0.0123	0.0038	0.0489	0.0000
4.5856	0.0045	0.0125	0.0040	0.0497	0.0000
4.6387	0.0045	0.0128	0.0041	0.0505	0.0000
4.6918	0.0045	0.0130	0.0043	0.0513	0.0000
4.7450	0.0045	0.0133	0.0044	0.0521	0.0000
4.7981	0.0045	0.0135	0.0046	0.0529	0.0000
4.8330	0.0045	0.0137	0.0047	0.0535	0.0000

Name : Surface filtration 9

Element Flows To:
Outlet 1 **Outlet 2**
Biofiltration 9

Name : DMA 13 - Self Mitigating
Bypass: Yes

GroundWater: No

Pervious Land Use	**acre**
A,Urban,Flat	**.3**
Pervious Total	**0.3**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**0.3**

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Biofiltration 10
Bottom Length: 19.33 ft.
Bottom Width: 3.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.5
Offset (in.): 3
Flow Through Underdrain (ac-ft.): 1.205
Total Outflow (ac-ft.): 1.339
Percent Through Underdrain: 89.97
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 10 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
106.62	0.001331	0.000000	0.0000	0.0000
106.67	0.001331	0.000019	0.0000	0.0000
106.72	0.001331	0.000038	0.0000	0.0000
106.76	0.001331	0.000057	0.0000	0.0000
106.81	0.001331	0.000076	0.0000	0.0000
106.86	0.001331	0.000095	0.0000	0.0000
106.91	0.001331	0.000114	0.0000	0.0000
106.95	0.001331	0.000133	0.0000	0.0000
107.00	0.001331	0.000152	0.0000	0.0000
107.05	0.001331	0.000171	0.0000	0.0000
107.10	0.001331	0.000190	0.0000	0.0000
107.14	0.001331	0.000209	0.0000	0.0000
107.19	0.001331	0.000228	0.0000	0.0000
107.24	0.001331	0.000247	0.0000	0.0000
107.29	0.001331	0.000266	0.0000	0.0000
107.33	0.001331	0.000285	0.0000	0.0000
107.38	0.001331	0.000304	0.0000	0.0000
107.43	0.001331	0.000323	0.0000	0.0000
107.48	0.001331	0.000342	0.0000	0.0000
107.52	0.001331	0.000361	0.0000	0.0000
107.57	0.001331	0.000380	0.0000	0.0000
107.62	0.001331	0.000399	0.0000	0.0000
107.67	0.001331	0.000418	0.0000	0.0000

107.72	0.001331	0.000437	0.0000	0.0000
107.76	0.001331	0.000456	0.0000	0.0000
107.81	0.001331	0.000475	0.0000	0.0000
107.86	0.001331	0.000495	0.0000	0.0000
107.91	0.001331	0.000514	0.0000	0.0000
107.95	0.001331	0.000533	0.0000	0.0000
108.00	0.001331	0.000552	0.0000	0.0000
108.05	0.001331	0.000571	0.0000	0.0000
108.10	0.001331	0.000590	0.0000	0.0000
108.14	0.001331	0.000616	0.0000	0.0000
108.19	0.001331	0.000642	0.0000	0.0000
108.24	0.001331	0.000669	0.0000	0.0000
108.29	0.001331	0.000695	0.0000	0.0000
108.33	0.001331	0.000721	0.0000	0.0000
108.38	0.001331	0.000747	0.0000	0.0000
108.43	0.001331	0.000774	0.0000	0.0000
108.48	0.001331	0.000800	0.0000	0.0000
108.52	0.001331	0.000826	0.0000	0.0000
108.57	0.001331	0.000853	0.0000	0.0000
108.62	0.001331	0.000879	0.0000	0.0000
108.67	0.001331	0.000905	0.0000	0.0000
108.72	0.001331	0.000932	0.0000	0.0000
108.76	0.001331	0.000958	0.0000	0.0000
108.81	0.001331	0.000984	0.0000	0.0000
108.86	0.001331	0.001011	0.0000	0.0000
108.91	0.001331	0.001037	0.0000	0.0000
108.95	0.001331	0.001063	0.0000	0.0000
109.00	0.001331	0.001090	0.0000	0.0000
109.05	0.001331	0.001116	0.0000	0.0000
109.10	0.001331	0.001142	0.0000	0.0000
109.14	0.001331	0.001168	0.0000	0.0000
109.19	0.001331	0.001195	0.0000	0.0000
109.24	0.001331	0.001221	0.0000	0.0000
109.29	0.001331	0.001247	0.0000	0.0000
109.33	0.001331	0.001274	0.0000	0.0000
109.38	0.001331	0.001300	0.0000	0.0000
109.43	0.001331	0.001326	0.0000	0.0000
109.45	0.001331	0.001339	0.0000	0.0000

Surface iltration 10 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
2.8330	0.001331	0.001339	0.0000	0.0069	0.0000
2.8806	0.001331	0.001403	0.0000	0.0069	0.0000
2.9282	0.001331	0.001466	0.0000	0.0071	0.0000
2.9758	0.001331	0.001530	0.0000	0.0074	0.0000
3.0235	0.001331	0.001593	0.0000	0.0076	0.0000
3.0711	0.001331	0.001656	0.0000	0.0078	0.0000
3.1187	0.001331	0.001720	0.0000	0.0080	0.0000
3.1663	0.001331	0.001783	0.0000	0.0082	0.0000
3.2139	0.001331	0.001847	0.0000	0.0084	0.0000
3.2615	0.001331	0.001910	0.0000	0.0086	0.0000
3.3092	0.001331	0.001973	0.0000	0.0088	0.0000
3.3568	0.001331	0.002037	0.0000	0.0091	0.0000
3.4044	0.001331	0.002100	0.0000	0.0093	0.0000
3.4520	0.001331	0.002164	0.0000	0.0095	0.0000
3.4996	0.001331	0.002227	0.0000	0.0097	0.0000
3.5472	0.001331	0.002290	0.0000	0.0099	0.0000

3.5948	0.001331	0.002354	0.0000	0.0101	0.0000
3.6425	0.001331	0.002417	0.0000	0.0103	0.0000
3.6901	0.001331	0.002481	0.0000	0.0105	0.0000
3.7377	0.001331	0.002544	0.0000	0.0108	0.0000
3.7853	0.001331	0.002607	0.0000	0.0110	0.0000
3.8329	0.001331	0.002671	0.0000	0.0112	0.0000
3.8805	0.001331	0.002734	0.0000	0.0114	0.0000
3.9282	0.001331	0.002798	0.0000	0.0116	0.0000
3.9758	0.001331	0.002861	0.0004	0.0118	0.0000
4.0234	0.001331	0.002924	0.0006	0.0120	0.0000
4.0710	0.001331	0.002988	0.0010	0.0123	0.0000
4.1186	0.001331	0.003051	0.0012	0.0125	0.0000
4.1662	0.001331	0.003115	0.0014	0.0127	0.0000
4.2138	0.001331	0.003178	0.0016	0.0129	0.0000
4.2615	0.001331	0.003241	0.0018	0.0131	0.0000
4.3091	0.001331	0.003305	0.0019	0.0133	0.0000
4.3330	0.001331	0.003337	0.0021	0.0134	0.0000

Name : Surface iltration 10

Element Flows To:

Outlet 1	**Outlet 2**
Biofiltration 10	

ANALYSIS RESULTS

Predeveloped Landuse Totals for POC #1
Total Pervious Area:8.91
Total Impervious Area:0.59

Mitigated Landuse Totals for POC #1
Total Pervious Area:7.42
Total Impervious Area:2.42

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	2.396973
5 year	3.943249
10 year	5.566506
25 year	7.150371

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	2.279818
5 year	3.772484
10 year	5.597138
25 year	7.565611

POC #1
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2397	787	720	91	Pass
0.2935	658	608	92	Pass
0.3473	555	526	94	Pass
0.4011	485	454	93	Pass
0.4549	418	380	90	Pass
0.5087	344	319	92	Pass
0.5625	285	282	98	Pass
0.6163	256	262	102	Pass
0.6701	238	238	100	Pass
0.7240	223	218	97	Pass
0.7778	200	203	101	Pass
0.8316	191	190	99	Pass
0.8854	180	179	99	Pass
0.9392	167	162	97	Pass
0.9930	155	151	97	Pass
1.0468	147	137	93	Pass
1.1006	139	126	90	Pass
1.1544	126	117	92	Pass
1.2082	117	109	93	Pass
1.2620	107	102	95	Pass
1.3158	99	95	95	Pass
1.3696	92	91	98	Pass
1.4234	90	83	92	Pass
1.4772	87	79	90	Pass
1.5310	86	76	88	Pass
1.5849	81	69	85	Pass
1.6387	77	64	83	Pass
1.6925	68	58	85	Pass
1.7463	66	55	83	Pass
1.8001	60	53	88	Pass
1.8539	59	50	84	Pass
1.9077	56	48	85	Pass
1.9615	52	47	90	Pass
2.0153	50	43	86	Pass
2.0691	46	39	84	Pass
2.1229	42	38	90	Pass
2.1767	38	38	100	Pass
2.2305	38	36	94	Pass
2.2843	37	34	91	Pass
2.3381	35	34	97	Pass
2.3919	34	33	97	Pass
2.4457	33	33	100	Pass
2.4996	29	32	110	Pass
2.5534	28	31	110	Pass
2.6072	26	28	107	Pass
2.6610	24	26	108	Pass
2.7148	24	23	95	Pass
2.7686	22	22	100	Pass

2.8224	22	22	100	Pass
2.8762	20	21	104	Pass
2.9300	19	21	110	Pass
2.9838	18	19	105	Pass
3.0376	17	18	105	Pass
3.0914	16	17	106	Pass
3.1452	16	17	106	Pass
3.1990	16	17	106	Pass
3.2528	16	17	106	Pass
3.3066	16	16	100	Pass
3.3605	15	16	106	Pass
3.4143	15	15	100	Pass
3.4681	15	14	93	Pass
3.5219	15	14	93	Pass
3.5757	15	14	93	Pass
3.6295	14	13	92	Pass
3.6833	14	13	92	Pass
3.7371	14	11	78	Pass
3.7909	13	9	69	Pass
3.8447	11	8	72	Pass
3.8985	10	8	80	Pass
3.9523	8	8	100	Pass
4.0061	8	8	100	Pass
4.0599	8	8	100	Pass
4.1137	8	8	100	Pass
4.1675	8	8	100	Pass
4.2214	8	7	87	Pass
4.2752	8	6	75	Pass
4.3290	8	6	75	Pass
4.3828	8	6	75	Pass
4.4366	8	6	75	Pass
4.4904	8	6	75	Pass
4.5442	8	6	75	Pass
4.5980	7	6	85	Pass
4.6518	7	6	85	Pass
4.7056	7	6	85	Pass
4.7594	6	6	100	Pass
4.8132	6	6	100	Pass
4.8670	6	6	100	Pass
4.9208	6	6	100	Pass
4.9746	6	6	100	Pass
5.0284	6	6	100	Pass
5.0823	6	6	100	Pass
5.1361	6	6	100	Pass
5.1899	6	6	100	Pass
5.2437	6	6	100	Pass
5.2975	6	5	83	Pass
5.3513	6	5	83	Pass
5.4051	5	5	100	Pass
5.4589	5	5	100	Pass
5.5127	5	4	80	Pass
5.5665	4	4	100	Pass

Drawdown Time Results

POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.**Perlnd and Implnd Changes**

No changes have been made.

SDHM 3.1
PROJECT REPORT

Project Name: POC B
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 2 : 10 Percent of the 2 Year

High Flow Threshold for POC 2: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 200
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,NatVeg,Steep	.3
C,NatVeg,Steep	1.15
D,NatVeg,Steep	6.14
A,Urban,Flat	1.9
D,Urban,Flat	.75
Pervious Total	10.24

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.45
IMPERVIOUS-STEEP	0.31
Impervious Total	0.76
Basin Total	11

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : DMA 2a
Bypass: No

GroundWater: No

Pervious Land Use	acre
Pervious Total	**0**

Impervious Land Use	acre
IMPERVIOUS-FLAT	**0.29**
Impervious Total	**0.29**

Basin Total **0.29**

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 2a	Surface iltration 2a	

Name : DMA 3
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,Urban,Flat	**.18**
Pervious Total	**0.18**

Impervious Land Use	acre
IMPERVIOUS-FLAT	**0.89**
Impervious Total	**0.89**

Basin Total **1.07**

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 3	Surface iltration 3	

Name : Biofiltration 3
Bottom Length: 159.40 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333

Material type for second layer: GRAVEL
Material thickness of third layer: 3.35
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 1
Orifice Diameter (in.): 0.85
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 29.073
Total Outflow (ac-ft.): 31.571
Percent Through Underdrain: 92.09
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.
Orifice 2 Diameter: 1 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 3 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
117.50	0.0366	0.0000	0.0000	0.0000
117.57	0.0366	0.0008	0.0000	0.0000
117.65	0.0366	0.0016	0.0000	0.0000
117.72	0.0366	0.0024	0.0002	0.0000
117.79	0.0366	0.0032	0.0007	0.0000
117.87	0.0366	0.0040	0.0017	0.0000
117.94	0.0366	0.0048	0.0019	0.0000
118.01	0.0366	0.0056	0.0033	0.0000
118.09	0.0366	0.0064	0.0057	0.0000
118.16	0.0366	0.0073	0.0058	0.0000
118.23	0.0366	0.0081	0.0058	0.0000
118.31	0.0366	0.0089	0.0069	0.0000
118.38	0.0366	0.0097	0.0074	0.0000
118.45	0.0366	0.0105	0.0081	0.0000
118.53	0.0366	0.0113	0.0085	0.0000
118.60	0.0366	0.0121	0.0090	0.0000
118.68	0.0366	0.0129	0.0093	0.0000
118.75	0.0366	0.0137	0.0098	0.0000
118.82	0.0366	0.0145	0.0101	0.0000
118.90	0.0366	0.0153	0.0105	0.0000
118.97	0.0366	0.0161	0.0108	0.0000
119.04	0.0366	0.0172	0.0112	0.0000
119.12	0.0366	0.0184	0.0114	0.0000
119.19	0.0366	0.0195	0.0118	0.0000
119.26	0.0366	0.0206	0.0120	0.0000
119.34	0.0366	0.0217	0.0124	0.0000
119.41	0.0366	0.0228	0.0126	0.0000
119.48	0.0366	0.0239	0.0130	0.0000
119.56	0.0366	0.0250	0.0132	0.0000
119.63	0.0366	0.0262	0.0136	0.0000
119.70	0.0366	0.0273	0.0143	0.0000
119.78	0.0366	0.0284	0.0151	0.0000

119.85	0.0366	0.0295	0.0159	0.0000
119.92	0.0366	0.0306	0.0167	0.0000
120.00	0.0366	0.0317	0.0176	0.0000
120.07	0.0366	0.0329	0.0180	0.0000
120.14	0.0366	0.0340	0.0182	0.0000
120.22	0.0366	0.0351	0.0183	0.0000
120.29	0.0366	0.0362	0.0185	0.0000
120.36	0.0366	0.0373	0.0190	0.0000
120.44	0.0366	0.0384	0.0196	0.0000
120.51	0.0366	0.0395	0.0202	0.0000
120.58	0.0366	0.0407	0.0209	0.0000
120.66	0.0366	0.0418	0.0215	0.0000
120.73	0.0366	0.0429	0.0222	0.0000
120.80	0.0366	0.0440	0.0228	0.0000
120.88	0.0366	0.0451	0.0234	0.0000
120.95	0.0366	0.0462	0.0240	0.0000
121.03	0.0366	0.0474	0.0246	0.0000
121.10	0.0366	0.0485	0.0252	0.0000
121.17	0.0366	0.0496	0.0257	0.0000
121.25	0.0366	0.0507	0.0263	0.0000
121.32	0.0366	0.0518	0.0268	0.0000
121.39	0.0366	0.0529	0.0273	0.0000
121.47	0.0366	0.0540	0.0279	0.0000
121.54	0.0366	0.0552	0.0284	0.0000
121.61	0.0366	0.0563	0.0289	0.0000
121.69	0.0366	0.0574	0.0293	0.0000
121.76	0.0366	0.0585	0.0298	0.0000
121.83	0.0366	0.0596	0.0303	0.0000
121.91	0.0366	0.0607	0.0308	0.0000
121.98	0.0366	0.0619	0.0312	0.0000
122.05	0.0366	0.0630	0.0317	0.0000
122.13	0.0366	0.0641	0.0321	0.0000
122.20	0.0366	0.0652	0.0326	0.0000
122.27	0.0366	0.0663	0.0330	0.0000
122.35	0.0366	0.0674	0.0334	0.0000
122.42	0.0366	0.0685	0.0338	0.0000
122.49	0.0366	0.0697	0.0343	0.0000
122.57	0.0366	0.0708	0.0347	0.0000
122.64	0.0366	0.0719	0.0351	0.0000
122.68	0.0366	0.0725	0.0355	0.0000

Surface iltration 3 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
5.1830	0.0366	0.0725	0.0000	0.1935	0.0000
5.2564	0.0377	0.0753	0.0000	0.1935	0.0000
5.3299	0.0387	0.0781	0.0000	0.2026	0.0000
5.4033	0.0398	0.0809	0.0000	0.2116	0.0000
5.4768	0.0409	0.0839	0.0000	0.2206	0.0000
5.5502	0.0420	0.0870	0.0000	0.2297	0.0000
5.6236	0.0430	0.0901	0.0000	0.2387	0.0000
5.6971	0.0441	0.0933	0.0004	0.2477	0.0000
5.7705	0.0452	0.0966	0.0081	0.2568	0.0000
5.8440	0.0463	0.0999	0.0110	0.2658	0.0000
5.9174	0.0473	0.1034	0.0132	0.2748	0.0000
5.9908	0.0484	0.1069	0.0151	0.2838	0.0000
6.0643	0.0495	0.1105	0.0168	0.2929	0.0000
6.1377	0.0506	0.1141	0.0184	0.3019	0.0000

6.2112	0.0516	0.1179	0.0699	0.3109	0.0000
6.2846	0.0527	0.1217	0.3626	0.3200	0.0000
6.3580	0.0538	0.1256	0.7764	0.3290	0.0000
6.4315	0.0549	0.1296	1.2318	0.3380	0.0000
6.5049	0.0559	0.1337	1.6510	0.3471	0.0000
6.5784	0.0570	0.1378	1.9699	0.3561	0.0000
6.6518	0.0581	0.1421	2.1696	0.3651	0.0000
6.6830	0.0585	0.1439	2.3471	0.3690	0.0000

Name : Surface iltration 3

Element Flows To:

Outlet 1	**Outlet 2**
Biofiltration 3	

Name : DMA 4
Bypass: No

GroundWater: No

Pervious Land Use	**acre**
A,Urban,Flat	**.08**
Pervious Total	**0.08**

Impervious Land Use	**acre**
IMPERVIOUS-FLAT	**0.28**
Impervious Total	**0.28**
Basin Total	**0.36**

Element Flows To:

Surface	**Interflow**	**Groundwater**
Surface iltration 4	Surface iltration 4	

Name : Biofiltration 4
Bottom Length: 35.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 3.14
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.85
Offset (in.): 0

Flow Through Underdrain (ac-ft.): 9.16
Total Outflow (ac-ft.): 10.012
Percent Through Underdrain: 91.49
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.
Orifice 2 Diameter: 1 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 4 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
113.45	0.0080	0.0000	0.0000	0.0000
113.52	0.0080	0.0002	0.0000	0.0000
113.59	0.0080	0.0003	0.0000	0.0000
113.66	0.0080	0.0005	0.0000	0.0000
113.73	0.0080	0.0007	0.0001	0.0000
113.81	0.0080	0.0009	0.0003	0.0000
113.88	0.0080	0.0010	0.0006	0.0000
113.95	0.0080	0.0012	0.0007	0.0000
114.02	0.0080	0.0014	0.0012	0.0000
114.09	0.0080	0.0015	0.0018	0.0000
114.16	0.0080	0.0017	0.0025	0.0000
114.23	0.0080	0.0019	0.0026	0.0000
114.30	0.0080	0.0021	0.0037	0.0000
114.37	0.0080	0.0022	0.0049	0.0000
114.45	0.0080	0.0024	0.0061	0.0000
114.52	0.0080	0.0026	0.0063	0.0000
114.59	0.0080	0.0027	0.0080	0.0000
114.66	0.0080	0.0029	0.0087	0.0000
114.73	0.0080	0.0031	0.0091	0.0000
114.80	0.0080	0.0033	0.0099	0.0000
114.87	0.0080	0.0034	0.0104	0.0000
114.94	0.0080	0.0036	0.0109	0.0000
115.01	0.0080	0.0038	0.0112	0.0000
115.09	0.0080	0.0041	0.0116	0.0000
115.16	0.0080	0.0043	0.0118	0.0000
115.23	0.0080	0.0045	0.0122	0.0000
115.30	0.0080	0.0048	0.0124	0.0000
115.37	0.0080	0.0050	0.0128	0.0000
115.44	0.0080	0.0053	0.0129	0.0000
115.51	0.0080	0.0055	0.0133	0.0000
115.58	0.0080	0.0057	0.0137	0.0000
115.66	0.0080	0.0060	0.0143	0.0000
115.73	0.0080	0.0062	0.0151	0.0000
115.80	0.0080	0.0064	0.0159	0.0000
115.87	0.0080	0.0067	0.0167	0.0000
115.94	0.0080	0.0069	0.0171	0.0000
116.01	0.0080	0.0072	0.0173	0.0000
116.08	0.0080	0.0074	0.0174	0.0000
116.15	0.0080	0.0076	0.0176	0.0000

116.22	0.0080	0.0079	0.0181	0.0000
116.30	0.0080	0.0081	0.0187	0.0000
116.37	0.0080	0.0083	0.0193	0.0000
116.44	0.0080	0.0086	0.0200	0.0000
116.51	0.0080	0.0088	0.0207	0.0000
116.58	0.0080	0.0091	0.0213	0.0000
116.65	0.0080	0.0093	0.0219	0.0000
116.72	0.0080	0.0095	0.0226	0.0000
116.79	0.0080	0.0098	0.0232	0.0000
116.86	0.0080	0.0100	0.0237	0.0000
116.94	0.0080	0.0102	0.0243	0.0000
117.01	0.0080	0.0105	0.0249	0.0000
117.08	0.0080	0.0107	0.0254	0.0000
117.15	0.0080	0.0110	0.0260	0.0000
117.22	0.0080	0.0112	0.0265	0.0000
117.29	0.0080	0.0114	0.0270	0.0000
117.36	0.0080	0.0117	0.0275	0.0000
117.43	0.0080	0.0119	0.0280	0.0000
117.50	0.0080	0.0121	0.0285	0.0000
117.58	0.0080	0.0124	0.0290	0.0000
117.65	0.0080	0.0126	0.0294	0.0000
117.72	0.0080	0.0129	0.0299	0.0000
117.79	0.0080	0.0131	0.0304	0.0000
117.86	0.0080	0.0133	0.0308	0.0000
117.93	0.0080	0.0136	0.0313	0.0000
118.00	0.0080	0.0138	0.0317	0.0000
118.07	0.0080	0.0140	0.0321	0.0000
118.14	0.0080	0.0143	0.0325	0.0000
118.22	0.0080	0.0145	0.0330	0.0000
118.29	0.0080	0.0147	0.0334	0.0000
118.36	0.0080	0.0150	0.0338	0.0000
118.42	0.0080	0.0152	0.0343	0.0000

Surface iltration 4 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
4.9730	0.0080	0.0152	0.0000	0.0424	0.0000
5.0441	0.0083	0.0158	0.0000	0.0424	0.0000
5.1153	0.0085	0.0164	0.0000	0.0444	0.0000
5.1864	0.0087	0.0170	0.0000	0.0463	0.0000
5.2575	0.0089	0.0176	0.0000	0.0482	0.0000
5.3287	0.0092	0.0183	0.0000	0.0501	0.0000
5.3998	0.0094	0.0189	0.0000	0.0520	0.0000
5.4709	0.0096	0.0196	0.0001	0.0540	0.0000
5.5421	0.0099	0.0203	0.0064	0.0559	0.0000
5.6132	0.0101	0.0210	0.0102	0.0578	0.0000
5.6843	0.0103	0.0217	0.0125	0.0597	0.0000
5.7555	0.0105	0.0225	0.0145	0.0616	0.0000
5.8266	0.0108	0.0232	0.0162	0.0636	0.0000
5.8977	0.0110	0.0240	0.0178	0.0655	0.0000
5.9688	0.0112	0.0248	0.0192	0.0674	0.0000
6.0400	0.0115	0.0256	0.2040	0.0693	0.0000
6.1111	0.0117	0.0264	0.5583	0.0712	0.0000
6.1822	0.0119	0.0273	0.9881	0.0732	0.0000
6.2534	0.0121	0.0281	1.4227	0.0751	0.0000
6.3245	0.0124	0.0290	1.7940	0.0770	0.0000
6.3956	0.0126	0.0299	2.0568	0.0789	0.0000
6.4668	0.0128	0.0308	2.2188	0.0809	0.0000

6.4730 0.0129 0.0309 2.3954 0.0810 0.0000

Name : Surface iltration 4

Element Flows To:

Outlet 1	Outlet 2
Biofiltration 4	

Name : DMA 5
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,Urban,Flat	.05
Pervious Total	**0.05**

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.59
Impervious Total	**0.59**
Basin Total	**0.64**

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 5	Surface iltration 5	

Name : Biofiltration 5
Bottom Length: 70.40 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 2.51
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.83
Orifice Diameter (in.): 0.85
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 17.724
Total Outflow (ac-ft.): 20.603
Percent Through Underdrain: 86.03
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.

Orifice 2 Diameter: 1 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 5 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
111.45	0.0162	0.0000	0.0000	0.0000
111.51	0.0162	0.0003	0.0000	0.0000
111.58	0.0162	0.0006	0.0000	0.0000
111.64	0.0162	0.0009	0.0000	0.0000
111.71	0.0162	0.0012	0.0002	0.0000
111.77	0.0162	0.0016	0.0005	0.0000
111.84	0.0162	0.0019	0.0008	0.0000
111.90	0.0162	0.0022	0.0009	0.0000
111.96	0.0162	0.0025	0.0018	0.0000
112.03	0.0162	0.0028	0.0028	0.0000
112.09	0.0162	0.0031	0.0041	0.0000
112.16	0.0162	0.0034	0.0047	0.0000
112.22	0.0162	0.0037	0.0050	0.0000
112.28	0.0162	0.0040	0.0061	0.0000
112.35	0.0162	0.0044	0.0067	0.0000
112.41	0.0162	0.0047	0.0074	0.0000
112.48	0.0162	0.0050	0.0078	0.0000
112.54	0.0162	0.0053	0.0083	0.0000
112.61	0.0162	0.0056	0.0086	0.0000
112.67	0.0162	0.0059	0.0091	0.0000
112.73	0.0162	0.0062	0.0093	0.0000
112.80	0.0162	0.0065	0.0097	0.0000
112.86	0.0162	0.0068	0.0100	0.0000
112.93	0.0162	0.0072	0.0104	0.0000
112.99	0.0162	0.0076	0.0106	0.0000
113.06	0.0162	0.0080	0.0110	0.0000
113.12	0.0162	0.0085	0.0112	0.0000
113.18	0.0162	0.0089	0.0115	0.0000
113.25	0.0162	0.0093	0.0117	0.0000
113.31	0.0162	0.0097	0.0121	0.0000
113.38	0.0162	0.0102	0.0122	0.0000
113.44	0.0162	0.0106	0.0126	0.0000
113.50	0.0162	0.0110	0.0128	0.0000
113.57	0.0162	0.0115	0.0134	0.0000
113.63	0.0162	0.0119	0.0141	0.0000
113.70	0.0162	0.0123	0.0145	0.0000
113.76	0.0162	0.0128	0.0146	0.0000
113.83	0.0162	0.0132	0.0147	0.0000
113.89	0.0162	0.0136	0.0148	0.0000
113.95	0.0162	0.0141	0.0151	0.0000
114.02	0.0162	0.0145	0.0157	0.0000
114.08	0.0162	0.0149	0.0164	0.0000
114.15	0.0162	0.0153	0.0171	0.0000
114.21	0.0162	0.0158	0.0177	0.0000
114.28	0.0162	0.0162	0.0184	0.0000
114.34	0.0162	0.0166	0.0191	0.0000

114.40	0.0162	0.0171	0.0197	0.0000
114.47	0.0162	0.0175	0.0203	0.0000
114.53	0.0162	0.0179	0.0209	0.0000
114.60	0.0162	0.0184	0.0215	0.0000
114.66	0.0162	0.0188	0.0221	0.0000
114.72	0.0162	0.0192	0.0227	0.0000
114.79	0.0162	0.0196	0.0232	0.0000
114.85	0.0162	0.0201	0.0237	0.0000
114.92	0.0162	0.0205	0.0242	0.0000
114.98	0.0162	0.0209	0.0248	0.0000
115.05	0.0162	0.0214	0.0253	0.0000
115.11	0.0162	0.0218	0.0257	0.0000
115.17	0.0162	0.0222	0.0262	0.0000
115.24	0.0162	0.0227	0.0267	0.0000
115.30	0.0162	0.0231	0.0272	0.0000
115.37	0.0162	0.0235	0.0276	0.0000
115.43	0.0162	0.0240	0.0281	0.0000
115.50	0.0162	0.0244	0.0285	0.0000
115.56	0.0162	0.0248	0.0289	0.0000
115.62	0.0162	0.0252	0.0294	0.0000
115.69	0.0162	0.0257	0.0298	0.0000
115.75	0.0162	0.0261	0.0302	0.0000
115.79	0.0162	0.0264	0.0406	0.0000

Surface iltration 5 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
4.3430	0.0162	0.0264	0.0000	0.0850	0.0000
4.4072	0.0166	0.0274	0.0000	0.0850	0.0000
4.4714	0.0170	0.0285	0.0000	0.0885	0.0000
4.5356	0.0174	0.0296	0.0000	0.0919	0.0000
4.5998	0.0178	0.0307	0.0000	0.0954	0.0000
4.6640	0.0182	0.0319	0.0000	0.0989	0.0000
4.7283	0.0187	0.0331	0.0000	0.1024	0.0000
4.7925	0.0191	0.0343	0.0000	0.1059	0.0000
4.8567	0.0195	0.0355	0.0004	0.1094	0.0000
4.9209	0.0199	0.0368	0.0074	0.1129	0.0000
4.9851	0.0203	0.0381	0.0103	0.1164	0.0000
5.0493	0.0207	0.0394	0.0124	0.1198	0.0000
5.1135	0.0211	0.0408	0.0142	0.1233	0.0000
5.1777	0.0216	0.0421	0.0158	0.1268	0.0000
5.2419	0.0220	0.0435	0.0172	0.1303	0.0000
5.3061	0.0224	0.0449	0.0186	0.1338	0.0000
5.3703	0.0228	0.0464	0.0678	0.1373	0.0000
5.4345	0.0232	0.0479	0.3135	0.1408	0.0000
5.4988	0.0236	0.0494	0.6606	0.1443	0.0000
5.5630	0.0240	0.0509	1.0551	0.1478	0.0000
5.6272	0.0245	0.0525	1.4447	0.1512	0.0000
5.6914	0.0249	0.0541	1.7798	0.1547	0.0000
5.7556	0.0253	0.0557	2.0267	0.1582	0.0000
5.8198	0.0257	0.0573	2.1859	0.1617	0.0000
5.8430	0.0259	0.0579	2.3445	0.1630	0.0000

Name : Surface iltration 5

Element Flows To:

Outlet 1	Outlet 2

Biofiltration 5

Name : DMA 6
Bypass: No

GroundWater: No

Pervious Land Use	acre
D,Urban,Flat	.07
Pervious Total	**0.07**

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.74
Impervious Total	**0.74**
Basin Total	**0.81**

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 6	Surface iltration 6	

Name : Biofiltration 6
Bottom Length: 85.70 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 1.71
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.85
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 19.787
Total Outflow (ac-ft.): 26.164
Percent Through Underdrain: 75.63
Discharge Structure
Riser Height: 0.92 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.25 ft.
Orifice 2 Diameter: 1 in. **Elevation:** 0.5 ft.

Element Flows To:

Outlet 1	Outlet 2

Biofiltration 6 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
111.93	0.0197	0.0000	0.0000	0.0000
111.98	0.0197	0.0003	0.0000	0.0000
112.04	0.0197	0.0006	0.0000	0.0000
112.09	0.0197	0.0010	0.0000	0.0000
112.15	0.0197	0.0013	0.0000	0.0000
112.20	0.0197	0.0016	0.0002	0.0000
112.26	0.0197	0.0019	0.0005	0.0000
112.31	0.0197	0.0023	0.0009	0.0000
112.37	0.0197	0.0026	0.0015	0.0000
112.42	0.0197	0.0029	0.0023	0.0000
112.48	0.0197	0.0032	0.0034	0.0000
112.53	0.0197	0.0035	0.0040	0.0000
112.58	0.0197	0.0039	0.0042	0.0000
112.64	0.0197	0.0042	0.0049	0.0000
112.69	0.0197	0.0045	0.0053	0.0000
112.75	0.0197	0.0048	0.0059	0.0000
112.80	0.0197	0.0052	0.0062	0.0000
112.86	0.0197	0.0055	0.0068	0.0000
112.91	0.0197	0.0058	0.0070	0.0000
112.97	0.0197	0.0061	0.0075	0.0000
113.02	0.0197	0.0064	0.0078	0.0000
113.08	0.0197	0.0068	0.0082	0.0000
113.13	0.0197	0.0071	0.0084	0.0000
113.18	0.0197	0.0074	0.0088	0.0000
113.24	0.0197	0.0077	0.0091	0.0000
113.29	0.0197	0.0080	0.0094	0.0000
113.35	0.0197	0.0084	0.0096	0.0000
113.40	0.0197	0.0087	0.0100	0.0000
113.46	0.0197	0.0091	0.0102	0.0000
113.51	0.0197	0.0096	0.0105	0.0000
113.57	0.0197	0.0100	0.0107	0.0000
113.62	0.0197	0.0105	0.0110	0.0000
113.68	0.0197	0.0109	0.0112	0.0000
113.73	0.0197	0.0114	0.0115	0.0000
113.78	0.0197	0.0118	0.0116	0.0000
113.84	0.0197	0.0123	0.0119	0.0000
113.89	0.0197	0.0127	0.0121	0.0000
113.95	0.0197	0.0131	0.0124	0.0000
114.00	0.0197	0.0136	0.0125	0.0000
114.06	0.0197	0.0140	0.0126	0.0000
114.11	0.0197	0.0145	0.0126	0.0000
114.17	0.0197	0.0149	0.0126	0.0000
114.22	0.0197	0.0154	0.0127	0.0000
114.28	0.0197	0.0158	0.0130	0.0000
114.33	0.0197	0.0163	0.0136	0.0000
114.38	0.0197	0.0167	0.0142	0.0000
114.44	0.0197	0.0172	0.0149	0.0000
114.49	0.0197	0.0176	0.0156	0.0000
114.55	0.0197	0.0180	0.0162	0.0000
114.60	0.0197	0.0185	0.0169	0.0000
114.66	0.0197	0.0189	0.0175	0.0000
114.71	0.0197	0.0194	0.0181	0.0000
114.77	0.0197	0.0198	0.0187	0.0000

114.82	0.0197	0.0203	0.0192	0.0000
114.88	0.0197	0.0207	0.0198	0.0000
114.93	0.0197	0.0212	0.0203	0.0000
114.98	0.0197	0.0216	0.0208	0.0000
115.04	0.0197	0.0220	0.0213	0.0000
115.09	0.0197	0.0225	0.0218	0.0000
115.15	0.0197	0.0229	0.0223	0.0000
115.20	0.0197	0.0234	0.0228	0.0000
115.26	0.0197	0.0238	0.0232	0.0000
115.31	0.0197	0.0243	0.0237	0.0000
115.37	0.0197	0.0247	0.0241	0.0000
115.42	0.0197	0.0252	0.0246	0.0000
115.47	0.0197	0.0256	0.0251	0.0000

Surface iltration 6 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.5430	0.0197	0.0256	0.0000	0.1028	0.0000
3.5975	0.0197	0.0267	0.0000	0.1028	0.0000
3.6521	0.0197	0.0277	0.0000	0.1064	0.0000
3.7066	0.0197	0.0288	0.0000	0.1100	0.0000
3.7612	0.0197	0.0299	0.0000	0.1136	0.0000
3.8157	0.0197	0.0310	0.0000	0.1172	0.0000
3.8702	0.0197	0.0320	0.0000	0.1208	0.0000
3.9248	0.0197	0.0331	0.0000	0.1244	0.0000
3.9793	0.0197	0.0342	0.0000	0.1280	0.0000
4.0338	0.0197	0.0353	0.0001	0.1316	0.0000
4.0884	0.0197	0.0363	0.0033	0.1353	0.0000
4.1429	0.0197	0.0374	0.0086	0.1389	0.0000
4.1975	0.0197	0.0385	0.0107	0.1425	0.0000
4.2520	0.0197	0.0395	0.0125	0.1461	0.0000
4.3065	0.0197	0.0406	0.0140	0.1497	0.0000
4.3611	0.0197	0.0417	0.0154	0.1533	0.0000
4.4156	0.0197	0.0428	0.0166	0.1569	0.0000
4.4702	0.0197	0.0438	0.0242	0.1605	0.0000
4.5247	0.0197	0.0449	0.1812	0.1641	0.0000
4.5792	0.0197	0.0460	0.4366	0.1677	0.0000
4.6338	0.0197	0.0471	0.7491	0.1713	0.0000
4.6883	0.0197	0.0481	1.0871	0.1749	0.0000
4.7428	0.0197	0.0492	1.4184	0.1785	0.0000
4.7974	0.0197	0.0503	1.7123	0.1821	0.0000
4.8519	0.0197	0.0513	1.9457	0.1857	0.0000
4.9065	0.0197	0.0524	2.1112	0.1894	0.0000
4.9610	0.0197	0.0535	2.2257	0.1930	0.0000
4.9630	0.0197	0.0535	2.3681	0.1931	0.0000

Name : Surface iltration 6

Element Flows To:

Outlet 1	**Outlet 2**
Biofiltration 6	

Name : DMA 2b
Bypass: No

GroundWater: No

Pervious Land Use	acre
Pervious Total	**0**

Impervious Land Use	acre
IMPERVIOUS-FLAT	**0.1**
Impervious Total	**0.1**
Basin Total	**0.1**

Element Flows To:

Surface	Interflow	Groundwater
Surface ltration 2b	Surface ltration 2b	

Name : DMA 2c
Bypass: No

GroundWater: No

Pervious Land Use	acre
A,Urban,Flat	**.09**
Pervious Total	**0.09**

Impervious Land Use	acre
IMPERVIOUS-FLAT	**0.12**
Impervious Total	**0.12**
Basin Total	**0.21**

Element Flows To:

Surface	Interflow	Groundwater
Surface ltration 2c	Surface ltration 2c	

Name : Biofiltration 2b
Bottom Length: 15.50 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.33
Material type for second layer: GRAVEL
Material thickness of third layer: 2
Material type for third layer: GRAVEL

Underdrain used
Underdrain Diameter (feet): 0.42
Orifice Diameter (in.): 0.6
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 3.322
Total Outflow (ac-ft.): 3.435
Percent Through Underdrain: 96.72
Discharge Structure
Riser Height: 1.5 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 1 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 2b Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
122.72	0.0036	0.0000	0.0000	0.0000
122.78	0.0036	0.0001	0.0000	0.0000
122.85	0.0036	0.0001	0.0000	0.0000
122.91	0.0036	0.0002	0.0000	0.0000
122.98	0.0036	0.0003	0.0000	0.0000
123.04	0.0036	0.0003	0.0001	0.0000
123.10	0.0036	0.0004	0.0002	0.0000
123.17	0.0036	0.0005	0.0004	0.0000
123.23	0.0036	0.0005	0.0006	0.0000
123.30	0.0036	0.0006	0.0006	0.0000
123.36	0.0036	0.0007	0.0009	0.0000
123.42	0.0036	0.0008	0.0013	0.0000
123.49	0.0036	0.0008	0.0017	0.0000
123.55	0.0036	0.0009	0.0022	0.0000
123.62	0.0036	0.0010	0.0024	0.0000
123.68	0.0036	0.0010	0.0027	0.0000
123.75	0.0036	0.0011	0.0034	0.0000
123.81	0.0036	0.0012	0.0035	0.0000
123.87	0.0036	0.0012	0.0036	0.0000
123.94	0.0036	0.0013	0.0038	0.0000
124.00	0.0036	0.0014	0.0039	0.0000
124.07	0.0036	0.0014	0.0042	0.0000
124.13	0.0036	0.0015	0.0043	0.0000
124.19	0.0036	0.0016	0.0045	0.0000
124.26	0.0036	0.0017	0.0047	0.0000
124.32	0.0036	0.0018	0.0049	0.0000
124.39	0.0036	0.0019	0.0050	0.0000
124.45	0.0036	0.0020	0.0052	0.0000
124.51	0.0036	0.0020	0.0053	0.0000
124.58	0.0036	0.0021	0.0055	0.0000
124.64	0.0036	0.0022	0.0056	0.0000
124.71	0.0036	0.0023	0.0058	0.0000
124.77	0.0036	0.0024	0.0061	0.0000
124.83	0.0036	0.0025	0.0063	0.0000
124.90	0.0036	0.0026	0.0064	0.0000
124.96	0.0036	0.0027	0.0064	0.0000

125.03	0.0036	0.0028	0.0065	0.0000
125.09	0.0036	0.0029	0.0067	0.0000
125.15	0.0036	0.0030	0.0070	0.0000
125.22	0.0036	0.0031	0.0073	0.0000
125.28	0.0036	0.0032	0.0077	0.0000
125.35	0.0036	0.0033	0.0081	0.0000
125.41	0.0036	0.0034	0.0085	0.0000
125.47	0.0036	0.0035	0.0088	0.0000
125.54	0.0036	0.0036	0.0092	0.0000
125.60	0.0036	0.0037	0.0095	0.0000
125.67	0.0036	0.0037	0.0098	0.0000
125.73	0.0036	0.0038	0.0101	0.0000
125.80	0.0036	0.0039	0.0104	0.0000
125.86	0.0036	0.0040	0.0107	0.0000
125.92	0.0036	0.0041	0.0110	0.0000
125.99	0.0036	0.0042	0.0113	0.0000
126.05	0.0036	0.0043	0.0116	0.0000
126.12	0.0036	0.0044	0.0118	0.0000
126.18	0.0036	0.0045	0.0121	0.0000
126.24	0.0036	0.0046	0.0123	0.0000
126.31	0.0036	0.0047	0.0126	0.0000
126.37	0.0036	0.0048	0.0128	0.0000
126.44	0.0036	0.0049	0.0131	0.0000
126.50	0.0036	0.0050	0.0133	0.0000
126.55	0.0036	0.0051	0.0179	0.0000

Surface ltration 2b Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.8300	0.0036	0.0051	0.0000	0.0187	0.0000
3.8941	0.0036	0.0053	0.0000	0.0187	0.0000
3.9581	0.0036	0.0055	0.0000	0.0195	0.0000
4.0222	0.0036	0.0057	0.0000	0.0202	0.0000
4.0863	0.0036	0.0060	0.0000	0.0210	0.0000
4.1503	0.0036	0.0062	0.0000	0.0218	0.0000
4.2144	0.0036	0.0064	0.0000	0.0225	0.0000
4.2785	0.0036	0.0066	0.0000	0.0233	0.0000
4.3425	0.0036	0.0069	0.0000	0.0241	0.0000
4.4066	0.0036	0.0071	0.0000	0.0248	0.0000
4.4707	0.0036	0.0073	0.0000	0.0256	0.0000
4.5347	0.0036	0.0076	0.0000	0.0264	0.0000
4.5988	0.0036	0.0078	0.0000	0.0271	0.0000
4.6629	0.0036	0.0080	0.0000	0.0279	0.0000
4.7269	0.0036	0.0082	0.0000	0.0287	0.0000
4.7910	0.0036	0.0085	0.0000	0.0294	0.0000
4.8551	0.0036	0.0087	0.0000	0.0302	0.0000
4.9191	0.0036	0.0089	0.0000	0.0310	0.0000
4.9832	0.0036	0.0092	0.0000	0.0317	0.0000
5.0473	0.0036	0.0094	0.0000	0.0325	0.0000
5.1113	0.0036	0.0096	0.0001	0.0333	0.0000
5.1754	0.0036	0.0098	0.0001	0.0340	0.0000
5.2395	0.0036	0.0101	0.0001	0.0348	0.0000
5.3035	0.0036	0.0103	0.0001	0.0356	0.0000
5.3676	0.0036	0.0105	0.0773	0.0363	0.0000
5.4316	0.0036	0.0108	0.3418	0.0371	0.0000
5.4957	0.0036	0.0110	0.6978	0.0379	0.0000
5.5598	0.0036	0.0112	1.0931	0.0386	0.0000
5.6238	0.0036	0.0114	1.4756	0.0394	0.0000

5.6879	0.0036	0.0117	1.7974	0.0402	0.0000
5.7520	0.0036	0.0119	2.0288	0.0409	0.0000
5.8160	0.0036	0.0121	2.1771	0.0417	0.0000
5.8300	0.0036	0.0122	2.3362	0.0419	0.0000

Name : Surface ltration 2b

Element Flows To:
Outlet 1 **Outlet 2**
Biofiltration 2b

Name : Biofiltration 2c
Bottom Length: 17.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.33
Material type for second layer: GRAVEL
Material thickness of third layer: 3.35
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.6
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 4.429
Total Outflow (ac-ft.): 4.521
Percent Through Underdrain: 97.97
Discharge Structure
Riser Height: 2 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 1 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 2c Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
121.45	0.0039	0.0000	0.0000	0.0000
121.53	0.0039	0.0001	0.0000	0.0000
121.62	0.0039	0.0002	0.0000	0.0000
121.70	0.0039	0.0003	0.0000	0.0000
121.79	0.0039	0.0004	0.0001	0.0000
121.87	0.0039	0.0005	0.0002	0.0000
121.96	0.0039	0.0006	0.0003	0.0000
122.04	0.0039	0.0007	0.0005	0.0000
122.13	0.0039	0.0008	0.0009	0.0000
122.21	0.0039	0.0009	0.0013	0.0000
122.29	0.0039	0.0010	0.0015	0.0000
122.38	0.0039	0.0011	0.0019	0.0000
122.46	0.0039	0.0012	0.0027	0.0000

122.55	0.0039	0.0013	0.0036	0.0000
122.63	0.0039	0.0014	0.0037	0.0000
122.72	0.0039	0.0015	0.0047	0.0000
122.80	0.0039	0.0016	0.0050	0.0000
122.88	0.0039	0.0017	0.0051	0.0000
122.97	0.0039	0.0018	0.0055	0.0000
123.05	0.0039	0.0020	0.0057	0.0000
123.14	0.0039	0.0021	0.0060	0.0000
123.22	0.0039	0.0022	0.0061	0.0000
123.31	0.0039	0.0024	0.0064	0.0000
123.39	0.0039	0.0025	0.0065	0.0000
123.48	0.0039	0.0026	0.0067	0.0000
123.56	0.0039	0.0028	0.0068	0.0000
123.64	0.0039	0.0029	0.0071	0.0000
123.73	0.0039	0.0030	0.0075	0.0000
123.81	0.0039	0.0032	0.0079	0.0000
123.90	0.0039	0.0033	0.0084	0.0000
123.98	0.0039	0.0035	0.0088	0.0000
124.07	0.0039	0.0036	0.0093	0.0000
124.15	0.0039	0.0037	0.0095	0.0000
124.24	0.0039	0.0039	0.0096	0.0000
124.32	0.0039	0.0040	0.0097	0.0000
124.40	0.0039	0.0041	0.0099	0.0000
124.49	0.0039	0.0043	0.0102	0.0000
124.57	0.0039	0.0044	0.0106	0.0000
124.66	0.0039	0.0046	0.0109	0.0000
124.74	0.0039	0.0047	0.0113	0.0000
124.83	0.0039	0.0048	0.0116	0.0000
124.91	0.0039	0.0050	0.0120	0.0000
124.99	0.0039	0.0051	0.0123	0.0000
125.08	0.0039	0.0052	0.0126	0.0000
125.16	0.0039	0.0054	0.0129	0.0000
125.25	0.0039	0.0055	0.0133	0.0000
125.33	0.0039	0.0056	0.0136	0.0000
125.42	0.0039	0.0058	0.0139	0.0000
125.50	0.0039	0.0059	0.0141	0.0000
125.59	0.0039	0.0061	0.0144	0.0000
125.67	0.0039	0.0062	0.0147	0.0000
125.75	0.0039	0.0063	0.0150	0.0000
125.84	0.0039	0.0065	0.0152	0.0000
125.92	0.0039	0.0066	0.0155	0.0000
126.01	0.0039	0.0067	0.0158	0.0000
126.09	0.0039	0.0069	0.0160	0.0000
126.18	0.0039	0.0070	0.0163	0.0000
126.26	0.0039	0.0071	0.0165	0.0000
126.34	0.0039	0.0073	0.0168	0.0000
126.43	0.0039	0.0074	0.0170	0.0000
126.51	0.0039	0.0076	0.0172	0.0000
126.60	0.0039	0.0077	0.0175	0.0000
126.63	0.0039	0.0077	0.0177	0.0000

Surface ltration 2c Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
5.1800	0.0039	0.0077	0.0000	0.0208	0.0000
5.2644	0.0040	0.0081	0.0000	0.0208	0.0000
5.3488	0.0042	0.0084	0.0000	0.0219	0.0000
5.4332	0.0043	0.0088	0.0000	0.0230	0.0000

5.5176	0.0044	0.0092	0.0000	0.0241	0.0000
5.6020	0.0046	0.0095	0.0000	0.0252	0.0000
5.6864	0.0047	0.0099	0.0000	0.0263	0.0000
5.7708	0.0048	0.0103	0.0000	0.0274	0.0000
5.8552	0.0050	0.0107	0.0000	0.0285	0.0000
5.9396	0.0051	0.0112	0.0000	0.0296	0.0000
6.0240	0.0052	0.0116	0.0000	0.0307	0.0000
6.1084	0.0054	0.0120	0.0000	0.0319	0.0000
6.1927	0.0055	0.0125	0.0000	0.0330	0.0000
6.2771	0.0056	0.0130	0.0000	0.0341	0.0000
6.3615	0.0057	0.0134	0.0000	0.0352	0.0000
6.4459	0.0059	0.0139	0.0001	0.0363	0.0000
6.5303	0.0060	0.0144	0.0001	0.0374	0.0000
6.6147	0.0061	0.0150	0.0001	0.0385	0.0000
6.6991	0.0063	0.0155	0.0001	0.0396	0.0000
6.7835	0.0064	0.0160	0.0001	0.0407	0.0000
6.8679	0.0065	0.0166	0.0001	0.0418	0.0000
6.9523	0.0067	0.0171	0.0001	0.0429	0.0000
7.0367	0.0068	0.0177	0.0001	0.0440	0.0000
7.1211	0.0069	0.0183	0.0001	0.0451	0.0000
7.2055	0.0071	0.0189	0.0433	0.0462	0.0000
7.2899	0.0072	0.0195	0.3836	0.0474	0.0000
7.3743	0.0073	0.0201	0.8724	0.0485	0.0000
7.4587	0.0075	0.0207	1.3889	0.0496	0.0000
7.5431	0.0076	0.0213	1.8196	0.0507	0.0000
7.6275	0.0077	0.0220	2.0957	0.0518	0.0000
7.6800	0.0078	0.0224	2.2971	0.0525	0.0000

Name : Surface ltration 2c

Element Flows To:

Outlet 1	**Outlet 2**
Biofiltration 2c	

Name : EXISTING BASIN 200
Bypass: Yes

GroundWater: No

Pervious Land Use	**acre**
D,NatVeg,Steep	**6.14**
A,NatVeg,Steep	**.29**
C,NatVeg,Steep	**1.15**
D,Urban,Flat	**.09**
Pervious Total	**7.67**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**7.67**

Element Flows To:
Surface **Interflow** **Groundwater**

Name : Vault 1
Width : 10 ft.
Length : 35 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.008	0.000	0.000	0.000
0.0111	0.008	0.000	0.000	0.000
0.0222	0.008	0.000	0.000	0.000
0.0333	0.008	0.000	0.000	0.000
0.0444	0.008	0.000	0.000	0.000
0.0556	0.008	0.000	0.000	0.000
0.0667	0.008	0.000	0.000	0.000
0.0778	0.008	0.000	0.000	0.000
0.0889	0.008	0.000	0.000	0.000
0.1000	0.008	0.000	0.000	0.000
0.1111	0.008	0.000	0.000	0.000
0.1222	0.008	0.001	0.000	0.000
0.1333	0.008	0.001	0.000	0.000
0.1444	0.008	0.001	0.000	0.000
0.1556	0.008	0.001	0.000	0.000
0.1667	0.008	0.001	0.000	0.000
0.1778	0.008	0.001	0.000	0.000
0.1889	0.008	0.001	0.000	0.000
0.2000	0.008	0.001	0.000	0.000
0.2111	0.008	0.001	0.000	0.000
0.2222	0.008	0.001	0.000	0.000
0.2333	0.008	0.001	0.000	0.000
0.2444	0.008	0.002	0.000	0.000
0.2556	0.008	0.002	0.000	0.000
0.2667	0.008	0.002	0.000	0.000
0.2778	0.008	0.002	0.000	0.000
0.2889	0.008	0.002	0.000	0.000
0.3000	0.008	0.002	0.000	0.000
0.3111	0.008	0.002	0.000	0.000
0.3222	0.008	0.002	0.000	0.000
0.3333	0.008	0.002	0.000	0.000
0.3444	0.008	0.002	0.000	0.000

0.3556	0.008	0.002	0.000	0.000
0.3667	0.008	0.002	0.000	0.000
0.3778	0.008	0.003	0.000	0.000
0.3889	0.008	0.003	0.000	0.000
0.4000	0.008	0.003	0.000	0.000
0.4111	0.008	0.003	0.000	0.000
0.4222	0.008	0.003	0.000	0.000
0.4333	0.008	0.003	0.000	0.000
0.4444	0.008	0.003	0.000	0.000
0.4556	0.008	0.003	0.000	0.000
0.4667	0.008	0.003	0.000	0.000
0.4778	0.008	0.003	0.000	0.000
0.4889	0.008	0.003	0.000	0.000
0.5000	0.008	0.004	0.000	0.000
0.5111	0.008	0.004	0.000	0.000
0.5222	0.008	0.004	0.000	0.000
0.5333	0.008	0.004	0.000	0.000
0.5444	0.008	0.004	0.000	0.000
0.5556	0.008	0.004	0.000	0.000
0.5667	0.008	0.004	0.000	0.000
0.5778	0.008	0.004	0.000	0.000
0.5889	0.008	0.004	0.000	0.000
0.6000	0.008	0.004	0.000	0.000
0.6111	0.008	0.004	0.000	0.000
0.6222	0.008	0.005	0.000	0.000
0.6333	0.008	0.005	0.000	0.000
0.6444	0.008	0.005	0.000	0.000
0.6556	0.008	0.005	0.000	0.000
0.6667	0.008	0.005	0.000	0.000
0.6778	0.008	0.005	0.000	0.000
0.6889	0.008	0.005	0.000	0.000
0.7000	0.008	0.005	0.000	0.000
0.7111	0.008	0.005	0.000	0.000
0.7222	0.008	0.005	0.000	0.000
0.7333	0.008	0.005	0.000	0.000
0.7444	0.008	0.006	0.000	0.000
0.7556	0.008	0.006	0.000	0.000
0.7667	0.008	0.006	0.000	0.000
0.7778	0.008	0.006	0.000	0.000
0.7889	0.008	0.006	0.000	0.000
0.8000	0.008	0.006	0.000	0.000
0.8111	0.008	0.006	0.000	0.000
0.8222	0.008	0.006	0.000	0.000
0.8333	0.008	0.006	0.000	0.000
0.8444	0.008	0.006	0.000	0.000
0.8556	0.008	0.006	0.000	0.000
0.8667	0.008	0.007	0.000	0.000
0.8778	0.008	0.007	0.000	0.000
0.8889	0.008	0.007	0.000	0.000
0.9000	0.008	0.007	0.000	0.000
0.9111	0.008	0.007	0.000	0.000
0.9222	0.008	0.007	0.000	0.000
0.9333	0.008	0.007	0.000	0.000
0.9444	0.008	0.007	0.000	0.000
0.9556	0.008	0.007	0.000	0.000
0.9667	0.008	0.007	0.000	0.000
0.9778	0.008	0.007	0.000	0.000

0.9889	0.008	0.007	0.000	0.000
1.0000	0.008	0.008	0.000	0.000
1.0111	0.008	0.008	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 2
Width : 10 ft.
Length : 12.7 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.002	0.000	0.000	0.000
0.0111	0.002	0.000	0.000	0.000
0.0222	0.002	0.000	0.000	0.000
0.0333	0.002	0.000	0.000	0.000
0.0444	0.002	0.000	0.000	0.000
0.0556	0.002	0.000	0.000	0.000
0.0667	0.002	0.000	0.000	0.000
0.0778	0.002	0.000	0.000	0.000
0.0889	0.002	0.000	0.000	0.000
0.1000	0.002	0.000	0.000	0.000
0.1111	0.002	0.000	0.000	0.000
0.1222	0.002	0.000	0.000	0.000
0.1333	0.002	0.000	0.000	0.000
0.1444	0.002	0.000	0.000	0.000
0.1556	0.002	0.000	0.000	0.000
0.1667	0.002	0.000	0.000	0.000
0.1778	0.002	0.000	0.000	0.000
0.1889	0.002	0.000	0.000	0.000
0.2000	0.002	0.000	0.000	0.000
0.2111	0.002	0.000	0.000	0.000
0.2222	0.002	0.000	0.000	0.000
0.2333	0.002	0.000	0.000	0.000
0.2444	0.002	0.000	0.000	0.000
0.2556	0.002	0.000	0.000	0.000
0.2667	0.002	0.000	0.000	0.000
0.2778	0.002	0.000	0.000	0.000
0.2889	0.002	0.000	0.000	0.000
0.3000	0.002	0.000	0.000	0.000
0.3111	0.002	0.000	0.000	0.000
0.3222	0.002	0.000	0.000	0.000
0.3333	0.002	0.001	0.000	0.000
0.3444	0.002	0.001	0.000	0.000
0.3556	0.002	0.001	0.000	0.000
0.3667	0.002	0.001	0.000	0.000

0.3778	0.002	0.001	0.000	0.000
0.3889	0.002	0.001	0.000	0.000
0.4000	0.002	0.001	0.000	0.000
0.4111	0.002	0.001	0.000	0.000
0.4222	0.002	0.001	0.000	0.000
0.4333	0.002	0.001	0.000	0.000
0.4444	0.002	0.001	0.000	0.000
0.4556	0.002	0.001	0.000	0.000
0.4667	0.002	0.001	0.000	0.000
0.4778	0.002	0.001	0.000	0.000
0.4889	0.002	0.001	0.000	0.000
0.5000	0.002	0.001	0.000	0.000
0.5111	0.002	0.001	0.000	0.000
0.5222	0.002	0.001	0.000	0.000
0.5333	0.002	0.001	0.000	0.000
0.5444	0.002	0.001	0.000	0.000
0.5556	0.002	0.001	0.000	0.000
0.5667	0.002	0.001	0.000	0.000
0.5778	0.002	0.001	0.000	0.000
0.5889	0.002	0.001	0.000	0.000
0.6000	0.002	0.001	0.000	0.000
0.6111	0.002	0.001	0.000	0.000
0.6222	0.002	0.001	0.000	0.000
0.6333	0.002	0.001	0.000	0.000
0.6444	0.002	0.001	0.000	0.000
0.6556	0.002	0.001	0.000	0.000
0.6667	0.002	0.001	0.000	0.000
0.6778	0.002	0.002	0.000	0.000
0.6889	0.002	0.002	0.000	0.000
0.7000	0.002	0.002	0.000	0.000
0.7111	0.002	0.002	0.000	0.000
0.7222	0.002	0.002	0.000	0.000
0.7333	0.002	0.002	0.000	0.000
0.7444	0.002	0.002	0.000	0.000
0.7556	0.002	0.002	0.000	0.000
0.7667	0.002	0.002	0.000	0.000
0.7778	0.002	0.002	0.000	0.000
0.7889	0.002	0.002	0.000	0.000
0.8000	0.002	0.002	0.000	0.000
0.8111	0.002	0.002	0.000	0.000
0.8222	0.002	0.002	0.000	0.000
0.8333	0.002	0.002	0.000	0.000
0.8444	0.002	0.002	0.000	0.000
0.8556	0.002	0.002	0.000	0.000
0.8667	0.002	0.002	0.000	0.000
0.8778	0.002	0.002	0.000	0.000
0.8889	0.002	0.002	0.000	0.000
0.9000	0.002	0.002	0.000	0.000
0.9111	0.002	0.002	0.000	0.000
0.9222	0.002	0.002	0.000	0.000
0.9333	0.002	0.002	0.000	0.000
0.9444	0.002	0.002	0.000	0.000
0.9556	0.002	0.002	0.000	0.000
0.9667	0.002	0.002	0.000	0.000
0.9778	0.002	0.002	0.000	0.000
0.9889	0.002	0.002	0.000	0.000
1.0000	0.002	0.002	0.000	0.000

1.0111	0.002	0.002	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 3
Width : 10 ft.
Length : 21 ft.
Depth: 1.72 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.004	0.000	0.000	0.000
0.0191	0.004	0.000	0.000	0.000
0.0382	0.004	0.000	0.000	0.000
0.0573	0.004	0.000	0.000	0.000
0.0764	0.004	0.000	0.000	0.000
0.0956	0.004	0.000	0.000	0.000
0.1147	0.004	0.000	0.000	0.000
0.1338	0.004	0.000	0.000	0.000
0.1529	0.004	0.000	0.000	0.000
0.1720	0.004	0.000	0.000	0.000
0.1911	0.004	0.000	0.000	0.000
0.2102	0.004	0.001	0.000	0.000
0.2293	0.004	0.001	0.000	0.000
0.2484	0.004	0.001	0.000	0.000
0.2676	0.004	0.001	0.000	0.000
0.2867	0.004	0.001	0.000	0.000
0.3058	0.004	0.001	0.000	0.000
0.3249	0.004	0.001	0.000	0.000
0.3440	0.004	0.001	0.000	0.000
0.3631	0.004	0.001	0.000	0.000
0.3822	0.004	0.001	0.000	0.000
0.4013	0.004	0.001	0.000	0.000
0.4204	0.004	0.002	0.000	0.000
0.4396	0.004	0.002	0.000	0.000
0.4587	0.004	0.002	0.000	0.000
0.4778	0.004	0.002	0.000	0.000
0.4969	0.004	0.002	0.000	0.000
0.5160	0.004	0.002	0.000	0.000
0.5351	0.004	0.002	0.000	0.000
0.5542	0.004	0.002	0.000	0.000
0.5733	0.004	0.002	0.000	0.000
0.5924	0.004	0.002	0.000	0.000
0.6116	0.004	0.002	0.000	0.000
0.6307	0.004	0.003	0.000	0.000
0.6498	0.004	0.003	0.000	0.000
0.6689	0.004	0.003	0.000	0.000

0.6880	0.004	0.003	0.000	0.000
0.7071	0.004	0.003	0.000	0.000
0.7262	0.004	0.003	0.000	0.000
0.7453	0.004	0.003	0.000	0.000
0.7644	0.004	0.003	0.000	0.000
0.7836	0.004	0.003	0.000	0.000
0.8027	0.004	0.003	0.000	0.000
0.8218	0.004	0.004	0.000	0.000
0.8409	0.004	0.004	0.000	0.000
0.8600	0.004	0.004	0.000	0.000
0.8791	0.004	0.004	0.000	0.000
0.8982	0.004	0.004	0.000	0.000
0.9173	0.004	0.004	0.000	0.000
0.9364	0.004	0.004	0.000	0.000
0.9556	0.004	0.004	0.000	0.000
0.9747	0.004	0.004	0.000	0.000
0.9938	0.004	0.004	0.000	0.000
1.0129	0.004	0.004	0.015	0.000
1.0320	0.004	0.005	0.060	0.000
1.0511	0.004	0.005	0.122	0.000
1.0702	0.004	0.005	0.197	0.000
1.0893	0.004	0.005	0.282	0.000
1.1084	0.004	0.005	0.376	0.000
1.1276	0.004	0.005	0.477	0.000
1.1467	0.004	0.005	0.585	0.000
1.1658	0.004	0.005	0.698	0.000
1.1849	0.004	0.005	0.814	0.000
1.2040	0.004	0.005	0.932	0.000
1.2231	0.004	0.005	1.051	0.000
1.2422	0.004	0.006	1.169	0.000
1.2613	0.004	0.006	1.286	0.000
1.2804	0.004	0.006	1.399	0.000
1.2996	0.004	0.006	1.507	0.000
1.3187	0.004	0.006	1.609	0.000
1.3378	0.004	0.006	1.705	0.000
1.3569	0.004	0.006	1.792	0.000
1.3760	0.004	0.006	1.872	0.000
1.3951	0.004	0.006	1.943	0.000
1.4142	0.004	0.006	2.005	0.000
1.4333	0.004	0.006	2.060	0.000
1.4524	0.004	0.007	2.107	0.000
1.4716	0.004	0.007	2.148	0.000
1.4907	0.004	0.007	2.185	0.000
1.5098	0.004	0.007	2.248	0.000
1.5289	0.004	0.007	2.290	0.000
1.5480	0.004	0.007	2.331	0.000
1.5671	0.004	0.007	2.371	0.000
1.5862	0.004	0.007	2.411	0.000
1.6053	0.004	0.007	2.450	0.000
1.6244	0.004	0.007	2.488	0.000
1.6436	0.004	0.007	2.526	0.000
1.6627	0.004	0.008	2.563	0.000
1.6818	0.004	0.008	2.600	0.000
1.7009	0.004	0.008	2.636	0.000
1.7200	0.004	0.008	2.672	0.000
1.7391	0.004	0.008	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Vault 4
Width : 10 ft.
Length : 114 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.026	0.000	0.000	0.000
0.0111	0.026	0.000	0.000	0.000
0.0222	0.026	0.000	0.000	0.000
0.0333	0.026	0.000	0.000	0.000
0.0444	0.026	0.001	0.000	0.000
0.0556	0.026	0.001	0.000	0.000
0.0667	0.026	0.001	0.000	0.000
0.0778	0.026	0.002	0.000	0.000
0.0889	0.026	0.002	0.000	0.000
0.1000	0.026	0.002	0.000	0.000
0.1111	0.026	0.002	0.000	0.000
0.1222	0.026	0.003	0.000	0.000
0.1333	0.026	0.003	0.000	0.000
0.1444	0.026	0.003	0.000	0.000
0.1556	0.026	0.004	0.000	0.000
0.1667	0.026	0.004	0.000	0.000
0.1778	0.026	0.004	0.000	0.000
0.1889	0.026	0.004	0.000	0.000
0.2000	0.026	0.005	0.000	0.000
0.2111	0.026	0.005	0.000	0.000
0.2222	0.026	0.005	0.000	0.000
0.2333	0.026	0.006	0.000	0.000
0.2444	0.026	0.006	0.000	0.000
0.2556	0.026	0.006	0.000	0.000
0.2667	0.026	0.007	0.000	0.000
0.2778	0.026	0.007	0.000	0.000
0.2889	0.026	0.007	0.000	0.000
0.3000	0.026	0.007	0.000	0.000
0.3111	0.026	0.008	0.000	0.000
0.3222	0.026	0.008	0.000	0.000
0.3333	0.026	0.008	0.000	0.000
0.3444	0.026	0.009	0.000	0.000
0.3556	0.026	0.009	0.000	0.000
0.3667	0.026	0.009	0.000	0.000
0.3778	0.026	0.009	0.000	0.000
0.3889	0.026	0.010	0.000	0.000
0.4000	0.026	0.010	0.000	0.000
0.4111	0.026	0.010	0.000	0.000

0.4222	0.026	0.011	0.000	0.000
0.4333	0.026	0.011	0.000	0.000
0.4444	0.026	0.011	0.000	0.000
0.4556	0.026	0.011	0.000	0.000
0.4667	0.026	0.012	0.000	0.000
0.4778	0.026	0.012	0.000	0.000
0.4889	0.026	0.012	0.000	0.000
0.5000	0.026	0.013	0.000	0.000
0.5111	0.026	0.013	0.000	0.000
0.5222	0.026	0.013	0.000	0.000
0.5333	0.026	0.014	0.000	0.000
0.5444	0.026	0.014	0.000	0.000
0.5556	0.026	0.014	0.000	0.000
0.5667	0.026	0.014	0.000	0.000
0.5778	0.026	0.015	0.000	0.000
0.5889	0.026	0.015	0.000	0.000
0.6000	0.026	0.015	0.000	0.000
0.6111	0.026	0.016	0.000	0.000
0.6222	0.026	0.016	0.000	0.000
0.6333	0.026	0.016	0.000	0.000
0.6444	0.026	0.016	0.000	0.000
0.6556	0.026	0.017	0.000	0.000
0.6667	0.026	0.017	0.000	0.000
0.6778	0.026	0.017	0.000	0.000
0.6889	0.026	0.018	0.000	0.000
0.7000	0.026	0.018	0.000	0.000
0.7111	0.026	0.018	0.000	0.000
0.7222	0.026	0.018	0.000	0.000
0.7333	0.026	0.019	0.000	0.000
0.7444	0.026	0.019	0.000	0.000
0.7556	0.026	0.019	0.000	0.000
0.7667	0.026	0.020	0.000	0.000
0.7778	0.026	0.020	0.000	0.000
0.7889	0.026	0.020	0.000	0.000
0.8000	0.026	0.020	0.000	0.000
0.8111	0.026	0.021	0.000	0.000
0.8222	0.026	0.021	0.000	0.000
0.8333	0.026	0.021	0.000	0.000
0.8444	0.026	0.022	0.000	0.000
0.8556	0.026	0.022	0.000	0.000
0.8667	0.026	0.022	0.000	0.000
0.8778	0.026	0.023	0.000	0.000
0.8889	0.026	0.023	0.000	0.000
0.9000	0.026	0.023	0.000	0.000
0.9111	0.026	0.023	0.000	0.000
0.9222	0.026	0.024	0.000	0.000
0.9333	0.026	0.024	0.000	0.000
0.9444	0.026	0.024	0.000	0.000
0.9556	0.026	0.025	0.000	0.000
0.9667	0.026	0.025	0.000	0.000
0.9778	0.026	0.025	0.000	0.000
0.9889	0.026	0.025	0.000	0.000
1.0000	0.026	0.026	0.000	0.000
1.0111	0.026	0.026	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 5
Width : 10 ft.
Length : 35 ft.
Depth: 1 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.008	0.000	0.000	0.000
0.0111	0.008	0.000	0.000	0.000
0.0222	0.008	0.000	0.000	0.000
0.0333	0.008	0.000	0.000	0.000
0.0444	0.008	0.000	0.000	0.000
0.0556	0.008	0.000	0.000	0.000
0.0667	0.008	0.000	0.000	0.000
0.0778	0.008	0.000	0.000	0.000
0.0889	0.008	0.000	0.000	0.000
0.1000	0.008	0.000	0.000	0.000
0.1111	0.008	0.000	0.000	0.000
0.1222	0.008	0.001	0.000	0.000
0.1333	0.008	0.001	0.000	0.000
0.1444	0.008	0.001	0.000	0.000
0.1556	0.008	0.001	0.000	0.000
0.1667	0.008	0.001	0.000	0.000
0.1778	0.008	0.001	0.000	0.000
0.1889	0.008	0.001	0.000	0.000
0.2000	0.008	0.001	0.000	0.000
0.2111	0.008	0.001	0.000	0.000
0.2222	0.008	0.001	0.000	0.000
0.2333	0.008	0.001	0.000	0.000
0.2444	0.008	0.002	0.000	0.000
0.2556	0.008	0.002	0.000	0.000
0.2667	0.008	0.002	0.000	0.000
0.2778	0.008	0.002	0.000	0.000
0.2889	0.008	0.002	0.000	0.000
0.3000	0.008	0.002	0.000	0.000
0.3111	0.008	0.002	0.000	0.000
0.3222	0.008	0.002	0.000	0.000
0.3333	0.008	0.002	0.000	0.000
0.3444	0.008	0.002	0.000	0.000
0.3556	0.008	0.002	0.000	0.000
0.3667	0.008	0.002	0.000	0.000
0.3778	0.008	0.003	0.000	0.000
0.3889	0.008	0.003	0.000	0.000
0.4000	0.008	0.003	0.000	0.000
0.4111	0.008	0.003	0.000	0.000
0.4222	0.008	0.003	0.000	0.000
0.4333	0.008	0.003	0.000	0.000

0.4444	0.008	0.003	0.000	0.000
0.4556	0.008	0.003	0.000	0.000
0.4667	0.008	0.003	0.000	0.000
0.4778	0.008	0.003	0.000	0.000
0.4889	0.008	0.003	0.000	0.000
0.5000	0.008	0.004	0.000	0.000
0.5111	0.008	0.004	0.000	0.000
0.5222	0.008	0.004	0.000	0.000
0.5333	0.008	0.004	0.000	0.000
0.5444	0.008	0.004	0.000	0.000
0.5556	0.008	0.004	0.000	0.000
0.5667	0.008	0.004	0.000	0.000
0.5778	0.008	0.004	0.000	0.000
0.5889	0.008	0.004	0.000	0.000
0.6000	0.008	0.004	0.000	0.000
0.6111	0.008	0.004	0.000	0.000
0.6222	0.008	0.005	0.000	0.000
0.6333	0.008	0.005	0.000	0.000
0.6444	0.008	0.005	0.000	0.000
0.6556	0.008	0.005	0.000	0.000
0.6667	0.008	0.005	0.000	0.000
0.6778	0.008	0.005	0.000	0.000
0.6889	0.008	0.005	0.000	0.000
0.7000	0.008	0.005	0.000	0.000
0.7111	0.008	0.005	0.000	0.000
0.7222	0.008	0.005	0.000	0.000
0.7333	0.008	0.005	0.000	0.000
0.7444	0.008	0.006	0.000	0.000
0.7556	0.008	0.006	0.000	0.000
0.7667	0.008	0.006	0.000	0.000
0.7778	0.008	0.006	0.000	0.000
0.7889	0.008	0.006	0.000	0.000
0.8000	0.008	0.006	0.000	0.000
0.8111	0.008	0.006	0.000	0.000
0.8222	0.008	0.006	0.000	0.000
0.8333	0.008	0.006	0.000	0.000
0.8444	0.008	0.006	0.000	0.000
0.8556	0.008	0.006	0.000	0.000
0.8667	0.008	0.007	0.000	0.000
0.8778	0.008	0.007	0.000	0.000
0.8889	0.008	0.007	0.000	0.000
0.9000	0.008	0.007	0.000	0.000
0.9111	0.008	0.007	0.000	0.000
0.9222	0.008	0.007	0.000	0.000
0.9333	0.008	0.007	0.000	0.000
0.9444	0.008	0.007	0.000	0.000
0.9556	0.008	0.007	0.000	0.000
0.9667	0.008	0.007	0.000	0.000
0.9778	0.008	0.007	0.000	0.000
0.9889	0.008	0.007	0.000	0.000
1.0000	0.008	0.008	0.000	0.000
1.0111	0.008	0.008	0.012	0.000
1.0222	0.000	0.000	0.035	0.000

Name : Vault 6
Width : 10 ft.

Length : 70.4 ft.
Depth: 1.72 ft.
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.016	0.000	0.000	0.000
0.0191	0.016	0.000	0.000	0.000
0.0382	0.016	0.000	0.000	0.000
0.0573	0.016	0.000	0.000	0.000
0.0764	0.016	0.001	0.000	0.000
0.0956	0.016	0.001	0.000	0.000
0.1147	0.016	0.001	0.000	0.000
0.1338	0.016	0.002	0.000	0.000
0.1529	0.016	0.002	0.000	0.000
0.1720	0.016	0.002	0.000	0.000
0.1911	0.016	0.003	0.000	0.000
0.2102	0.016	0.003	0.000	0.000
0.2293	0.016	0.003	0.000	0.000
0.2484	0.016	0.004	0.000	0.000
0.2676	0.016	0.004	0.000	0.000
0.2867	0.016	0.004	0.000	0.000
0.3058	0.016	0.004	0.000	0.000
0.3249	0.016	0.005	0.000	0.000
0.3440	0.016	0.005	0.000	0.000
0.3631	0.016	0.005	0.000	0.000
0.3822	0.016	0.006	0.000	0.000
0.4013	0.016	0.006	0.000	0.000
0.4204	0.016	0.006	0.000	0.000
0.4396	0.016	0.007	0.000	0.000
0.4587	0.016	0.007	0.000	0.000
0.4778	0.016	0.007	0.000	0.000
0.4969	0.016	0.008	0.000	0.000
0.5160	0.016	0.008	0.000	0.000
0.5351	0.016	0.008	0.000	0.000
0.5542	0.016	0.009	0.000	0.000
0.5733	0.016	0.009	0.000	0.000
0.5924	0.016	0.009	0.000	0.000
0.6116	0.016	0.009	0.000	0.000
0.6307	0.016	0.010	0.000	0.000
0.6498	0.016	0.010	0.000	0.000
0.6689	0.016	0.010	0.000	0.000
0.6880	0.016	0.011	0.000	0.000
0.7071	0.016	0.011	0.000	0.000
0.7262	0.016	0.011	0.000	0.000
0.7453	0.016	0.012	0.000	0.000
0.7644	0.016	0.012	0.000	0.000
0.7836	0.016	0.012	0.000	0.000

0.8027	0.016	0.013	0.000	0.000
0.8218	0.016	0.013	0.000	0.000
0.8409	0.016	0.013	0.000	0.000
0.8600	0.016	0.013	0.000	0.000
0.8791	0.016	0.014	0.000	0.000
0.8982	0.016	0.014	0.000	0.000
0.9173	0.016	0.014	0.000	0.000
0.9364	0.016	0.015	0.000	0.000
0.9556	0.016	0.015	0.000	0.000
0.9747	0.016	0.015	0.000	0.000
0.9938	0.016	0.016	0.000	0.000
1.0129	0.016	0.016	0.015	0.000
1.0320	0.016	0.016	0.060	0.000
1.0511	0.016	0.017	0.122	0.000
1.0702	0.016	0.017	0.197	0.000
1.0893	0.016	0.017	0.282	0.000
1.1084	0.016	0.017	0.376	0.000
1.1276	0.016	0.018	0.477	0.000
1.1467	0.016	0.018	0.585	0.000
1.1658	0.016	0.018	0.698	0.000
1.1849	0.016	0.019	0.814	0.000
1.2040	0.016	0.019	0.932	0.000
1.2231	0.016	0.019	1.051	0.000
1.2422	0.016	0.020	1.169	0.000
1.2613	0.016	0.020	1.286	0.000
1.2804	0.016	0.020	1.399	0.000
1.2996	0.016	0.021	1.507	0.000
1.3187	0.016	0.021	1.609	0.000
1.3378	0.016	0.021	1.705	0.000
1.3569	0.016	0.021	1.792	0.000
1.3760	0.016	0.022	1.872	0.000
1.3951	0.016	0.022	1.943	0.000
1.4142	0.016	0.022	2.005	0.000
1.4333	0.016	0.023	2.060	0.000
1.4524	0.016	0.023	2.107	0.000
1.4716	0.016	0.023	2.148	0.000
1.4907	0.016	0.024	2.185	0.000
1.5098	0.016	0.024	2.248	0.000
1.5289	0.016	0.024	2.290	0.000
1.5480	0.016	0.025	2.331	0.000
1.5671	0.016	0.025	2.371	0.000
1.5862	0.016	0.025	2.411	0.000
1.6053	0.016	0.025	2.450	0.000
1.6244	0.016	0.026	2.488	0.000
1.6436	0.016	0.026	2.526	0.000
1.6627	0.016	0.026	2.563	0.000
1.6818	0.016	0.027	2.600	0.000
1.7009	0.016	0.027	2.636	0.000
1.7200	0.016	0.027	2.672	0.000
1.7391	0.016	0.028	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Vault 7
Width : 10 ft.
Length : 85.6 ft.
Depth: 1.72 ft.

Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Vault Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.019	0.000	0.000	0.000
0.0191	0.019	0.000	0.000	0.000
0.0382	0.019	0.000	0.000	0.000
0.0573	0.019	0.001	0.000	0.000
0.0764	0.019	0.001	0.000	0.000
0.0956	0.019	0.001	0.000	0.000
0.1147	0.019	0.002	0.000	0.000
0.1338	0.019	0.002	0.000	0.000
0.1529	0.019	0.003	0.000	0.000
0.1720	0.019	0.003	0.000	0.000
0.1911	0.019	0.003	0.000	0.000
0.2102	0.019	0.004	0.000	0.000
0.2293	0.019	0.004	0.000	0.000
0.2484	0.019	0.004	0.000	0.000
0.2676	0.019	0.005	0.000	0.000
0.2867	0.019	0.005	0.000	0.000
0.3058	0.019	0.006	0.000	0.000
0.3249	0.019	0.006	0.000	0.000
0.3440	0.019	0.006	0.000	0.000
0.3631	0.019	0.007	0.000	0.000
0.3822	0.019	0.007	0.000	0.000
0.4013	0.019	0.007	0.000	0.000
0.4204	0.019	0.008	0.000	0.000
0.4396	0.019	0.008	0.000	0.000
0.4587	0.019	0.009	0.000	0.000
0.4778	0.019	0.009	0.000	0.000
0.4969	0.019	0.009	0.000	0.000
0.5160	0.019	0.010	0.000	0.000
0.5351	0.019	0.010	0.000	0.000
0.5542	0.019	0.010	0.000	0.000
0.5733	0.019	0.011	0.000	0.000
0.5924	0.019	0.011	0.000	0.000
0.6116	0.019	0.012	0.000	0.000
0.6307	0.019	0.012	0.000	0.000
0.6498	0.019	0.012	0.000	0.000
0.6689	0.019	0.013	0.000	0.000
0.6880	0.019	0.013	0.000	0.000
0.7071	0.019	0.013	0.000	0.000
0.7262	0.019	0.014	0.000	0.000
0.7453	0.019	0.014	0.000	0.000
0.7644	0.019	0.015	0.000	0.000
0.7836	0.019	0.015	0.000	0.000
0.8027	0.019	0.015	0.000	0.000
0.8218	0.019	0.016	0.000	0.000

0.8409	0.019	0.016	0.000	0.000
0.8600	0.019	0.016	0.000	0.000
0.8791	0.019	0.017	0.000	0.000
0.8982	0.019	0.017	0.000	0.000
0.9173	0.019	0.018	0.000	0.000
0.9364	0.019	0.018	0.000	0.000
0.9556	0.019	0.018	0.000	0.000
0.9747	0.019	0.019	0.000	0.000
0.9938	0.019	0.019	0.000	0.000
1.0129	0.019	0.019	0.015	0.000
1.0320	0.019	0.020	0.060	0.000
1.0511	0.019	0.020	0.122	0.000
1.0702	0.019	0.021	0.197	0.000
1.0893	0.019	0.021	0.282	0.000
1.1084	0.019	0.021	0.376	0.000
1.1276	0.019	0.022	0.477	0.000
1.1467	0.019	0.022	0.585	0.000
1.1658	0.019	0.022	0.698	0.000
1.1849	0.019	0.023	0.814	0.000
1.2040	0.019	0.023	0.932	0.000
1.2231	0.019	0.024	1.051	0.000
1.2422	0.019	0.024	1.169	0.000
1.2613	0.019	0.024	1.286	0.000
1.2804	0.019	0.025	1.399	0.000
1.2996	0.019	0.025	1.507	0.000
1.3187	0.019	0.025	1.609	0.000
1.3378	0.019	0.026	1.705	0.000
1.3569	0.019	0.026	1.792	0.000
1.3760	0.019	0.027	1.872	0.000
1.3951	0.019	0.027	1.943	0.000
1.4142	0.019	0.027	2.005	0.000
1.4333	0.019	0.028	2.060	0.000
1.4524	0.019	0.028	2.107	0.000
1.4716	0.019	0.028	2.148	0.000
1.4907	0.019	0.029	2.185	0.000
1.5098	0.019	0.029	2.248	0.000
1.5289	0.019	0.030	2.290	0.000
1.5480	0.019	0.030	2.331	0.000
1.5671	0.019	0.030	2.371	0.000
1.5862	0.019	0.031	2.411	0.000
1.6053	0.019	0.031	2.450	0.000
1.6244	0.019	0.031	2.488	0.000
1.6436	0.019	0.032	2.526	0.000
1.6627	0.019	0.032	2.563	0.000
1.6818	0.019	0.033	2.600	0.000
1.7009	0.019	0.033	2.636	0.000
1.7200	0.019	0.033	2.672	0.000
1.7391	0.019	0.034	2.707	0.000
1.7582	0.000	0.000	2.742	0.000

Name : Biofiltration 2a
Bottom Length: 35.00 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333

Material type for second layer: GRAVEL
Material thickness of third layer: 1.71
Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 0.5
Orifice Diameter (in.): 0.6
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 8.399
Total Outflow (ac-ft.): 9.981
Percent Through Underdrain: 84.15
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 12 in.
Orifice 1 Diameter: 0.0625 in. **Elevation:** 0.5 ft.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 2a Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
121.95	0.0080	0.0000	0.0000	0.0000
122.01	0.0080	0.0001	0.0000	0.0000
122.06	0.0080	0.0003	0.0000	0.0000
122.12	0.0080	0.0004	0.0000	0.0000
122.17	0.0080	0.0005	0.0000	0.0000
122.23	0.0080	0.0007	0.0001	0.0000
122.28	0.0080	0.0008	0.0002	0.0000
122.34	0.0080	0.0009	0.0004	0.0000
122.39	0.0080	0.0011	0.0006	0.0000
122.45	0.0080	0.0012	0.0010	0.0000
122.50	0.0080	0.0013	0.0014	0.0000
122.56	0.0080	0.0015	0.0020	0.0000
122.62	0.0080	0.0016	0.0021	0.0000
122.67	0.0080	0.0017	0.0022	0.0000
122.73	0.0080	0.0019	0.0025	0.0000
122.78	0.0080	0.0020	0.0027	0.0000
122.84	0.0080	0.0021	0.0030	0.0000
122.89	0.0080	0.0023	0.0031	0.0000
122.95	0.0080	0.0024	0.0034	0.0000
123.00	0.0080	0.0025	0.0035	0.0000
123.06	0.0080	0.0027	0.0038	0.0000
123.11	0.0080	0.0028	0.0039	0.0000
123.17	0.0080	0.0029	0.0041	0.0000
123.22	0.0080	0.0031	0.0042	0.0000
123.28	0.0080	0.0032	0.0045	0.0000
123.34	0.0080	0.0033	0.0046	0.0000
123.39	0.0080	0.0035	0.0047	0.0000
123.45	0.0080	0.0036	0.0048	0.0000
123.50	0.0080	0.0038	0.0050	0.0000
123.56	0.0080	0.0040	0.0051	0.0000
123.61	0.0080	0.0042	0.0053	0.0000
123.67	0.0080	0.0043	0.0054	0.0000
123.72	0.0080	0.0045	0.0055	0.0000

123.78	0.0080	0.0047	0.0056	0.0000
123.83	0.0080	0.0049	0.0058	0.0000
123.89	0.0080	0.0051	0.0059	0.0000
123.95	0.0080	0.0053	0.0060	0.0000
124.00	0.0080	0.0055	0.0061	0.0000
124.06	0.0080	0.0056	0.0061	0.0000
124.11	0.0080	0.0058	0.0061	0.0000
124.17	0.0080	0.0060	0.0061	0.0000
124.22	0.0080	0.0062	0.0061	0.0000
124.28	0.0080	0.0064	0.0063	0.0000
124.33	0.0080	0.0066	0.0066	0.0000
124.39	0.0080	0.0067	0.0070	0.0000
124.44	0.0080	0.0069	0.0073	0.0000
124.50	0.0080	0.0071	0.0077	0.0000
124.55	0.0080	0.0073	0.0080	0.0000
124.61	0.0080	0.0075	0.0083	0.0000
124.67	0.0080	0.0077	0.0086	0.0000
124.72	0.0080	0.0079	0.0089	0.0000
124.78	0.0080	0.0080	0.0092	0.0000
124.83	0.0080	0.0082	0.0095	0.0000
124.89	0.0080	0.0084	0.0098	0.0000
124.94	0.0080	0.0086	0.0101	0.0000
125.00	0.0080	0.0088	0.0103	0.0000
125.05	0.0080	0.0090	0.0106	0.0000
125.11	0.0080	0.0092	0.0108	0.0000
125.16	0.0080	0.0093	0.0111	0.0000
125.22	0.0080	0.0095	0.0113	0.0000
125.28	0.0080	0.0097	0.0116	0.0000
125.33	0.0080	0.0099	0.0118	0.0000
125.39	0.0080	0.0101	0.0120	0.0000
125.44	0.0080	0.0103	0.0122	0.0000
125.49	0.0080	0.0104	0.0125	0.0000

Surface iltration 2a Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
3.5430	0.0080	0.0104	0.0000	0.0420	0.0000
3.5984	0.0082	0.0109	0.0000	0.0420	0.0000
3.6538	0.0084	0.0113	0.0000	0.0435	0.0000
3.7093	0.0086	0.0118	0.0000	0.0450	0.0000
3.7647	0.0087	0.0123	0.0000	0.0465	0.0000
3.8201	0.0089	0.0128	0.0000	0.0480	0.0000
3.8755	0.0091	0.0133	0.0000	0.0495	0.0000
3.9309	0.0093	0.0138	0.0000	0.0510	0.0000
3.9863	0.0095	0.0143	0.0000	0.0525	0.0000
4.0418	0.0096	0.0148	0.0000	0.0540	0.0000
4.0972	0.0098	0.0154	0.0000	0.0555	0.0000
4.1526	0.0100	0.0159	0.0000	0.0570	0.0000
4.2080	0.0102	0.0165	0.0000	0.0585	0.0000
4.2634	0.0104	0.0171	0.0000	0.0600	0.0000
4.3188	0.0105	0.0176	0.0001	0.0615	0.0000
4.3743	0.0107	0.0182	0.0001	0.0630	0.0000
4.4297	0.0109	0.0188	0.0001	0.0645	0.0000
4.4851	0.0111	0.0194	0.0001	0.0660	0.0000
4.5405	0.0112	0.0200	0.0001	0.0674	0.0000
4.5959	0.0114	0.0207	0.1291	0.0689	0.0000
4.6514	0.0116	0.0213	0.3757	0.0704	0.0000
4.7068	0.0118	0.0220	0.6862	0.0719	0.0000

4.7622	0.0120	0.0226	1.0272	0.0734	0.0000
4.8176	0.0121	0.0233	1.3651	0.0749	0.0000
4.8730	0.0123	0.0240	1.6672	0.0764	0.0000
4.9284	0.0125	0.0246	1.9085	0.0779	0.0000
4.9839	0.0127	0.0253	2.0795	0.0794	0.0000
5.0393	0.0128	0.0261	2.1964	0.0809	0.0000
5.0430	0.0129	0.0261	2.3395	0.0810	0.0000

Name : Surface iltration 2a

Element Flows To:
Outlet 1 **Outlet 2**
Biofiltration 2a

ANALYSIS RESULTS

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Predeveloped Landuse Totals for POC #2
Total Pervious Area:10.24
Total Impervious Area:0.76

Mitigated Landuse Totals for POC #2
Total Pervious Area:8.14
Total Impervious Area:3.01

Flow Frequency Return Periods for Predeveloped. POC #2

Return Period	Flow(cfs)
2 year	2.895503
5 year	4.697031
10 year	6.561797
25 year	8.448235

Flow Frequency Return Periods for Mitigated. POC #2

Return Period	Flow(cfs)
2 year	2.769176
5 year	4.694356
10 year	6.47231
25 year	9.121759

POC #2
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.2896	806	847	105	Pass
0.3529	674	685	101	Pass
0.4163	570	587	102	Pass
0.4796	494	508	102	Pass
0.5430	435	427	98	Pass
0.6063	369	360	97	Pass
0.6697	298	318	106	Pass
0.7330	262	283	108	Pass
0.7964	246	250	101	Pass
0.8598	226	233	103	Pass
0.9231	207	221	106	Pass
0.9865	192	206	107	Pass
1.0498	186	195	104	Pass
1.1132	175	180	102	Pass
1.1765	162	165	101	Pass
1.2399	152	150	98	Pass
1.3032	145	135	93	Pass
1.3666	137	122	89	Pass
1.4300	125	117	93	Pass
1.4933	116	108	93	Pass
1.5567	104	101	97	Pass
1.6200	97	97	100	Pass
1.6834	93	92	98	Pass
1.7467	90	87	96	Pass
1.8101	87	80	91	Pass
1.8735	84	73	86	Pass
1.9368	80	68	85	Pass
2.0002	76	64	84	Pass
2.0635	68	60	88	Pass
2.1269	64	58	90	Pass
2.1902	61	55	90	Pass
2.2536	58	50	86	Pass
2.3169	57	46	80	Pass
2.3803	52	44	84	Pass
2.4437	50	43	86	Pass
2.5070	47	42	89	Pass
2.5704	42	40	95	Pass
2.6337	40	36	90	Pass
2.6971	38	35	92	Pass
2.7604	37	35	94	Pass
2.8238	35	31	88	Pass
2.8871	34	31	91	Pass
2.9505	31	31	100	Pass
3.0139	29	28	96	Pass
3.0772	28	27	96	Pass
3.1406	26	23	88	Pass
3.2039	25	23	92	Pass
3.2673	24	22	91	Pass
3.3306	22	22	100	Pass
3.3940	22	20	90	Pass
3.4574	19	20	105	Pass
3.5207	18	19	105	Pass
3.5841	17	17	100	Pass
3.6474	17	16	94	Pass
3.7108	17	16	94	Pass
3.7741	16	16	100	Pass

3.8375	16	15	93	Pass
3.9008	16	15	93	Pass
3.9642	15	15	100	Pass
4.0276	15	15	100	Pass
4.0909	15	15	100	Pass
4.1543	15	15	100	Pass
4.2176	15	14	93	Pass
4.2810	15	12	80	Pass
4.3443	14	10	71	Pass
4.4077	14	10	71	Pass
4.4710	14	10	71	Pass
4.5344	13	10	76	Pass
4.5978	12	10	83	Pass
4.6611	10	9	90	Pass
4.7245	8	8	100	Pass
4.7878	8	8	100	Pass
4.8512	8	8	100	Pass
4.9145	8	8	100	Pass
4.9779	8	7	87	Pass
5.0413	8	6	75	Pass
5.1046	8	6	75	Pass
5.1680	8	6	75	Pass
5.2313	8	6	75	Pass
5.2947	8	6	75	Pass
5.3580	8	6	75	Pass
5.4214	7	6	85	Pass
5.4847	7	6	85	Pass
5.5481	7	6	85	Pass
5.6115	7	6	85	Pass
5.6748	6	6	100	Pass
5.7382	6	6	100	Pass
5.8015	6	5	83	Pass
5.8649	6	5	83	Pass
5.9282	6	5	83	Pass
5.9916	6	5	83	Pass
6.0549	6	5	83	Pass
6.1183	6	5	83	Pass
6.1817	6	5	83	Pass
6.2450	6	5	83	Pass
6.3084	6	5	83	Pass
6.3717	6	5	83	Pass
6.4351	5	4	80	Pass
6.4984	5	4	80	Pass
6.5618	4	4	100	Pass

Drawdown Time Results

POC #3 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #5 was not reported because POC must exist in both scenarios and both scenarios must have been run.**Perlnd and Implnd Changes**

No changes have been made.

SDHM 3.1
PROJECT REPORT

Project Name: POC C
Site Name: West Oaks
Site Address: West Oaks Way
City : Carlsbad
Report Date: 4/8/2019
Gage : OCEANSID
Data Start : 10/01/1959
Data End : 09/30/2004
Precip Scale: 1.00
Version Date: 2018/07/12

Low Flow Threshold for POC 3 : 10 Percent of the 2 Year

High Flow Threshold for POC 3: 10 year

PREDEVELOPED LAND USE

Name : Existing Basin 300
Bypass: No

GroundWater: No

Pervious Land Use	acre
D,NatVeg,Steep	13.67
A,Urban,Flat	1.34
D,Urban,Flat	.5
Pervious Total	15.51

Impervious Land Use	acre
Impervious Total	0
Basin Total	15.51

Element Flows To:

Surface	Interflow	Groundwater

MITIGATED LAND USE

Name : Existing Basin 300
Bypass: Yes

GroundWater: No

Pervious Land Use	acre
D,NatVeg,Steep	13.61
D,Urban,Flat	.07
A,Urban,Flat	.01
Pervious Total	13.69

Impervious Land Use	acre
Impervious Total	0
Basin Total	13.69

Element Flows To:

Surface	Interflow	Groundwater

Name : DMA 1
Bypass: No

GroundWater: No

Pervious Land Use	acre
D,Urban,Flat	.18
Pervious Total	0.18

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.59
Impervious Total	0.59
Basin Total	0.77

Element Flows To:

Surface	Interflow	Groundwater
Surface iltration 1	Surface iltration 1	

Name : Biofiltration 1
Bottom Length: 75.40 ft.
Bottom Width: 10.00 ft.
Material thickness of first layer: 1.5
Material type for first layer: ESM
Material thickness of second layer: 0.333
Material type for second layer: GRAVEL
Material thickness of third layer: 0

Material type for third layer: GRAVEL
Underdrain used
Underdrain Diameter (feet): 1
Orifice Diameter (in.): 6
Offset (in.): 0
Flow Through Underdrain (ac-ft.): 16.489
Total Outflow (ac-ft.): 22.159
Percent Through Underdrain: 74.41
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 12 in.

Element Flows To:
Outlet 1 **Outlet 2**

Biofiltration 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
124.50	0.0173	0.0000	0.0000	0.0000
124.53	0.0173	0.0002	0.0000	0.0000
124.56	0.0173	0.0003	0.0000	0.0000
124.59	0.0173	0.0005	0.0000	0.0000
124.62	0.0173	0.0006	0.0000	0.0000
124.66	0.0173	0.0008	0.0000	0.0000
124.69	0.0173	0.0010	0.0000	0.0000
124.72	0.0173	0.0011	0.0000	0.0000
124.75	0.0173	0.0013	0.0000	0.0000
124.78	0.0173	0.0015	0.0000	0.0000
124.81	0.0173	0.0016	0.0000	0.0000
124.84	0.0173	0.0018	0.0000	0.0000
124.87	0.0173	0.0019	0.0000	0.0000
124.90	0.0173	0.0021	0.0000	0.0000
124.94	0.0173	0.0023	0.0000	0.0000
124.97	0.0173	0.0024	0.0000	0.0000
125.00	0.0173	0.0026	0.0000	0.0000
125.03	0.0173	0.0027	0.0000	0.0000
125.06	0.0173	0.0029	0.0000	0.0000
125.09	0.0173	0.0031	0.0000	0.0000
125.12	0.0173	0.0032	0.0000	0.0000
125.15	0.0173	0.0034	0.0000	0.0000
125.18	0.0173	0.0036	0.0000	0.0000
125.22	0.0173	0.0037	0.0000	0.0000
125.25	0.0173	0.0039	0.0000	0.0000
125.28	0.0173	0.0040	0.0000	0.0000
125.31	0.0173	0.0042	0.0000	0.0000
125.34	0.0173	0.0044	0.0000	0.0000
125.37	0.0173	0.0045	0.0000	0.0000
125.40	0.0173	0.0047	0.0000	0.0000
125.43	0.0173	0.0048	0.0000	0.0000
125.47	0.0173	0.0050	0.0000	0.0000
125.50	0.0173	0.0052	0.0000	0.0000
125.53	0.0173	0.0053	0.0000	0.0000
125.56	0.0173	0.0055	0.0000	0.0000
125.59	0.0173	0.0057	0.0000	0.0000

125.62	0.0173	0.0058	0.0000	0.0000
125.65	0.0173	0.0060	0.0000	0.0000
125.68	0.0173	0.0061	0.0000	0.0000
125.71	0.0173	0.0063	0.0000	0.0000
125.75	0.0173	0.0065	0.0000	0.0000
125.78	0.0173	0.0066	0.0000	0.0000
125.81	0.0173	0.0068	0.0000	0.0000
125.84	0.0173	0.0070	0.0000	0.0000
125.87	0.0173	0.0071	0.0000	0.0000
125.90	0.0173	0.0073	0.0000	0.0000
125.93	0.0173	0.0074	0.0000	0.0000
125.96	0.0173	0.0076	0.0000	0.0000
125.99	0.0173	0.0078	0.0000	0.0000
126.03	0.0173	0.0080	0.0000	0.0000
126.06	0.0173	0.0082	0.0000	0.0000
126.09	0.0173	0.0084	0.0000	0.0000
126.12	0.0173	0.0087	0.0000	0.0000
126.15	0.0173	0.0089	0.0000	0.0000
126.18	0.0173	0.0091	0.0000	0.0000
126.21	0.0173	0.0093	0.0000	0.0000
126.24	0.0173	0.0095	0.0000	0.0000
126.27	0.0173	0.0098	0.0000	0.0000
126.31	0.0173	0.0100	0.0000	0.0000
126.33	0.0173	0.0102	0.0000	0.0000

Surface iltration 1 Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Wetted Surface
1.8330	0.0173	0.0102	0.0000	0.0891	0.0000
1.8641	0.0175	0.0107	0.0000	0.0891	0.0000
1.8953	0.0177	0.0113	0.0000	0.0909	0.0000
1.9264	0.0180	0.0118	0.0000	0.0927	0.0000
1.9575	0.0182	0.0124	0.0000	0.0945	0.0000
1.9887	0.0184	0.0130	0.0001	0.0963	0.0000
2.0198	0.0186	0.0135	0.0002	0.0981	0.0000
2.0509	0.0188	0.0141	0.0004	0.0999	0.0000
2.0821	0.0190	0.0147	0.0005	0.1018	0.0000
2.1132	0.0192	0.0153	0.0008	0.1036	0.0000
2.1443	0.0195	0.0159	0.0011	0.1054	0.0000
2.1755	0.0197	0.0165	0.0014	0.1072	0.0000
2.2066	0.0199	0.0171	0.0018	0.1090	0.0000
2.2377	0.0201	0.0178	0.0023	0.1108	0.0000
2.2688	0.0203	0.0184	0.0028	0.1126	0.0000
2.3000	0.0205	0.0190	0.0034	0.1144	0.0000
2.3311	0.0208	0.0197	0.0041	0.1162	0.0000
2.3622	0.0210	0.0203	0.0048	0.1181	0.0000
2.3934	0.0212	0.0210	0.0057	0.1199	0.0000
2.4245	0.0214	0.0216	0.0066	0.1217	0.0000
2.4556	0.0216	0.0223	0.0076	0.1235	0.0000
2.4868	0.0218	0.0230	0.0087	0.1253	0.0000
2.5179	0.0221	0.0237	0.0098	0.1271	0.0000
2.5490	0.0223	0.0244	0.0111	0.1289	0.0000
2.5802	0.0225	0.0251	0.0124	0.1307	0.0000
2.6113	0.0227	0.0258	0.0139	0.1325	0.0000
2.6424	0.0229	0.0265	0.0154	0.1344	0.0000
2.6736	0.0231	0.0272	0.0171	0.1362	0.0000
2.7047	0.0233	0.0279	0.0188	0.1380	0.0000
2.7358	0.0236	0.0286	0.0207	0.1398	0.0000

2.7670	0.0238	0.0294	0.0226	0.1416	0.0000
2.7981	0.0240	0.0301	0.0247	0.1434	0.0000
2.8292	0.0242	0.0309	0.0269	0.1452	0.0000
2.8330	0.0242	0.0310	0.0291	0.1454	0.0000

Name : Surface iltration 1

Element Flows To:

Outlet 1	**Outlet 2**
Biofiltration 1	

Name : DMA 11 - Self Mitigating
Bypass: Yes

GroundWater: No

Pervious Land Use	**acre**
D,Urban,Flat	**.09**
Pervious Total	**0.09**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**0.09**

Element Flows To:

Surface	**Interflow**	**Groundwater**

Name : DMA 12 - Self Mitigating
Bypass: Yes

GroundWater: No

Pervious Land Use	**acre**
D,Urban,Flat	**.16**
Pervious Total	**0.16**

Impervious Land Use	**acre**
Impervious Total	**0**
Basin Total	**0.16**

Element Flows To:
Surface **Interflow** **Groundwater**

ANALYSIS RESULTS

POC #1 was not reported because POC must exist in both scenarios and both scenarios must have been run. POC #2 was not reported because POC must exist in both scenarios and both scenarios must have been run.

Predeveloped Landuse Totals for POC #3
Total Pervious Area:15.51
Total Impervious Area:0

Mitigated Landuse Totals for POC #3
Total Pervious Area:14.12
Total Impervious Area:0.59

Flow Frequency Return Periods for Predeveloped. POC #3

Return Period	Flow(cfs)
2 year	4.238067
5 year	6.9256
10 year	9.385681
25 year	12.133464

Flow Frequency Return Periods for Mitigated. POC #3

Return Period	Flow(cfs)
2 year	4.137524
5 year	6.857351
10 year	9.086473
25 year	11.750872

POC #3
The Facility PASSED

The Facility PASSED.

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.4238	680	705	103	Pass
0.5143	600	616	102	Pass
0.6049	526	552	104	Pass
0.6954	470	485	103	Pass
0.7859	414	438	105	Pass
0.8764	361	370	102	Pass
0.9670	295	304	103	Pass
1.0575	255	268	105	Pass

1.1480	236	249	105	Pass
1.2385	222	227	102	Pass
1.3290	210	209	99	Pass
1.4196	197	196	99	Pass
1.5101	183	185	101	Pass
1.6006	175	177	101	Pass
1.6911	169	170	100	Pass
1.7817	156	160	102	Pass
1.8722	147	152	103	Pass
1.9627	139	144	103	Pass
2.0532	127	132	103	Pass
2.1438	118	115	97	Pass
2.2343	108	105	97	Pass
2.3248	98	97	98	Pass
2.4153	93	95	102	Pass
2.5059	89	90	101	Pass
2.5964	86	87	101	Pass
2.6869	82	83	101	Pass
2.7774	81	80	98	Pass
2.8680	75	76	101	Pass
2.9585	72	72	100	Pass
3.0490	65	62	95	Pass
3.1395	61	61	100	Pass
3.2301	58	59	101	Pass
3.3206	56	55	98	Pass
3.4111	55	52	94	Pass
3.5016	48	48	100	Pass
3.5921	48	44	91	Pass
3.6827	45	42	93	Pass
3.7732	41	41	100	Pass
3.8637	40	39	97	Pass
3.9542	38	36	94	Pass
4.0448	37	36	97	Pass
4.1353	34	35	102	Pass
4.2258	34	30	88	Pass
4.3163	30	29	96	Pass
4.4069	29	28	96	Pass
4.4974	26	24	92	Pass
4.5879	24	23	95	Pass
4.6784	23	22	95	Pass
4.7690	23	20	86	Pass
4.8595	21	19	90	Pass
4.9500	21	18	85	Pass
5.0405	18	17	94	Pass
5.1311	17	17	100	Pass
5.2216	17	17	100	Pass
5.3121	17	17	100	Pass
5.4026	17	17	100	Pass
5.4931	17	17	100	Pass
5.5837	17	16	94	Pass
5.6742	16	16	100	Pass
5.7647	16	16	100	Pass
5.8552	16	16	100	Pass
5.9458	16	16	100	Pass
6.0363	15	14	93	Pass
6.1268	15	14	93	Pass
6.2173	15	14	93	Pass

6.3079	14	14	100	Pass
6.3984	14	10	71	Pass
6.4889	14	10	71	Pass
6.5794	12	10	83	Pass
6.6700	12	9	75	Pass
6.7605	10	9	90	Pass
6.8510	9	9	100	Pass
6.9415	9	8	88	Pass
7.0321	8	8	100	Pass
7.1226	8	8	100	Pass
7.2131	8	8	100	Pass
7.3036	8	8	100	Pass
7.3942	8	8	100	Pass
7.4847	8	8	100	Pass
7.5752	8	7	87	Pass
7.6657	8	7	87	Pass
7.7562	7	7	100	Pass
7.8468	7	7	100	Pass
7.9373	7	6	85	Pass
8.0278	7	6	85	Pass
8.1183	7	6	85	Pass
8.2089	6	6	100	Pass
8.2994	6	6	100	Pass
8.3899	6	6	100	Pass
8.4804	6	6	100	Pass
8.5710	6	6	100	Pass
8.6615	6	6	100	Pass
8.7520	6	6	100	Pass
8.8425	6	6	100	Pass
8.9331	6	6	100	Pass
9.0236	6	6	100	Pass
9.1141	6	4	66	Pass
9.2046	6	3	50	Pass
9.2952	6	3	50	Pass
9.3857	4	3	75	Pass

Drawdown Time Results

POC #4 was not reported because POC must exist in both scenarios and both scenarios must have been run.**Perlnd and Implnd Changes**

No changes have been made.

Appendix F

Detention Analysis
Rick Rat Hydro Design Storm Hydrographs
BMP Hydrograph Reports

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.95 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 4.8 CFS

BMP 1

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) = 0.1
TIME (MIN) = 25	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 35	DISCHARGE (CFS) = 0.1
TIME (MIN) = 40	DISCHARGE (CFS) = 0.1
TIME (MIN) = 45	DISCHARGE (CFS) = 0.1
TIME (MIN) = 50	DISCHARGE (CFS) = 0.1
TIME (MIN) = 55	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
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) = 0.2
TIME (MIN) = 150	DISCHARGE (CFS) = 0.2
TIME (MIN) = 155	DISCHARGE (CFS) = 0.2
TIME (MIN) = 160	DISCHARGE (CFS) = 0.2
TIME (MIN) = 165	DISCHARGE (CFS) = 0.2
TIME (MIN) = 170	DISCHARGE (CFS) = 0.2
TIME (MIN) = 175	DISCHARGE (CFS) = 0.2
TIME (MIN) = 180	DISCHARGE (CFS) = 0.2
TIME (MIN) = 185	DISCHARGE (CFS) = 0.3
TIME (MIN) = 190	DISCHARGE (CFS) = 0.3
TIME (MIN) = 195	DISCHARGE (CFS) = 0.3
TIME (MIN) = 200	DISCHARGE (CFS) = 0.3
TIME (MIN) = 205	DISCHARGE (CFS) = 0.3
TIME (MIN) = 210	DISCHARGE (CFS) = 0.4
TIME (MIN) = 215	DISCHARGE (CFS) = 0.4
TIME (MIN) = 220	DISCHARGE (CFS) = 0.5
TIME (MIN) = 225	DISCHARGE (CFS) = 0.6
TIME (MIN) = 230	DISCHARGE (CFS) = 0.6
TIME (MIN) = 235	DISCHARGE (CFS) = 0.9
TIME (MIN) = 240	DISCHARGE (CFS) = 1.3
TIME (MIN) = 245	DISCHARGE (CFS) = 4.8
TIME (MIN) = 250	DISCHARGE (CFS) = 0.8
TIME (MIN) = 255	DISCHARGE (CFS) = 0.5
TIME (MIN) = 260	DISCHARGE (CFS) = 0.4
TIME (MIN) = 265	DISCHARGE (CFS) = 0.3
TIME (MIN) = 270	DISCHARGE (CFS) = 0.3
TIME (MIN) = 275	DISCHARGE (CFS) = 0.3
TIME (MIN) = 280	DISCHARGE (CFS) = 0.2
TIME (MIN) = 285	DISCHARGE (CFS) = 0.2
TIME (MIN) = 290	DISCHARGE (CFS) = 0.2
TIME (MIN) = 295	DISCHARGE (CFS) = 0.2
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) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0.1
TIME (MIN) = 345	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 355	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.31 ACRES
RUNOFF COEFFICIENT 0.86
PEAK DISCHARGE 1.92 CFS

BMP 2A

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 0
TIME (MIN) = 25	DISCHARGE (CFS) = 0
TIME (MIN) = 30	DISCHARGE (CFS) = 0
TIME (MIN) = 35	DISCHARGE (CFS) = 0
TIME (MIN) = 40	DISCHARGE (CFS) = 0
TIME (MIN) = 45	DISCHARGE (CFS) = 0
TIME (MIN) = 50	DISCHARGE (CFS) = 0
TIME (MIN) = 55	DISCHARGE (CFS) = 0
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 115	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 125	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 135	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 145	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 155	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 165	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 175	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 185	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 195	DISCHARGE (CFS) = 0.1
TIME (MIN) = 200	DISCHARGE (CFS) = 0.1
TIME (MIN) = 205	DISCHARGE (CFS) = 0.1
TIME (MIN) = 210	DISCHARGE (CFS) = 0.1
TIME (MIN) = 215	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 225	DISCHARGE (CFS) = 0.2
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 235	DISCHARGE (CFS) = 0.4
TIME (MIN) = 240	DISCHARGE (CFS) = 0.5
TIME (MIN) = 245	DISCHARGE (CFS) = 1.92
TIME (MIN) = 250	DISCHARGE (CFS) = 0.3
TIME (MIN) = 255	DISCHARGE (CFS) = 0.2
TIME (MIN) = 260	DISCHARGE (CFS) = 0.2
TIME (MIN) = 265	DISCHARGE (CFS) = 0.1
TIME (MIN) = 270	DISCHARGE (CFS) = 0.1
TIME (MIN) = 275	DISCHARGE (CFS) = 0.1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 285	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 295	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0
TIME (MIN) = 345	DISCHARGE (CFS) = 0
TIME (MIN) = 350	DISCHARGE (CFS) = 0
TIME (MIN) = 355	DISCHARGE (CFS) = 0
TIME (MIN) = 360	DISCHARGE (CFS) = 0
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.1 ACRES
RUNOFF COEFFICIENT 0.86
PEAK DISCHARGE 0.61 CFS

BMP 2B

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 0
TIME (MIN) = 25	DISCHARGE (CFS) = 0
TIME (MIN) = 30	DISCHARGE (CFS) = 0
TIME (MIN) = 35	DISCHARGE (CFS) = 0
TIME (MIN) = 40	DISCHARGE (CFS) = 0
TIME (MIN) = 45	DISCHARGE (CFS) = 0
TIME (MIN) = 50	DISCHARGE (CFS) = 0
TIME (MIN) = 55	DISCHARGE (CFS) = 0
TIME (MIN) = 60	DISCHARGE (CFS) = 0
TIME (MIN) = 65	DISCHARGE (CFS) = 0
TIME (MIN) = 70	DISCHARGE (CFS) = 0
TIME (MIN) = 75	DISCHARGE (CFS) = 0
TIME (MIN) = 80	DISCHARGE (CFS) = 0
TIME (MIN) = 85	DISCHARGE (CFS) = 0
TIME (MIN) = 90	DISCHARGE (CFS) = 0
TIME (MIN) = 95	DISCHARGE (CFS) = 0
TIME (MIN) = 100	DISCHARGE (CFS) = 0
TIME (MIN) = 105	DISCHARGE (CFS) = 0
TIME (MIN) = 110	DISCHARGE (CFS) = 0
TIME (MIN) = 115	DISCHARGE (CFS) = 0
TIME (MIN) = 120	DISCHARGE (CFS) = 0
TIME (MIN) = 125	DISCHARGE (CFS) = 0
TIME (MIN) = 130	DISCHARGE (CFS) = 0
TIME (MIN) = 135	DISCHARGE (CFS) = 0
TIME (MIN) = 140	DISCHARGE (CFS) = 0
TIME (MIN) = 145	DISCHARGE (CFS) = 0
TIME (MIN) = 150	DISCHARGE (CFS) = 0
TIME (MIN) = 155	DISCHARGE (CFS) = 0
TIME (MIN) = 160	DISCHARGE (CFS) = 0
TIME (MIN) = 165	DISCHARGE (CFS) = 0
TIME (MIN) = 170	DISCHARGE (CFS) = 0
TIME (MIN) = 175	DISCHARGE (CFS) = 0
TIME (MIN) = 180	DISCHARGE (CFS) = 0
TIME (MIN) = 185	DISCHARGE (CFS) = 0
TIME (MIN) = 190	DISCHARGE (CFS) = 0
TIME (MIN) = 195	DISCHARGE (CFS) = 0
TIME (MIN) = 200	DISCHARGE (CFS) = 0
TIME (MIN) = 205	DISCHARGE (CFS) = 0
TIME (MIN) = 210	DISCHARGE (CFS) = 0
TIME (MIN) = 215	DISCHARGE (CFS) = 0.1
TIME (MIN) = 220	DISCHARGE (CFS) = 0.1
TIME (MIN) = 225	DISCHARGE (CFS) = 0.1
TIME (MIN) = 230	DISCHARGE (CFS) = 0.1
TIME (MIN) = 235	DISCHARGE (CFS) = 0.1
TIME (MIN) = 240	DISCHARGE (CFS) = 0.2
TIME (MIN) = 245	DISCHARGE (CFS) = 0.61
TIME (MIN) = 250	DISCHARGE (CFS) = 0.1
TIME (MIN) = 255	DISCHARGE (CFS) = 0.1
TIME (MIN) = 260	DISCHARGE (CFS) = 0.1
TIME (MIN) = 265	DISCHARGE (CFS) = 0
TIME (MIN) = 270	DISCHARGE (CFS) = 0
TIME (MIN) = 275	DISCHARGE (CFS) = 0
TIME (MIN) = 280	DISCHARGE (CFS) = 0
TIME (MIN) = 285	DISCHARGE (CFS) = 0
TIME (MIN) = 290	DISCHARGE (CFS) = 0
TIME (MIN) = 295	DISCHARGE (CFS) = 0
TIME (MIN) = 300	DISCHARGE (CFS) = 0
TIME (MIN) = 305	DISCHARGE (CFS) = 0
TIME (MIN) = 310	DISCHARGE (CFS) = 0
TIME (MIN) = 315	DISCHARGE (CFS) = 0
TIME (MIN) = 320	DISCHARGE (CFS) = 0
TIME (MIN) = 325	DISCHARGE (CFS) = 0
TIME (MIN) = 330	DISCHARGE (CFS) = 0
TIME (MIN) = 335	DISCHARGE (CFS) = 0
TIME (MIN) = 340	DISCHARGE (CFS) = 0
TIME (MIN) = 345	DISCHARGE (CFS) = 0
TIME (MIN) = 350	DISCHARGE (CFS) = 0
TIME (MIN) = 355	DISCHARGE (CFS) = 0
TIME (MIN) = 360	DISCHARGE (CFS) = 0
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.23 ACRES
RUNOFF COEFFICIENT 0.56
PEAK DISCHARGE 0.99 CFS

BMP 2C

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 0
TIME (MIN) = 25	DISCHARGE (CFS) = 0
TIME (MIN) = 30	DISCHARGE (CFS) = 0
TIME (MIN) = 35	DISCHARGE (CFS) = 0
TIME (MIN) = 40	DISCHARGE (CFS) = 0
TIME (MIN) = 45	DISCHARGE (CFS) = 0
TIME (MIN) = 50	DISCHARGE (CFS) = 0
TIME (MIN) = 55	DISCHARGE (CFS) = 0
TIME (MIN) = 60	DISCHARGE (CFS) = 0
TIME (MIN) = 65	DISCHARGE (CFS) = 0
TIME (MIN) = 70	DISCHARGE (CFS) = 0
TIME (MIN) = 75	DISCHARGE (CFS) = 0
TIME (MIN) = 80	DISCHARGE (CFS) = 0
TIME (MIN) = 85	DISCHARGE (CFS) = 0
TIME (MIN) = 90	DISCHARGE (CFS) = 0
TIME (MIN) = 95	DISCHARGE (CFS) = 0
TIME (MIN) = 100	DISCHARGE (CFS) = 0
TIME (MIN) = 105	DISCHARGE (CFS) = 0
TIME (MIN) = 110	DISCHARGE (CFS) = 0
TIME (MIN) = 115	DISCHARGE (CFS) = 0
TIME (MIN) = 120	DISCHARGE (CFS) = 0
TIME (MIN) = 125	DISCHARGE (CFS) = 0
TIME (MIN) = 130	DISCHARGE (CFS) = 0
TIME (MIN) = 135	DISCHARGE (CFS) = 0
TIME (MIN) = 140	DISCHARGE (CFS) = 0
TIME (MIN) = 145	DISCHARGE (CFS) = 0
TIME (MIN) = 150	DISCHARGE (CFS) = 0
TIME (MIN) = 155	DISCHARGE (CFS) = 0
TIME (MIN) = 160	DISCHARGE (CFS) = 0
TIME (MIN) = 165	DISCHARGE (CFS) = 0
TIME (MIN) = 170	DISCHARGE (CFS) = 0
TIME (MIN) = 175	DISCHARGE (CFS) = 0
TIME (MIN) = 180	DISCHARGE (CFS) = 0
TIME (MIN) = 185	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 195	DISCHARGE (CFS) = 0.1
TIME (MIN) = 200	DISCHARGE (CFS) = 0.1
TIME (MIN) = 205	DISCHARGE (CFS) = 0.1
TIME (MIN) = 210	DISCHARGE (CFS) = 0.1
TIME (MIN) = 215	DISCHARGE (CFS) = 0.1
TIME (MIN) = 220	DISCHARGE (CFS) = 0.1
TIME (MIN) = 225	DISCHARGE (CFS) = 0.1
TIME (MIN) = 230	DISCHARGE (CFS) = 0.1
TIME (MIN) = 235	DISCHARGE (CFS) = 0.2
TIME (MIN) = 240	DISCHARGE (CFS) = 0.2
TIME (MIN) = 245	DISCHARGE (CFS) = 0.99
TIME (MIN) = 250	DISCHARGE (CFS) = 0.1
TIME (MIN) = 255	DISCHARGE (CFS) = 0.1
TIME (MIN) = 260	DISCHARGE (CFS) = 0.1
TIME (MIN) = 265	DISCHARGE (CFS) = 0.1
TIME (MIN) = 270	DISCHARGE (CFS) = 0.1
TIME (MIN) = 275	DISCHARGE (CFS) = 0
TIME (MIN) = 280	DISCHARGE (CFS) = 0
TIME (MIN) = 285	DISCHARGE (CFS) = 0
TIME (MIN) = 290	DISCHARGE (CFS) = 0
TIME (MIN) = 295	DISCHARGE (CFS) = 0
TIME (MIN) = 300	DISCHARGE (CFS) = 0
TIME (MIN) = 305	DISCHARGE (CFS) = 0
TIME (MIN) = 310	DISCHARGE (CFS) = 0
TIME (MIN) = 315	DISCHARGE (CFS) = 0
TIME (MIN) = 320	DISCHARGE (CFS) = 0
TIME (MIN) = 325	DISCHARGE (CFS) = 0
TIME (MIN) = 330	DISCHARGE (CFS) = 0
TIME (MIN) = 335	DISCHARGE (CFS) = 0
TIME (MIN) = 340	DISCHARGE (CFS) = 0
TIME (MIN) = 345	DISCHARGE (CFS) = 0
TIME (MIN) = 350	DISCHARGE (CFS) = 0
TIME (MIN) = 355	DISCHARGE (CFS) = 0
TIME (MIN) = 360	DISCHARGE (CFS) = 0
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 1.12 ACRES
RUNOFF COEFFICIENT 0.78
PEAK DISCHARGE 6.45 CFS

BMP 3

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) = 0.1
TIME (MIN) = 25	DISCHARGE (CFS) = 0.1
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) = 0.2
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) = 0.3
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) = 0.7
TIME (MIN) = 230	DISCHARGE (CFS) = 0.8
TIME (MIN) = 235	DISCHARGE (CFS) = 1.2
TIME (MIN) = 240	DISCHARGE (CFS) = 1.5
TIME (MIN) = 245	DISCHARGE (CFS) = 6.45
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) = 0.2
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) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 5 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.38 ACRES
RUNOFF COEFFICIENT 0.7
PEAK DISCHARGE 1.95 CFS

BMP 4

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 5	DISCHARGE (CFS) = 0
TIME (MIN) = 10	DISCHARGE (CFS) = 0
TIME (MIN) = 15	DISCHARGE (CFS) = 0
TIME (MIN) = 20	DISCHARGE (CFS) = 0
TIME (MIN) = 25	DISCHARGE (CFS) = 0
TIME (MIN) = 30	DISCHARGE (CFS) = 0
TIME (MIN) = 35	DISCHARGE (CFS) = 0
TIME (MIN) = 40	DISCHARGE (CFS) = 0
TIME (MIN) = 45	DISCHARGE (CFS) = 0
TIME (MIN) = 50	DISCHARGE (CFS) = 0
TIME (MIN) = 55	DISCHARGE (CFS) = 0
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 65	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 75	DISCHARGE (CFS) = 0.1
TIME (MIN) = 80	DISCHARGE (CFS) = 0.1
TIME (MIN) = 85	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 95	DISCHARGE (CFS) = 0.1
TIME (MIN) = 100	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 110	DISCHARGE (CFS) = 0.1
TIME (MIN) = 115	DISCHARGE (CFS) = 0.1
TIME (MIN) = 120	DISCHARGE (CFS) = 0.1
TIME (MIN) = 125	DISCHARGE (CFS) = 0.1
TIME (MIN) = 130	DISCHARGE (CFS) = 0.1
TIME (MIN) = 135	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 145	DISCHARGE (CFS) = 0.1
TIME (MIN) = 150	DISCHARGE (CFS) = 0.1
TIME (MIN) = 155	DISCHARGE (CFS) = 0.1
TIME (MIN) = 160	DISCHARGE (CFS) = 0.1
TIME (MIN) = 165	DISCHARGE (CFS) = 0.1
TIME (MIN) = 170	DISCHARGE (CFS) = 0.1
TIME (MIN) = 175	DISCHARGE (CFS) = 0.1
TIME (MIN) = 180	DISCHARGE (CFS) = 0.1
TIME (MIN) = 185	DISCHARGE (CFS) = 0.1
TIME (MIN) = 190	DISCHARGE (CFS) = 0.1
TIME (MIN) = 195	DISCHARGE (CFS) = 0.1
TIME (MIN) = 200	DISCHARGE (CFS) = 0.1
TIME (MIN) = 205	DISCHARGE (CFS) = 0.1
TIME (MIN) = 210	DISCHARGE (CFS) = 0.1
TIME (MIN) = 215	DISCHARGE (CFS) = 0.2
TIME (MIN) = 220	DISCHARGE (CFS) = 0.2
TIME (MIN) = 225	DISCHARGE (CFS) = 0.2
TIME (MIN) = 230	DISCHARGE (CFS) = 0.3
TIME (MIN) = 235	DISCHARGE (CFS) = 0.4
TIME (MIN) = 240	DISCHARGE (CFS) = 0.5
TIME (MIN) = 245	DISCHARGE (CFS) = 1.95
TIME (MIN) = 250	DISCHARGE (CFS) = 0.3
TIME (MIN) = 255	DISCHARGE (CFS) = 0.2
TIME (MIN) = 260	DISCHARGE (CFS) = 0.2
TIME (MIN) = 265	DISCHARGE (CFS) = 0.1
TIME (MIN) = 270	DISCHARGE (CFS) = 0.1
TIME (MIN) = 275	DISCHARGE (CFS) = 0.1
TIME (MIN) = 280	DISCHARGE (CFS) = 0.1
TIME (MIN) = 285	DISCHARGE (CFS) = 0.1
TIME (MIN) = 290	DISCHARGE (CFS) = 0.1
TIME (MIN) = 295	DISCHARGE (CFS) = 0.1
TIME (MIN) = 300	DISCHARGE (CFS) = 0.1
TIME (MIN) = 305	DISCHARGE (CFS) = 0.1
TIME (MIN) = 310	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 320	DISCHARGE (CFS) = 0.1
TIME (MIN) = 325	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 335	DISCHARGE (CFS) = 0.1
TIME (MIN) = 340	DISCHARGE (CFS) = 0
TIME (MIN) = 345	DISCHARGE (CFS) = 0
TIME (MIN) = 350	DISCHARGE (CFS) = 0
TIME (MIN) = 355	DISCHARGE (CFS) = 0
TIME (MIN) = 360	DISCHARGE (CFS) = 0
TIME (MIN) = 365	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.66 ACRES
RUNOFF COEFFICIENT 0.82
PEAK DISCHARGE 3.11 CFS

BMP 5

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 7	DISCHARGE (CFS) = 0.1
TIME (MIN) = 14	DISCHARGE (CFS) = 0.1
TIME (MIN) = 21	DISCHARGE (CFS) = 0.1
TIME (MIN) = 28	DISCHARGE (CFS) = 0.1
TIME (MIN) = 35	DISCHARGE (CFS) = 0.1
TIME (MIN) = 42	DISCHARGE (CFS) = 0.1
TIME (MIN) = 49	DISCHARGE (CFS) = 0.1
TIME (MIN) = 56	DISCHARGE (CFS) = 0.1
TIME (MIN) = 63	DISCHARGE (CFS) = 0.1
TIME (MIN) = 70	DISCHARGE (CFS) = 0.1
TIME (MIN) = 77	DISCHARGE (CFS) = 0.1
TIME (MIN) = 84	DISCHARGE (CFS) = 0.1
TIME (MIN) = 91	DISCHARGE (CFS) = 0.1
TIME (MIN) = 98	DISCHARGE (CFS) = 0.1
TIME (MIN) = 105	DISCHARGE (CFS) = 0.1
TIME (MIN) = 112	DISCHARGE (CFS) = 0.1
TIME (MIN) = 119	DISCHARGE (CFS) = 0.1
TIME (MIN) = 126	DISCHARGE (CFS) = 0.1
TIME (MIN) = 133	DISCHARGE (CFS) = 0.1
TIME (MIN) = 140	DISCHARGE (CFS) = 0.1
TIME (MIN) = 147	DISCHARGE (CFS) = 0.2
TIME (MIN) = 154	DISCHARGE (CFS) = 0.2
TIME (MIN) = 161	DISCHARGE (CFS) = 0.2
TIME (MIN) = 168	DISCHARGE (CFS) = 0.2
TIME (MIN) = 175	DISCHARGE (CFS) = 0.2
TIME (MIN) = 182	DISCHARGE (CFS) = 0.2
TIME (MIN) = 189	DISCHARGE (CFS) = 0.2
TIME (MIN) = 196	DISCHARGE (CFS) = 0.2
TIME (MIN) = 203	DISCHARGE (CFS) = 0.3
TIME (MIN) = 210	DISCHARGE (CFS) = 0.3
TIME (MIN) = 217	DISCHARGE (CFS) = 0.4
TIME (MIN) = 224	DISCHARGE (CFS) = 0.4
TIME (MIN) = 231	DISCHARGE (CFS) = 0.6
TIME (MIN) = 238	DISCHARGE (CFS) = 0.9
TIME (MIN) = 245	DISCHARGE (CFS) = 3.11
TIME (MIN) = 252	DISCHARGE (CFS) = 0.5
TIME (MIN) = 259	DISCHARGE (CFS) = 0.3
TIME (MIN) = 266	DISCHARGE (CFS) = 0.3
TIME (MIN) = 273	DISCHARGE (CFS) = 0.2
TIME (MIN) = 280	DISCHARGE (CFS) = 0.2
TIME (MIN) = 287	DISCHARGE (CFS) = 0.2
TIME (MIN) = 294	DISCHARGE (CFS) = 0.2
TIME (MIN) = 301	DISCHARGE (CFS) = 0.1
TIME (MIN) = 308	DISCHARGE (CFS) = 0.1
TIME (MIN) = 315	DISCHARGE (CFS) = 0.1
TIME (MIN) = 322	DISCHARGE (CFS) = 0.1
TIME (MIN) = 329	DISCHARGE (CFS) = 0.1
TIME (MIN) = 336	DISCHARGE (CFS) = 0.1
TIME (MIN) = 343	DISCHARGE (CFS) = 0.1
TIME (MIN) = 350	DISCHARGE (CFS) = 0.1
TIME (MIN) = 357	DISCHARGE (CFS) = 0.1
TIME (MIN) = 364	DISCHARGE (CFS) = 0

RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 8/29/2018
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 6 MIN.
6 HOUR RAINFALL 2.7 INCHES
BASIN AREA 0.84 ACRES
RUNOFF COEFFICIENT 0.76
PEAK DISCHARGE 3.98 CFS

BMP 6

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 6	DISCHARGE (CFS) = 0.1
TIME (MIN) = 12	DISCHARGE (CFS) = 0.1
TIME (MIN) = 18	DISCHARGE (CFS) = 0.1
TIME (MIN) = 24	DISCHARGE (CFS) = 0.1
TIME (MIN) = 30	DISCHARGE (CFS) = 0.1
TIME (MIN) = 36	DISCHARGE (CFS) = 0.1
TIME (MIN) = 42	DISCHARGE (CFS) = 0.1
TIME (MIN) = 48	DISCHARGE (CFS) = 0.1
TIME (MIN) = 54	DISCHARGE (CFS) = 0.1
TIME (MIN) = 60	DISCHARGE (CFS) = 0.1
TIME (MIN) = 66	DISCHARGE (CFS) = 0.1
TIME (MIN) = 72	DISCHARGE (CFS) = 0.1
TIME (MIN) = 78	DISCHARGE (CFS) = 0.1
TIME (MIN) = 84	DISCHARGE (CFS) = 0.1
TIME (MIN) = 90	DISCHARGE (CFS) = 0.1
TIME (MIN) = 96	DISCHARGE (CFS) = 0.1
TIME (MIN) = 102	DISCHARGE (CFS) = 0.1
TIME (MIN) = 108	DISCHARGE (CFS) = 0.1
TIME (MIN) = 114	DISCHARGE (CFS) = 0.2
TIME (MIN) = 120	DISCHARGE (CFS) = 0.2
TIME (MIN) = 126	DISCHARGE (CFS) = 0.2
TIME (MIN) = 132	DISCHARGE (CFS) = 0.2
TIME (MIN) = 138	DISCHARGE (CFS) = 0.2
TIME (MIN) = 144	DISCHARGE (CFS) = 0.2
TIME (MIN) = 150	DISCHARGE (CFS) = 0.2
TIME (MIN) = 156	DISCHARGE (CFS) = 0.2
TIME (MIN) = 162	DISCHARGE (CFS) = 0.2
TIME (MIN) = 168	DISCHARGE (CFS) = 0.2
TIME (MIN) = 174	DISCHARGE (CFS) = 0.2
TIME (MIN) = 180	DISCHARGE (CFS) = 0.2
TIME (MIN) = 186	DISCHARGE (CFS) = 0.3
TIME (MIN) = 192	DISCHARGE (CFS) = 0.3
TIME (MIN) = 198	DISCHARGE (CFS) = 0.3
TIME (MIN) = 204	DISCHARGE (CFS) = 0.3
TIME (MIN) = 210	DISCHARGE (CFS) = 0.4
TIME (MIN) = 216	DISCHARGE (CFS) = 0.4
TIME (MIN) = 222	DISCHARGE (CFS) = 0.5
TIME (MIN) = 228	DISCHARGE (CFS) = 0.5
TIME (MIN) = 234	DISCHARGE (CFS) = 0.8
TIME (MIN) = 240	DISCHARGE (CFS) = 1.2
TIME (MIN) = 246	DISCHARGE (CFS) = 3.98
TIME (MIN) = 252	DISCHARGE (CFS) = 0.6
TIME (MIN) = 258	DISCHARGE (CFS) = 0.4
TIME (MIN) = 264	DISCHARGE (CFS) = 0.3
TIME (MIN) = 270	DISCHARGE (CFS) = 0.3
TIME (MIN) = 276	DISCHARGE (CFS) = 0.2
TIME (MIN) = 282	DISCHARGE (CFS) = 0.2
TIME (MIN) = 288	DISCHARGE (CFS) = 0.2
TIME (MIN) = 294	DISCHARGE (CFS) = 0.2
TIME (MIN) = 300	DISCHARGE (CFS) = 0.2
TIME (MIN) = 306	DISCHARGE (CFS) = 0.2
TIME (MIN) = 312	DISCHARGE (CFS) = 0.1
TIME (MIN) = 318	DISCHARGE (CFS) = 0.1
TIME (MIN) = 324	DISCHARGE (CFS) = 0.1
TIME (MIN) = 330	DISCHARGE (CFS) = 0.1
TIME (MIN) = 336	DISCHARGE (CFS) = 0.1
TIME (MIN) = 342	DISCHARGE (CFS) = 0.1
TIME (MIN) = 348	DISCHARGE (CFS) = 0.1
TIME (MIN) = 354	DISCHARGE (CFS) = 0.1
TIME (MIN) = 360	DISCHARGE (CFS) = 0.1
TIME (MIN) = 366	DISCHARGE (CFS) = 0

Hydrograph Report

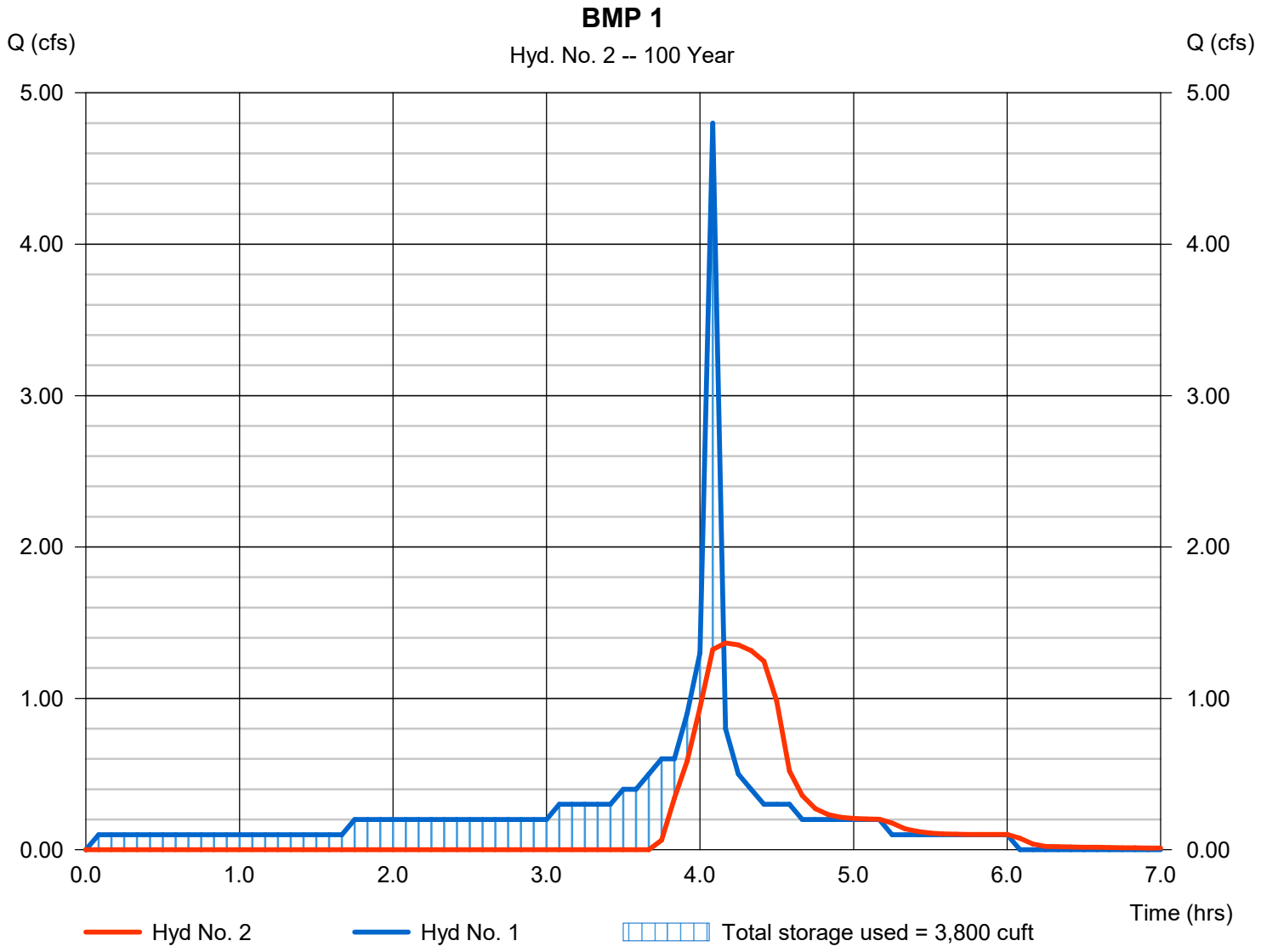
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 1

Hydrograph type	=	Reservoir	Peak discharge	=	1.365 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	3,982 cuft
Inflow hyd. No.	=	1 - DMA 1	Max. Elevation	=	129.90 ft
Reservoir name	=	BMP 1	Max. Storage	=	3,800 cuft

Storage Indication method used.



Hydrograph Report

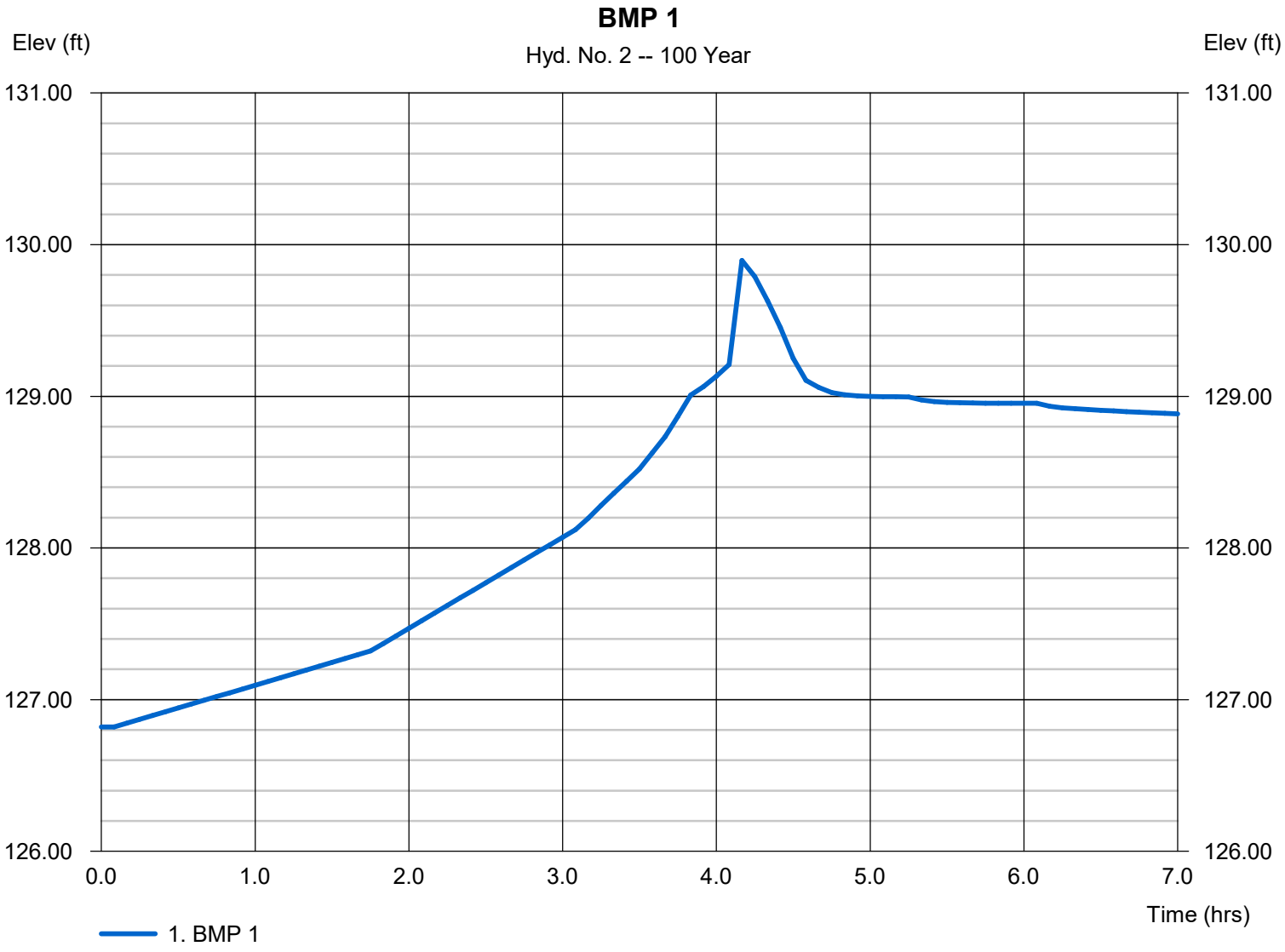
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 1

Hydrograph type	= Reservoir	Peak discharge	= 1.365 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 3,982 cuft
Inflow hyd. No.	= 1 - DMA 1	Max. Elevation	= 129.90 ft
Reservoir name	= BMP 1	Max. Storage	= 3,800 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 1

Pond Data

UG Chambers -Invert elev. = 126.82 ft, Rise x Span = 1.39 x 10.00 ft, Barrel Len = 119.90 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 128.22 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	126.82	n/a	0	0
0.14	126.96	n/a	167	167
0.28	127.10	n/a	167	333
0.42	127.24	n/a	167	500
0.56	127.38	n/a	167	667
0.70	127.51	n/a	167	833
0.83	127.65	n/a	167	1,000
0.97	127.79	n/a	167	1,167
1.11	127.93	n/a	167	1,334
1.25	128.07	n/a	167	1,500
1.39	128.21	n/a	167	1,667
1.40	128.22	960	5	1,672
2.18	129.00	1,290	878	2,549
2.68	129.50	1,513	701	3,250
3.08	129.90	1,691	641	3,891

Culvert / Orifice Structures

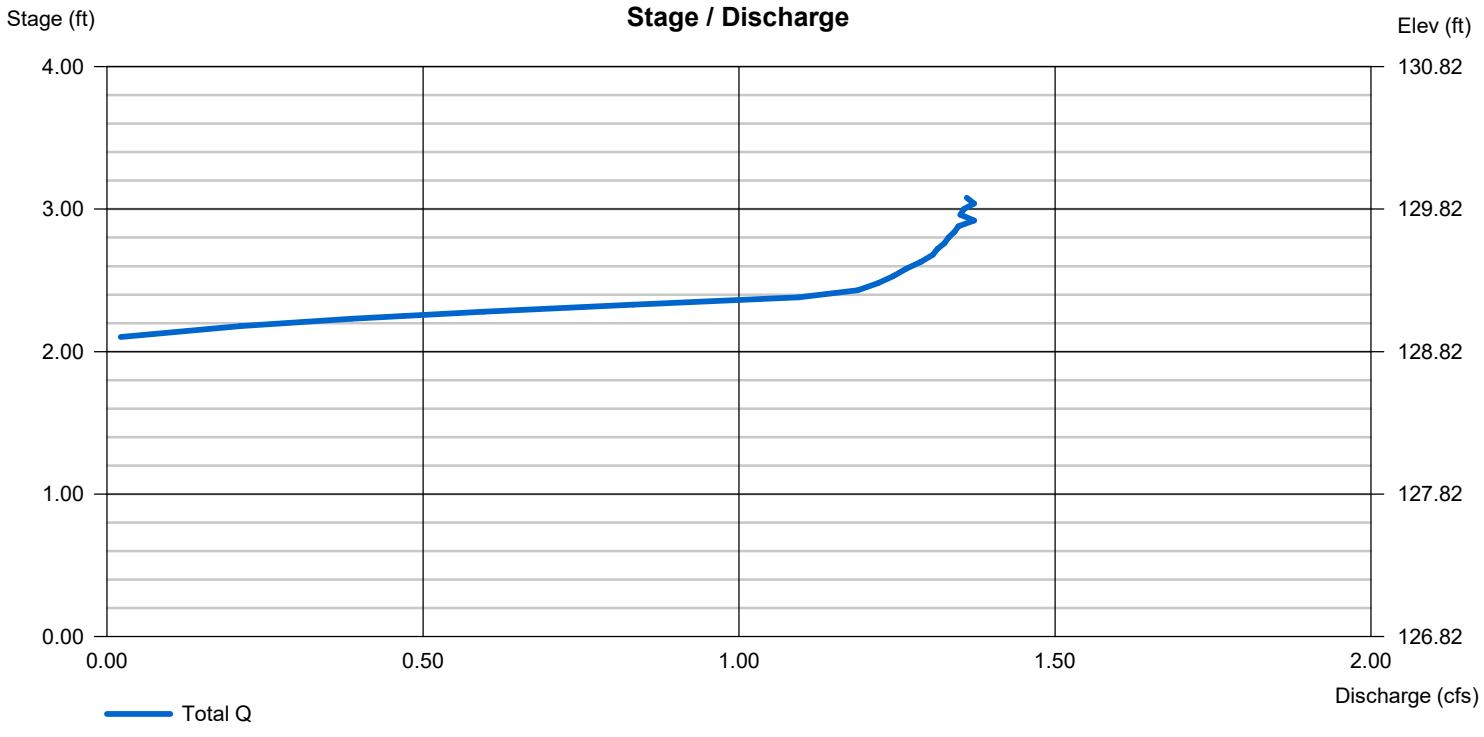
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	Inactive	Inactive	Inactive
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 126.82	0.00	0.00	0.00
Length (ft)	= 26.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	1.00	1.00	0.00
Crest El. (ft)	= 129.40	128.90	128.90	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Rect	---
Multi-Stage	= Yes	Yes	Yes	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).



Hydrograph Report

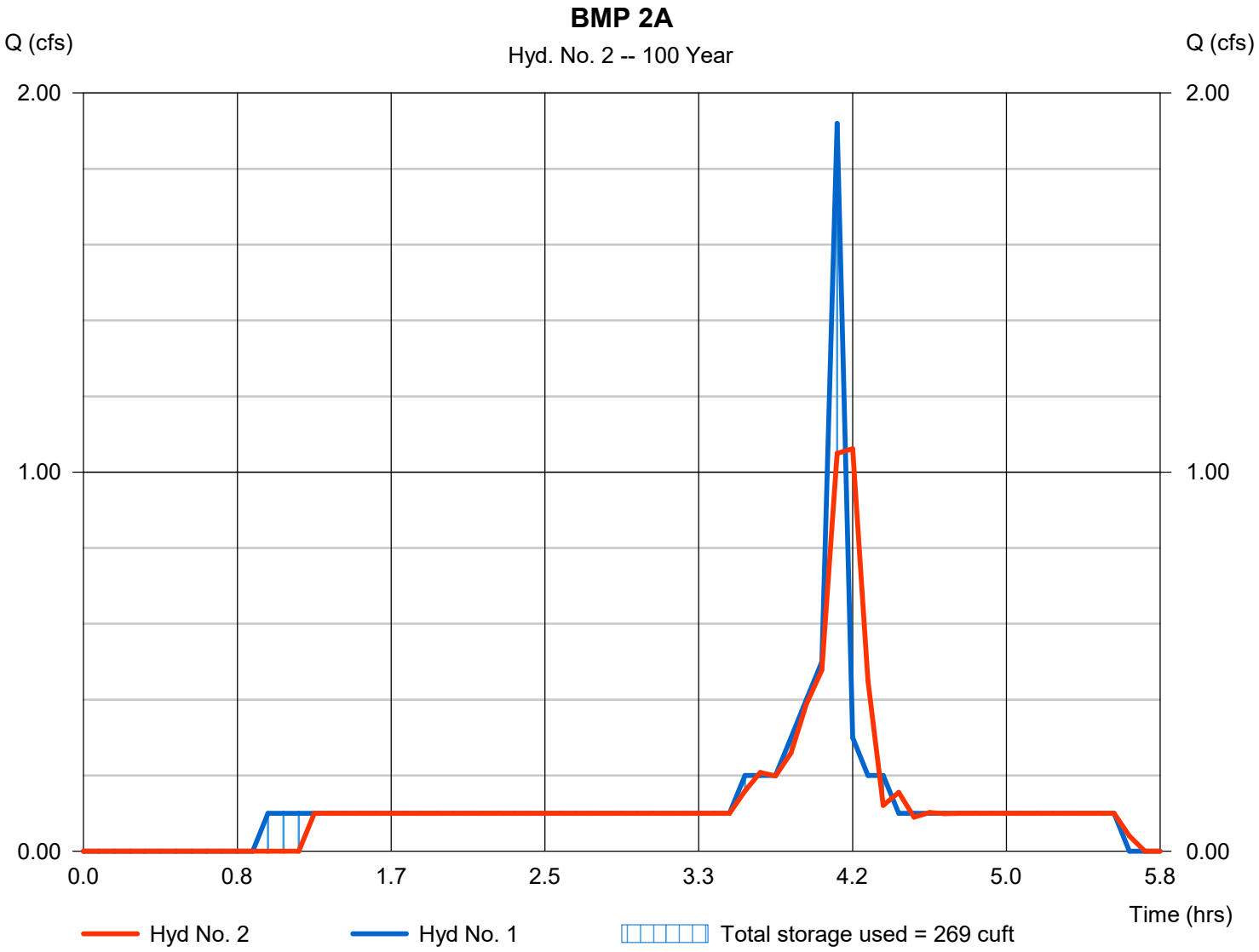
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2A

Hydrograph type	= Reservoir	Peak discharge	= 1.062 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 2,628 cuft
Inflow hyd. No.	= 1 - Hydrograph 2A	Max. Elevation	= 127.00 ft
Reservoir name	= Pond 2A	Max. Storage	= 269 cuft

Storage Indication method used.



Hydrograph Report

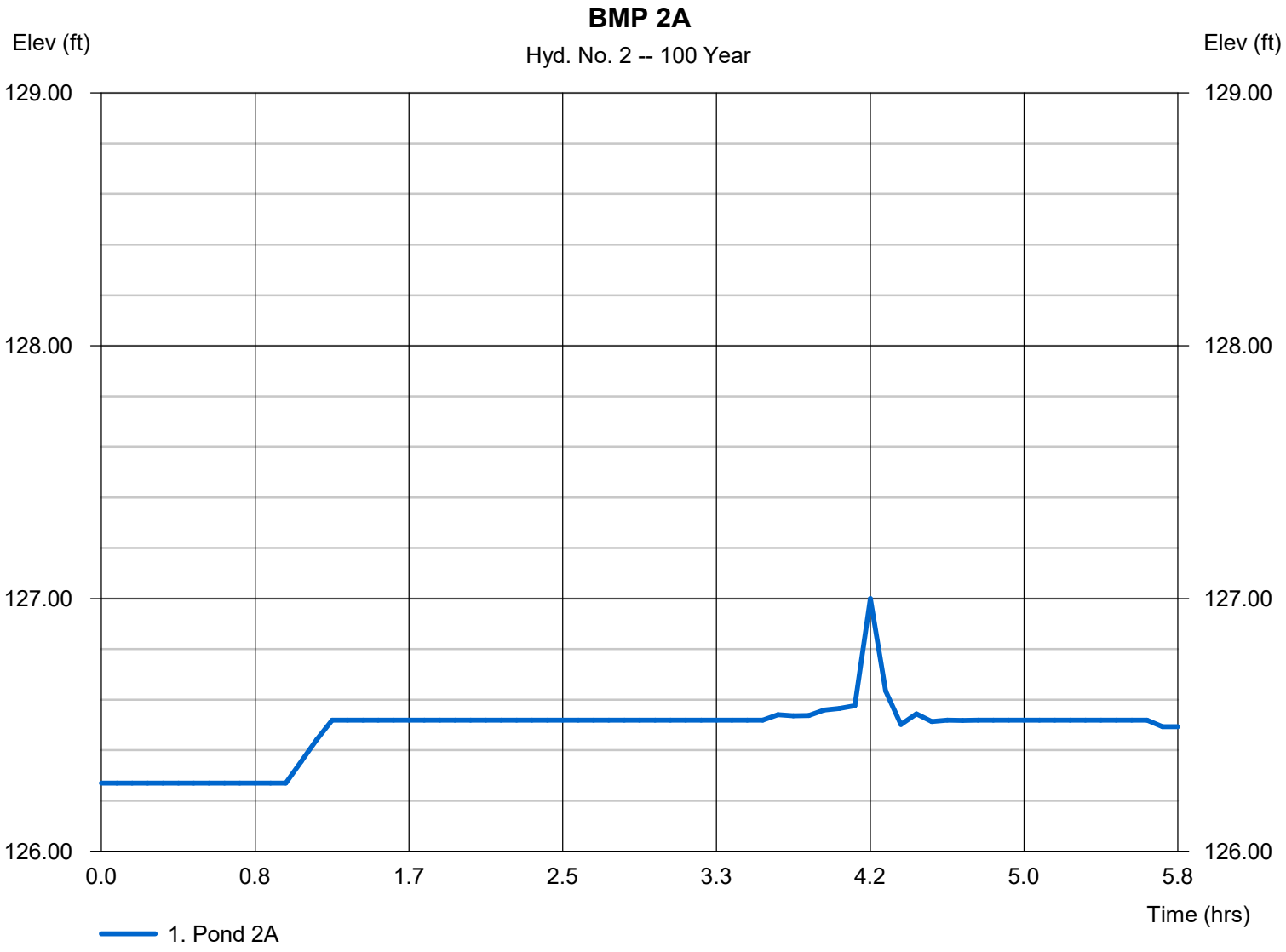
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2A

Hydrograph type	= Reservoir	Peak discharge	= 1.062 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 2,628 cuft
Inflow hyd. No.	= 1 - Hydrograph 2A	Max. Elevation	= 127.00 ft
Reservoir name	= Pond 2A	Max. Storage	= 269 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - Pond 2A

Pond Data

UG Chambers -Invert elev. = 126.27 ft, Rise x Span = 0.22 x 10.00 ft, Barrel Len = 35.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 126.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	126.27	n/a	0	0
0.02	126.29	n/a	8	8
0.04	126.31	n/a	8	15
0.07	126.34	n/a	8	23
0.09	126.36	n/a	8	31
0.11	126.38	n/a	8	39
0.13	126.40	n/a	8	46
0.15	126.42	n/a	8	54
0.18	126.45	n/a	8	62
0.20	126.47	n/a	8	69
0.22	126.49	n/a	8	77
0.23	126.50	516	3	80
0.73	127.00	609	281	361

Culvert / Orifice Structures

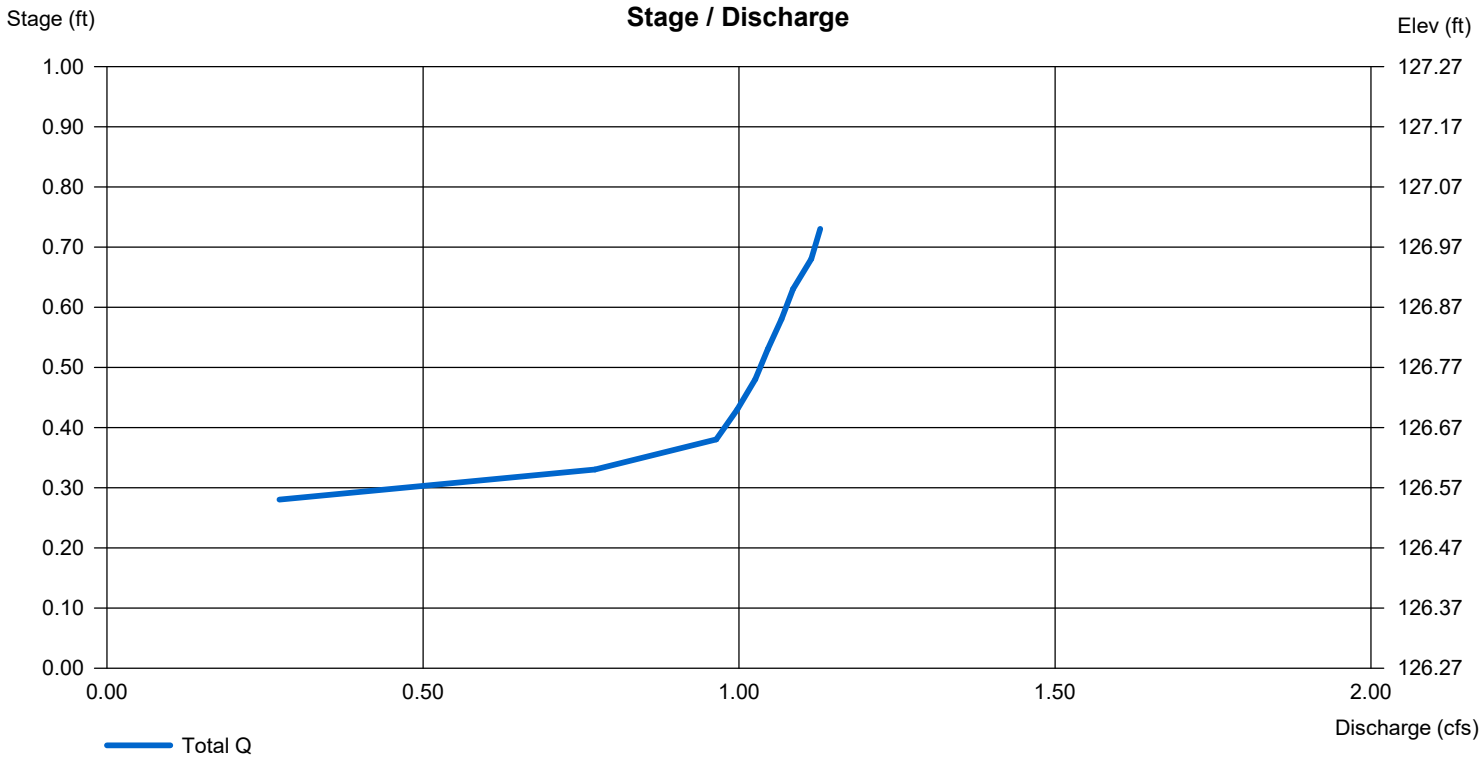
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	0.00	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 125.28	0.00	0.00	0.00
Length (ft)	= 14.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	0.00	0.00	0.00
Crest El. (ft)	= 126.50	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).



Hydrograph Report

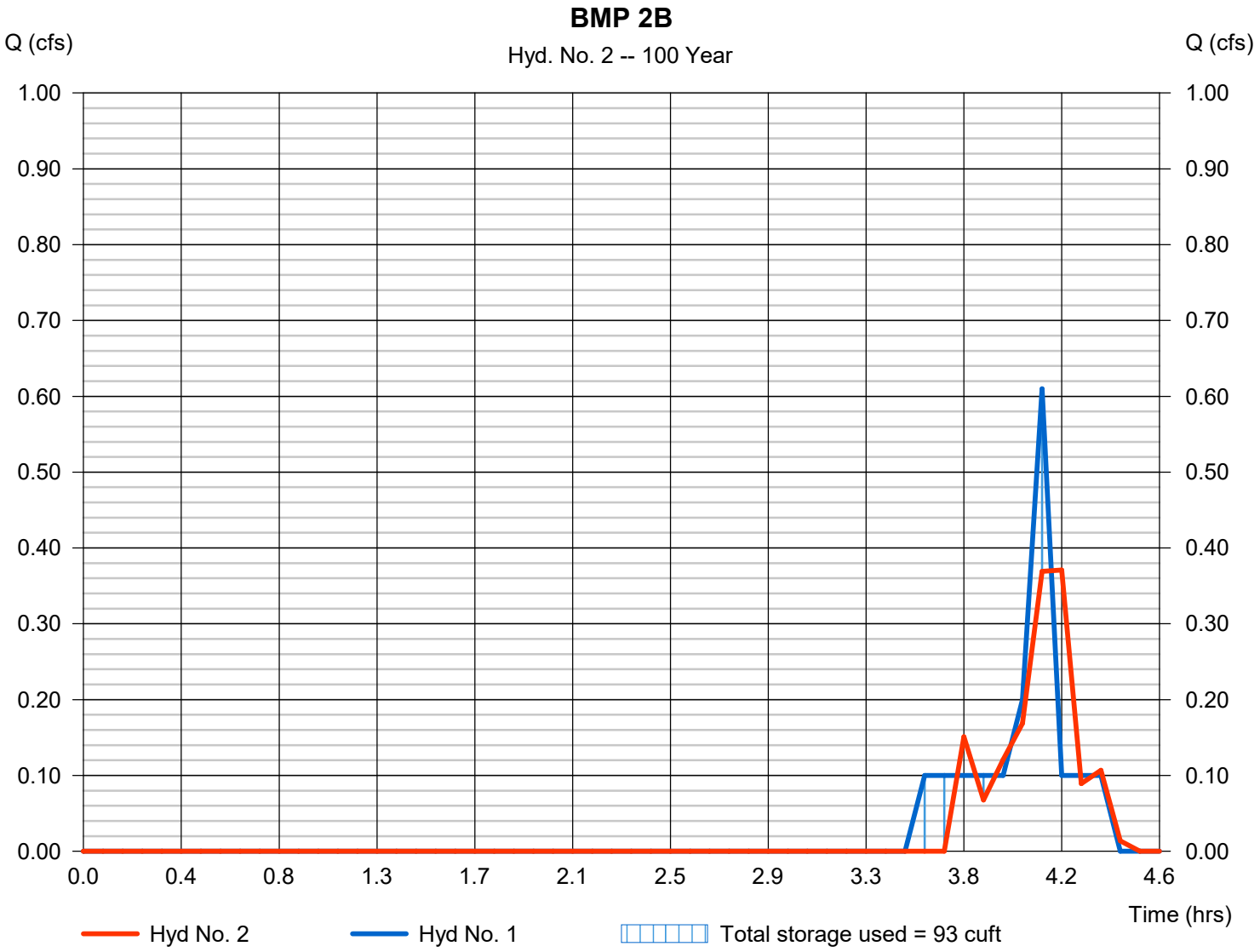
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2B

Hydrograph type	= Reservoir	Peak discharge	= 0.371 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 437 cuft
Inflow hyd. No.	= 1 - Hydrograph 2B	Max. Elevation	= 128.30 ft
Reservoir name	= BMP 2B	Max. Storage	= 93 cuft

Storage Indication method used.



Hydrograph Report

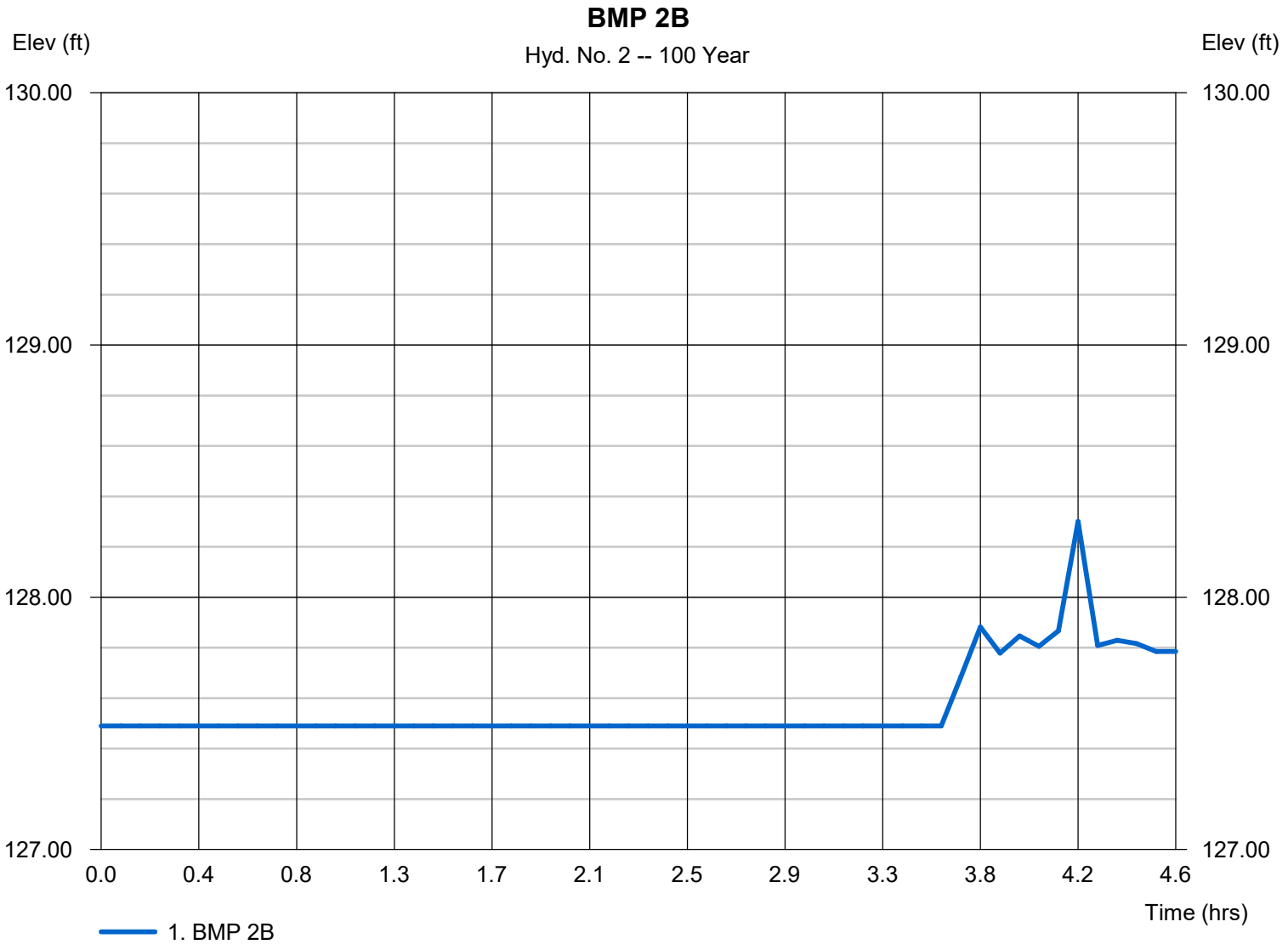
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2B

Hydrograph type	= Reservoir	Peak discharge	= 0.371 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 437 cuft
Inflow hyd. No.	= 1 - Hydrograph 2B	Max. Elevation	= 128.30 ft
Reservoir name	= BMP 2B	Max. Storage	= 93 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 2B

Pond Data

UG Chambers -Invert elev. = 127.49 ft, Rise x Span = 0.30 x 10.00 ft, Barrel Len = 15.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 127.80 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	127.49	n/a	0	0
0.03	127.52	n/a	5	5
0.06	127.55	n/a	5	9
0.09	127.58	n/a	5	14
0.12	127.61	n/a	5	19
0.15	127.64	n/a	5	23
0.18	127.67	n/a	5	28
0.21	127.70	n/a	5	33
0.24	127.73	n/a	5	37
0.27	127.76	n/a	5	42
0.30	127.79	n/a	5	47
0.31	127.80	155	1	47
0.81	128.30	155	77	125

Culvert / Orifice Structures

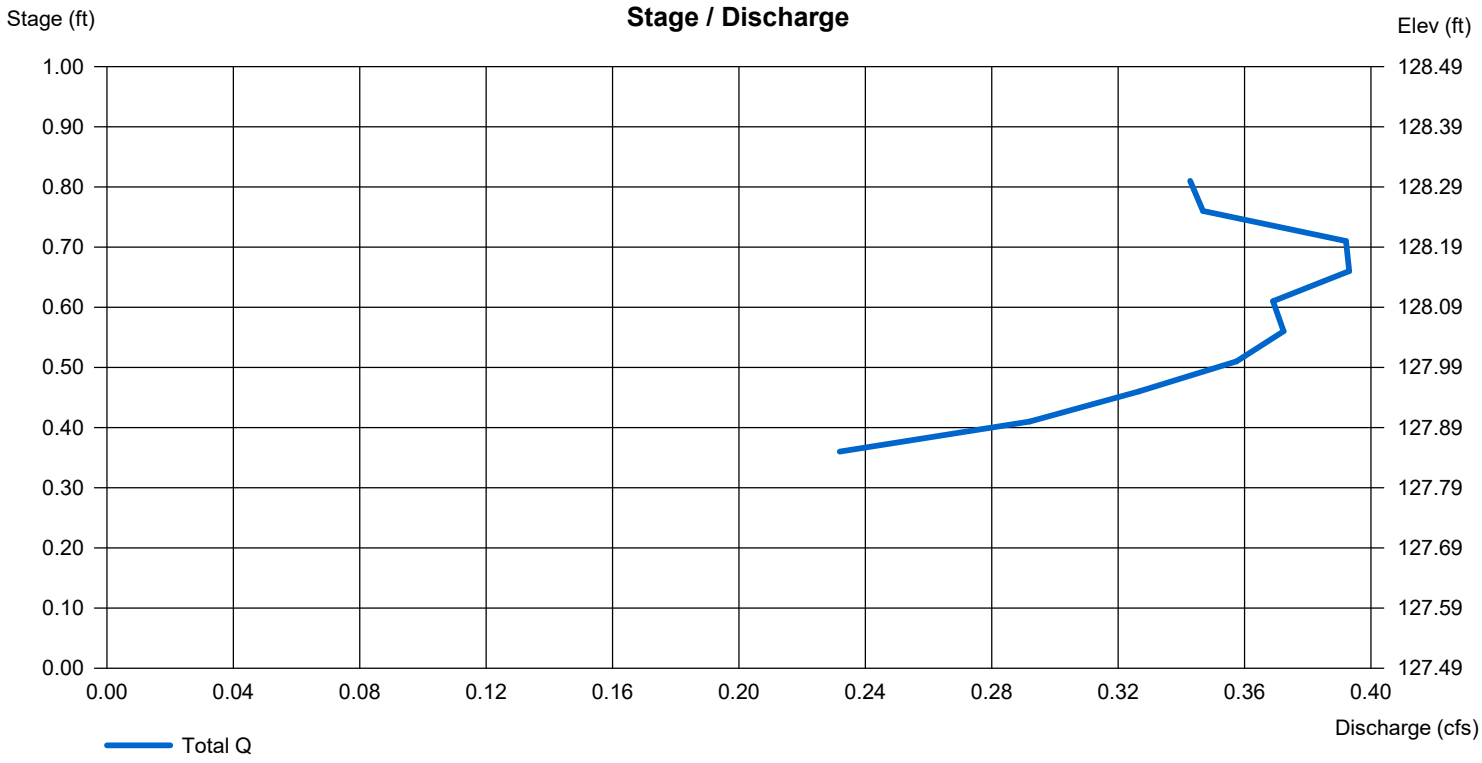
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 5.00	0.00	0.00	0.00
Span (in)	= 5.00	0.00	0.00	0.00
No. Barrels	= 1	0	0	0
Invert El. (ft)	= 127.49	0.00	0.00	0.00
Length (ft)	= 46.00	0.00	0.00	0.00
Slope (%)	= 1.25	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	0.00	0.00	0.00
Crest El. (ft)	= 127.80	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).



Hydrograph Report

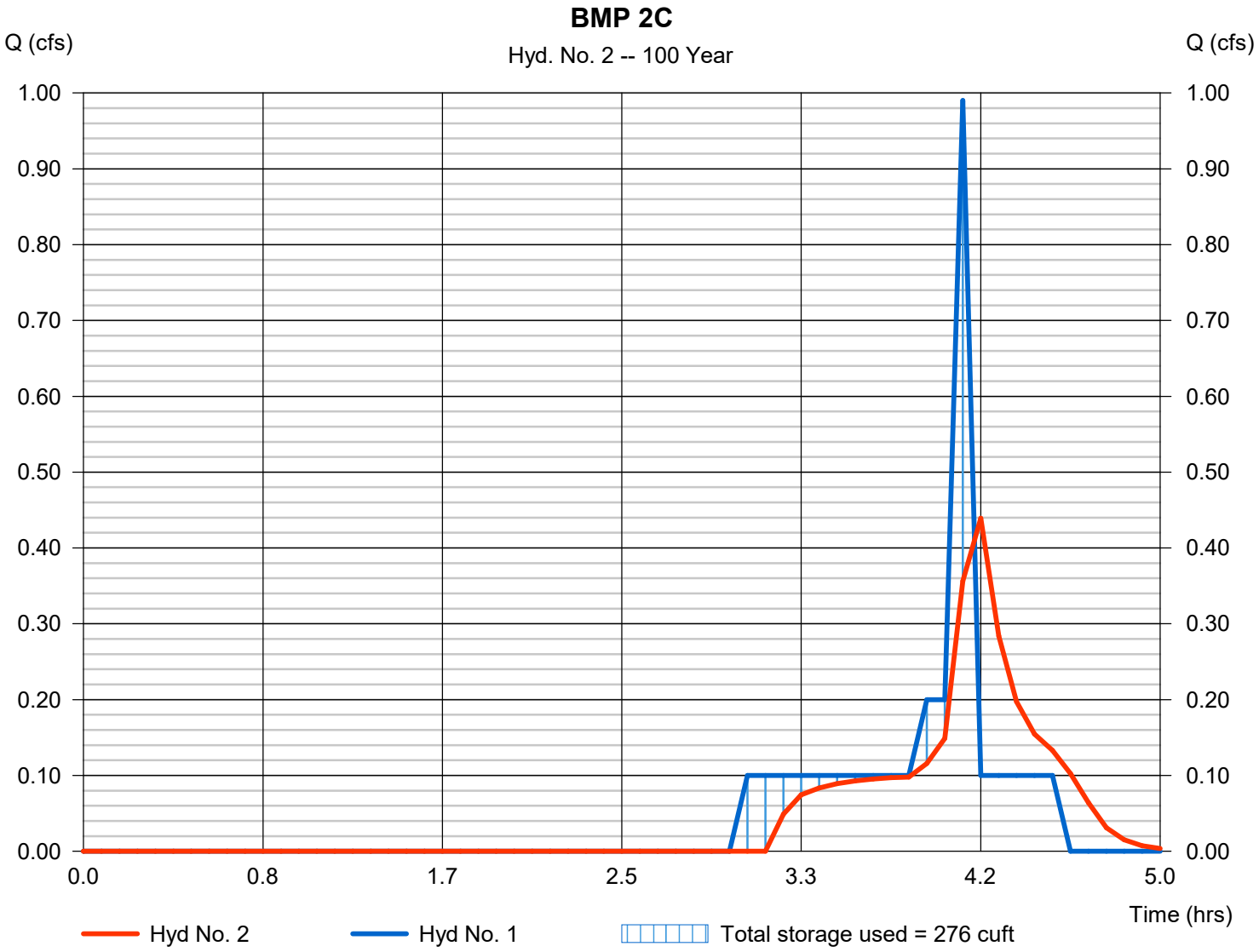
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2C

Hydrograph type	= Reservoir	Peak discharge	= 0.439 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 820 cuft
Inflow hyd. No.	= 1 - Hydrograph 2C	Max. Elevation	= 126.44 ft
Reservoir name	= BMP 2C	Max. Storage	= 276 cuft

Storage Indication method used.



Hydrograph Report

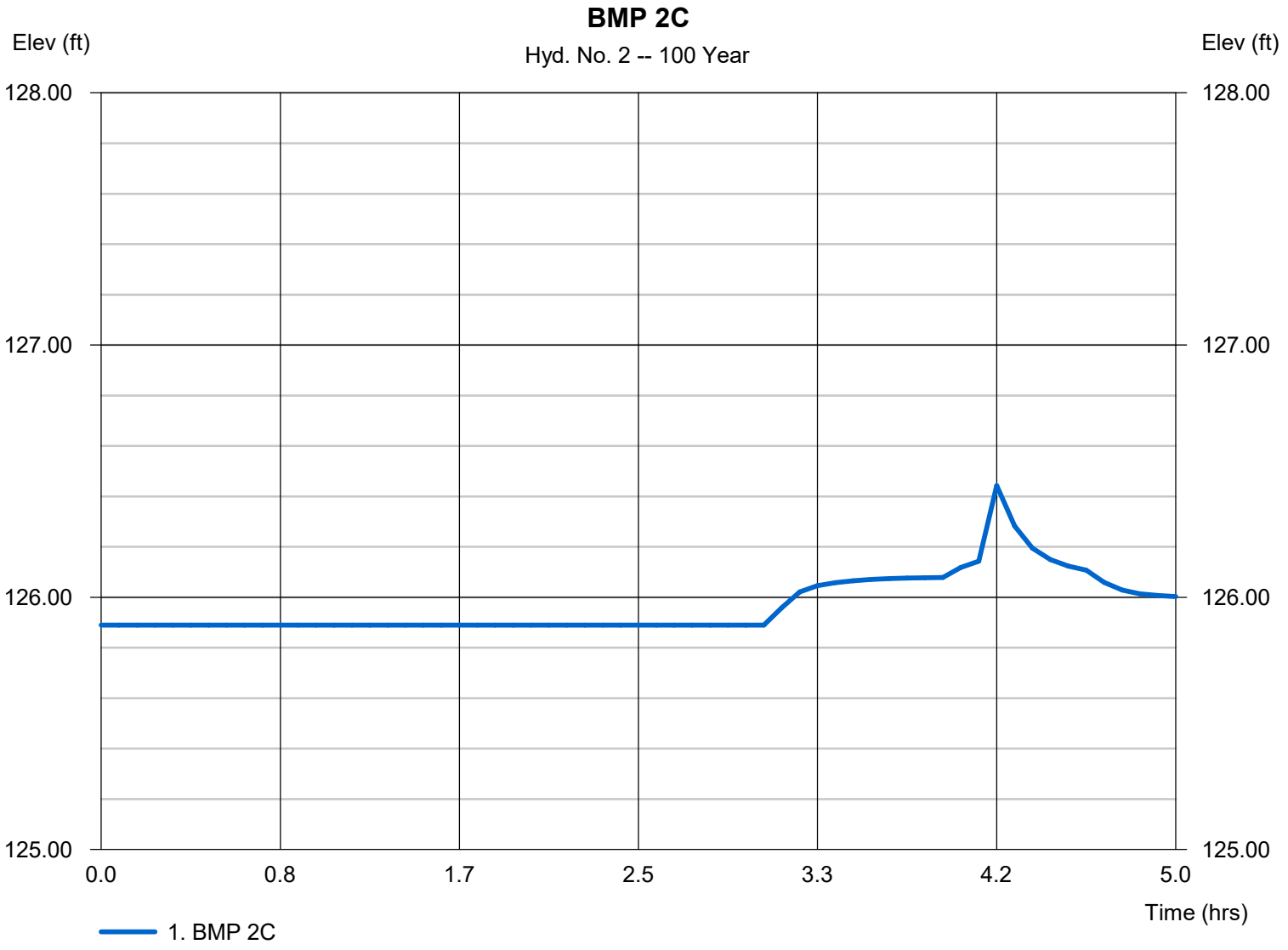
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 2C

Hydrograph type	=	Reservoir	Peak discharge	=	0.439 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	820 cuft
Inflow hyd. No.	=	1 - Hydrograph 2C	Max. Elevation	=	126.44 ft
Reservoir name	=	BMP 2C	Max. Storage	=	276 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 2C

Pond Data

UG Chambers -Invert elev. = 125.89 ft, Rise x Span = 0.10 x 10.00 ft, Barrel Len = 43.60 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 126.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	125.89	n/a	0	0
0.01	125.90	n/a	4	4
0.02	125.91	n/a	4	9
0.03	125.92	n/a	4	13
0.04	125.93	n/a	4	17
0.05	125.94	n/a	4	22
0.06	125.95	n/a	4	26
0.07	125.96	n/a	4	31
0.08	125.97	n/a	4	35
0.09	125.98	n/a	4	39
0.10	125.99	n/a	4	44
0.11	126.00	576	3	46
0.61	126.50	692	317	363

Culvert / Orifice Structures

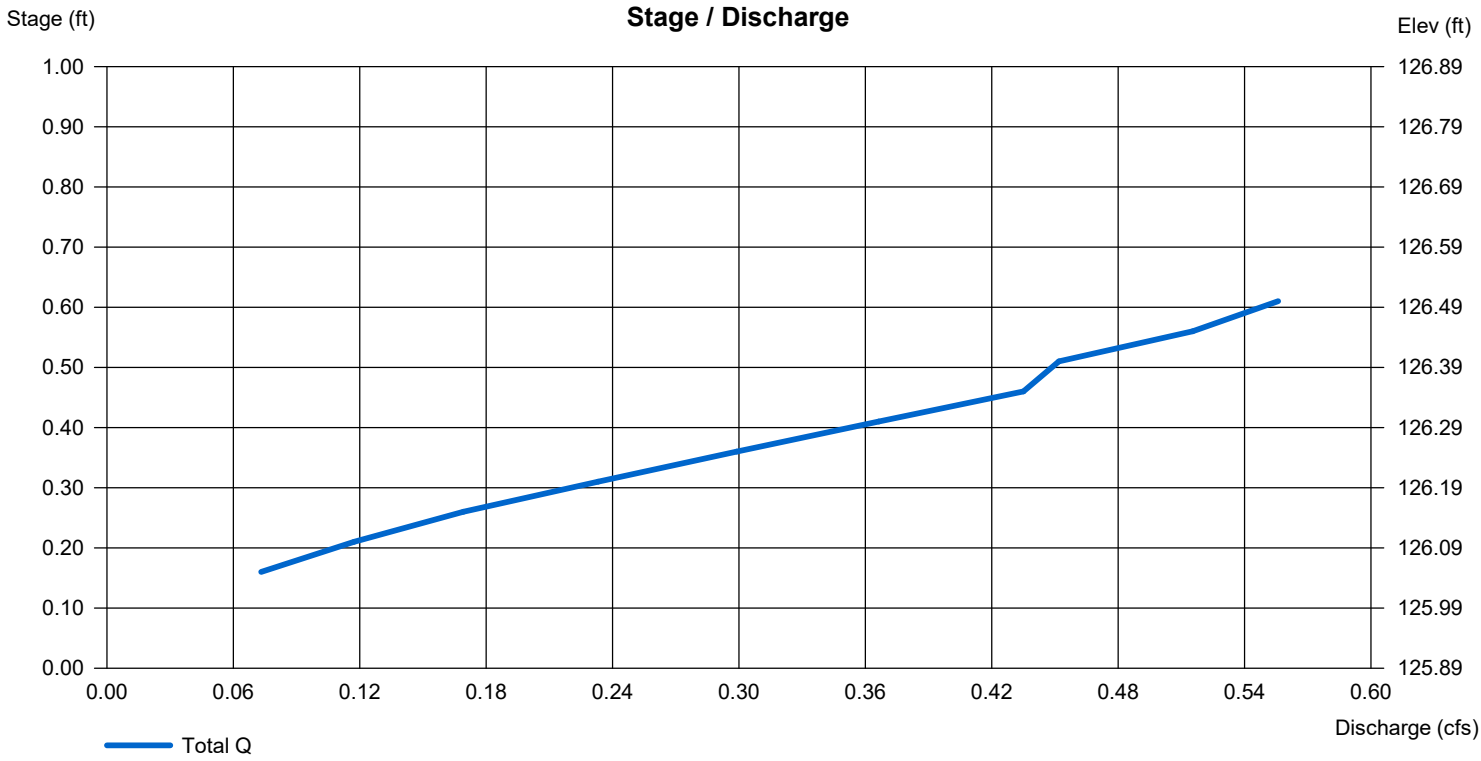
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	Inactive	Inactive	Inactive
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 125.89	0.00	0.00	0.00
Length (ft)	= 222.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	0.00	0.00	0.00
Crest El. (ft)	= 126.00	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 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).



Hydrograph Report

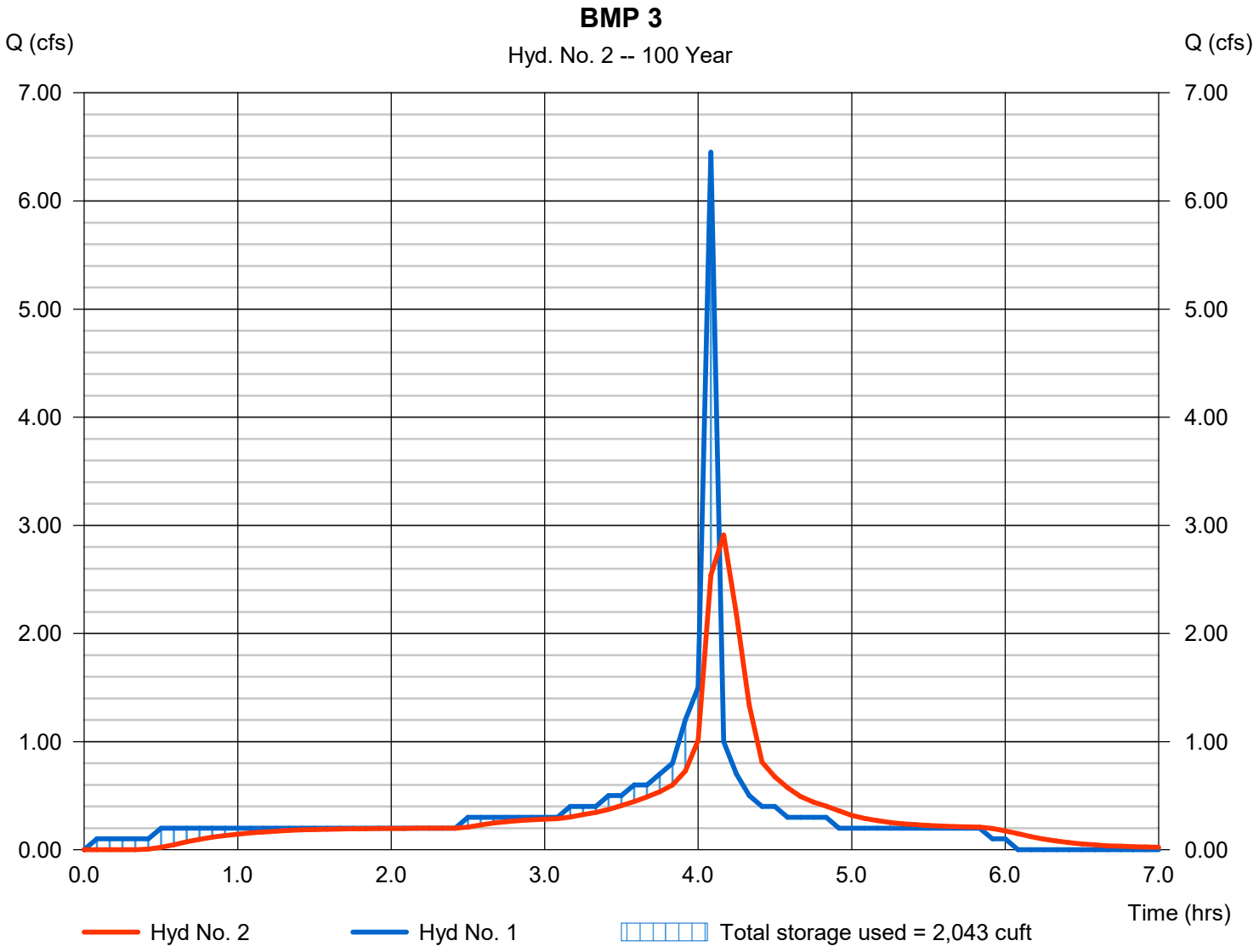
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 3

Hydrograph type	=	Reservoir	Peak discharge	=	2.912 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.17 hrs
Time interval	=	5 min	Hyd. volume	=	8,440 cuft
Inflow hyd. No.	=	1 - DMA 3	Max. Elevation	=	121.50 ft
Reservoir name	=	BMP 3	Max. Storage	=	2,043 cuft

Storage Indication method used.



Hydrograph Report

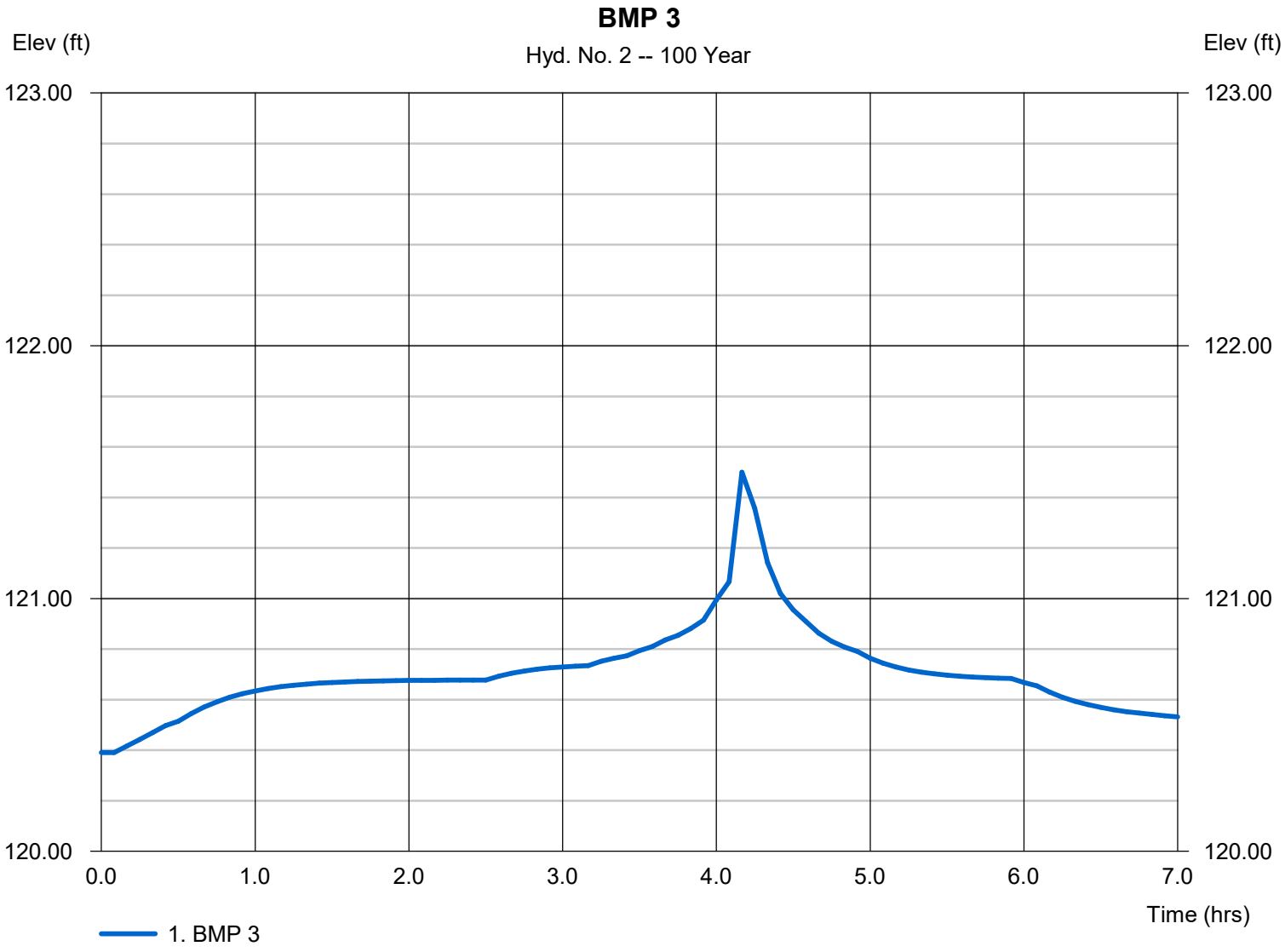
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 3

Hydrograph type	= Reservoir	Peak discharge	= 2.912 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.17 hrs
Time interval	= 5 min	Hyd. volume	= 8,440 cuft
Inflow hyd. No.	= 1 - DMA 3	Max. Elevation	= 121.50 ft
Reservoir name	= BMP 3	Max. Storage	= 2,043 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 3

Pond Data

UG Chambers -Invert elev. = 120.39 ft, Rise x Span = 0.10 x 10.00 ft, Barrel Len = 114.00 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 120.50 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	120.39	n/a	0	0
0.01	120.40	n/a	11	11
0.02	120.41	n/a	11	23
0.03	120.42	n/a	11	34
0.04	120.43	n/a	11	46
0.05	120.44	n/a	11	57
0.06	120.45	n/a	11	68
0.07	120.46	n/a	11	80
0.08	120.47	n/a	11	91
0.09	120.48	n/a	11	103
0.10	120.49	n/a	11	114
0.11	120.50	1,660	8	122
0.61	121.00	1,929	897	1,020
1.11	121.50	2,205	1,034	2,053

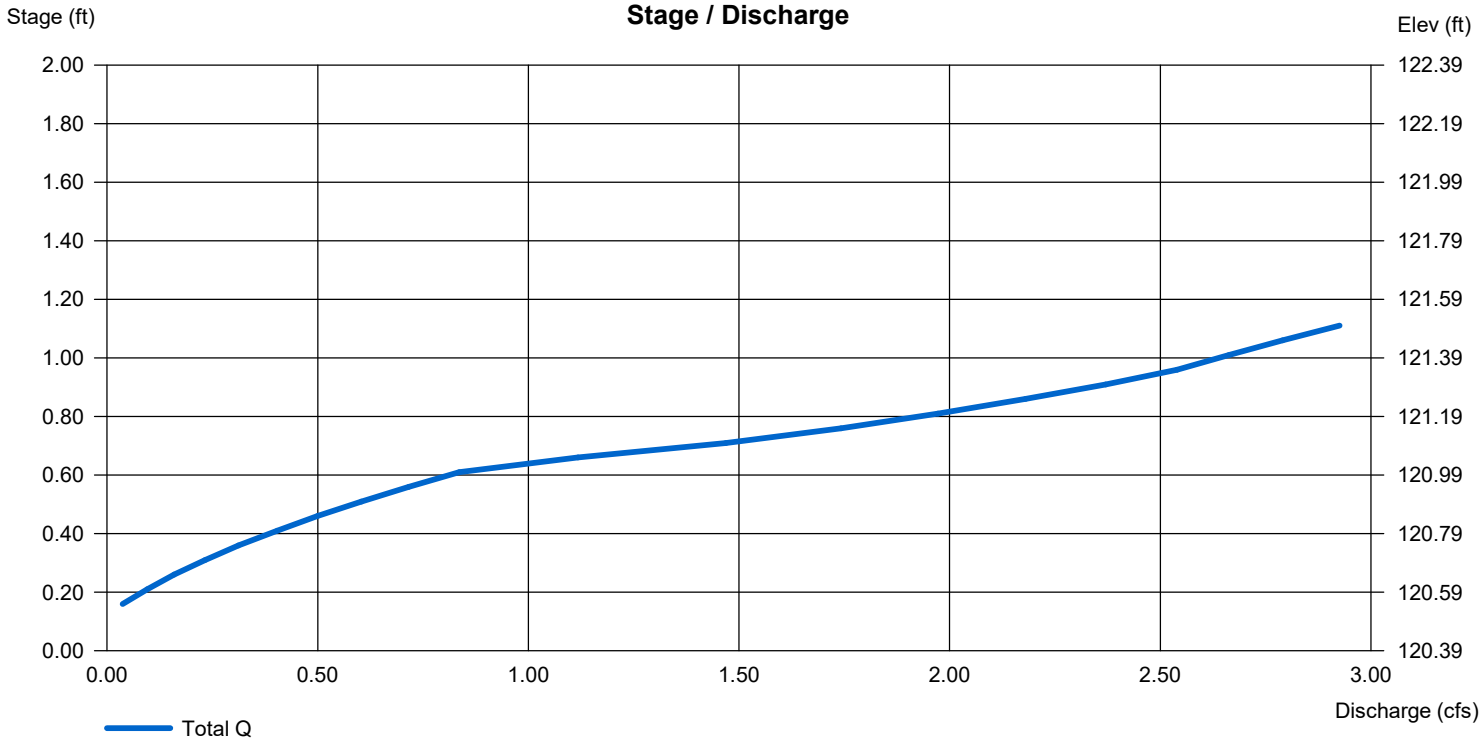
Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 120.39	0.00	0.00	0.00
Length (ft)	= 43.00	0.00	0.00	0.00
Slope (%)	= 5.80	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	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	1.00	Inactive	0.00
Crest El. (ft)	= 121.00	120.50	120.50	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	Rect	---
Multi-Stage	= Yes	Yes	Yes	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).



Hydrograph Report

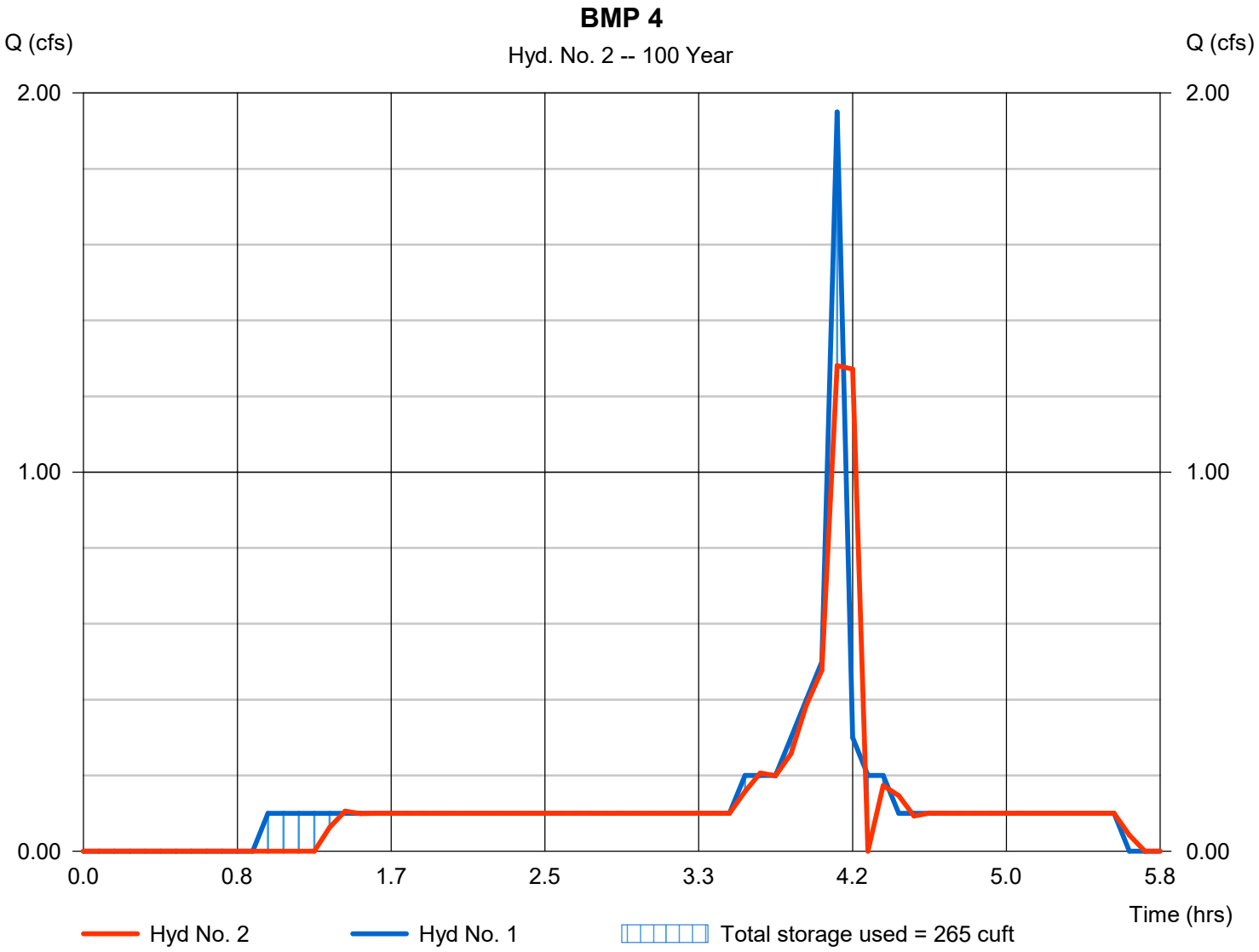
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 1.281 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 2,598 cuft
Inflow hyd. No.	= 1 - DMA 4	Max. Elevation	= 118.41 ft
Reservoir name	= BMP 4	Max. Storage	= 265 cuft

Storage Indication method used.



Hydrograph Report

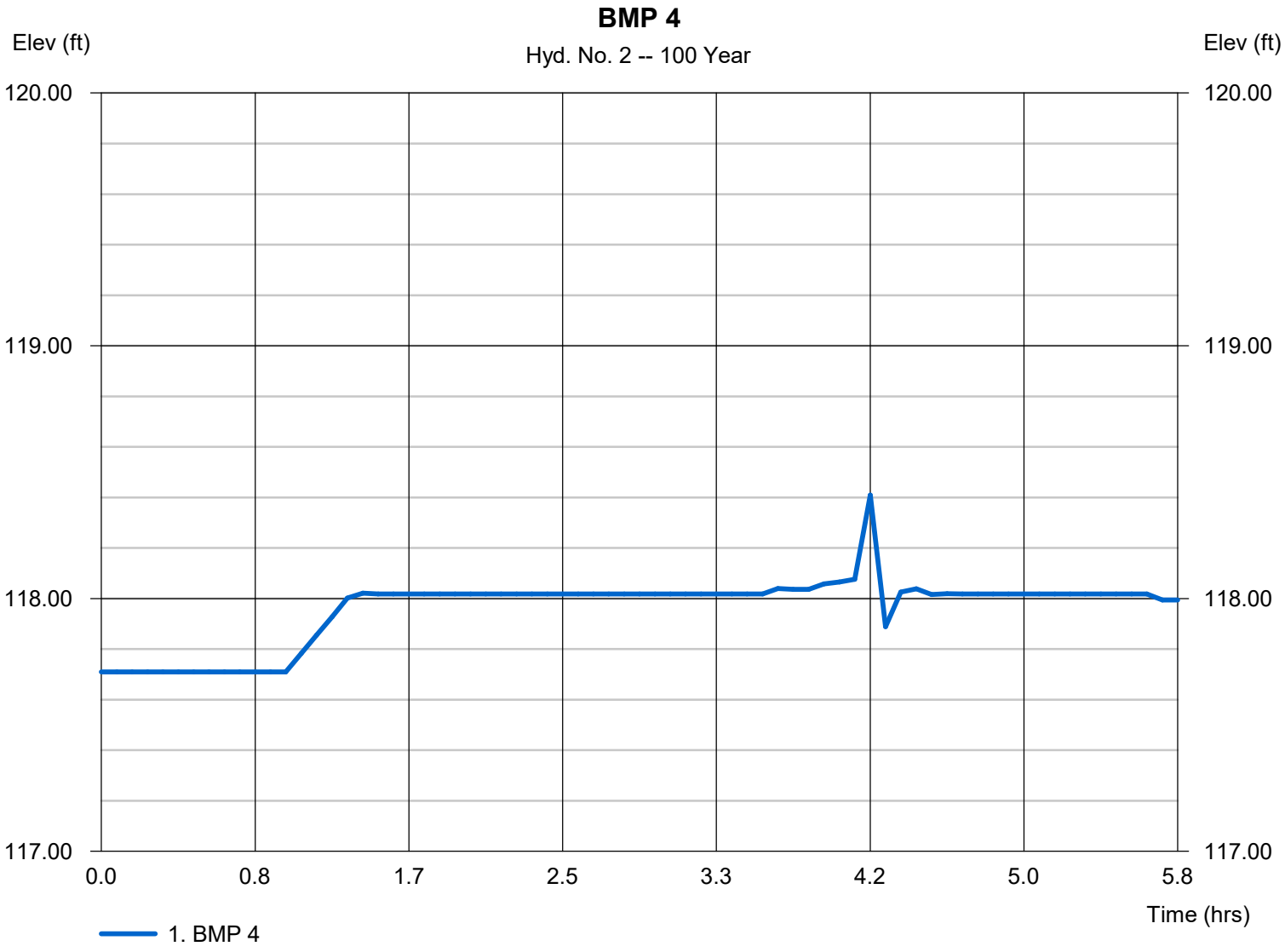
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 4

Hydrograph type	= Reservoir	Peak discharge	= 1.281 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 5 min	Hyd. volume	= 2,598 cuft
Inflow hyd. No.	= 1 - DMA 4	Max. Elevation	= 118.41 ft
Reservoir name	= BMP 4	Max. Storage	= 265 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 4

Pond Data

UG Chambers -Invert elev. = 117.71 ft, Rise x Span = 0.28 x 10.00 ft, Barrel Len = 41.40 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 118.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	117.71	n/a	0	0
0.03	117.74	n/a	12	12
0.06	117.77	n/a	12	23
0.08	117.79	n/a	12	35
0.11	117.82	n/a	12	46
0.14	117.85	n/a	12	58
0.17	117.88	n/a	12	70
0.20	117.91	n/a	12	81
0.22	117.93	n/a	12	93
0.25	117.96	n/a	12	104
0.28	117.99	n/a	12	116
0.29	118.00	548	3	119
0.79	118.50	656	301	420

Culvert / Orifice Structures

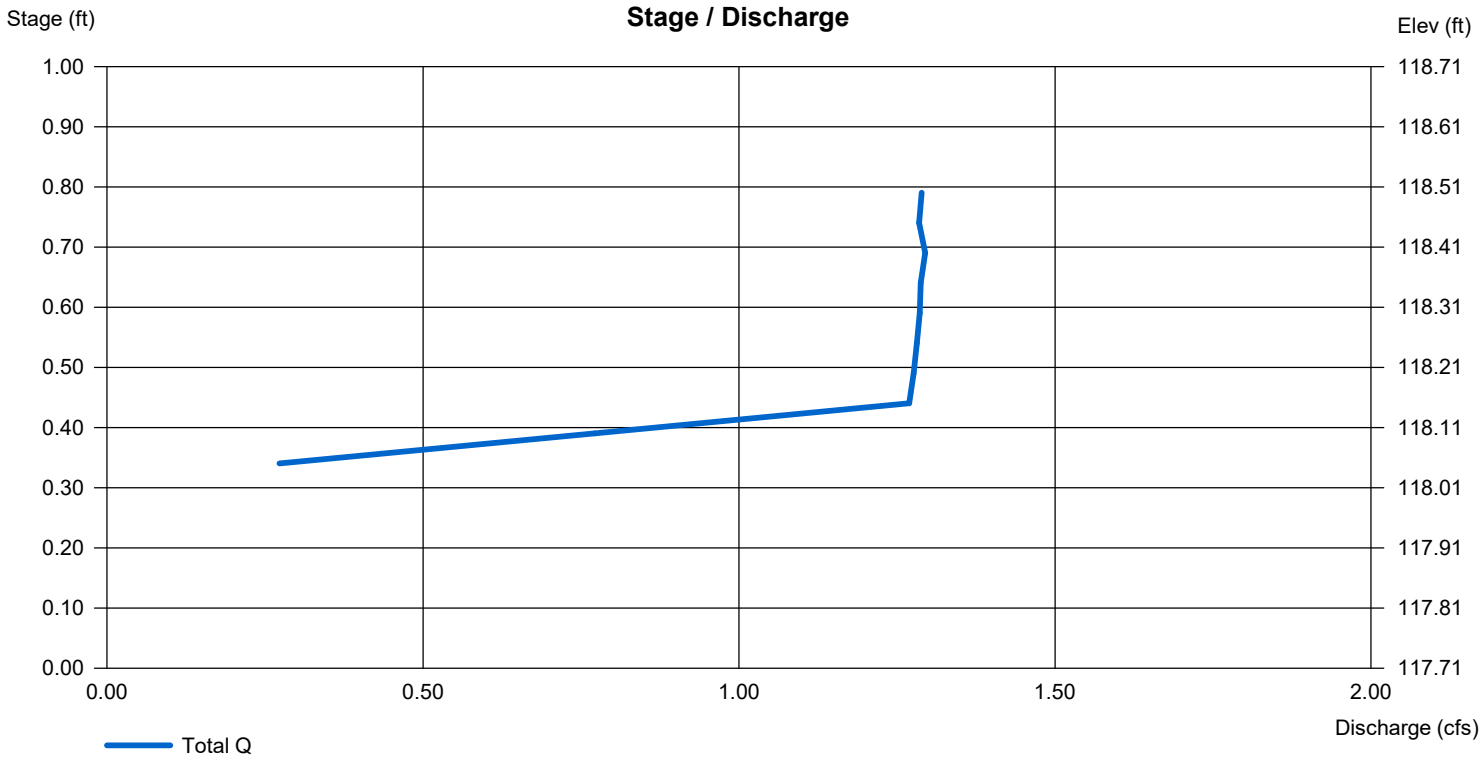
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	Inactive	Inactive	Inactive
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 113.45	0.00	0.00	0.00
Length (ft)	= 139.00	0.00	0.00	0.00
Slope (%)	= 2.80	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	0.00	0.00	0.00
Crest El. (ft)	= 118.00	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 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).



Hydrograph Report

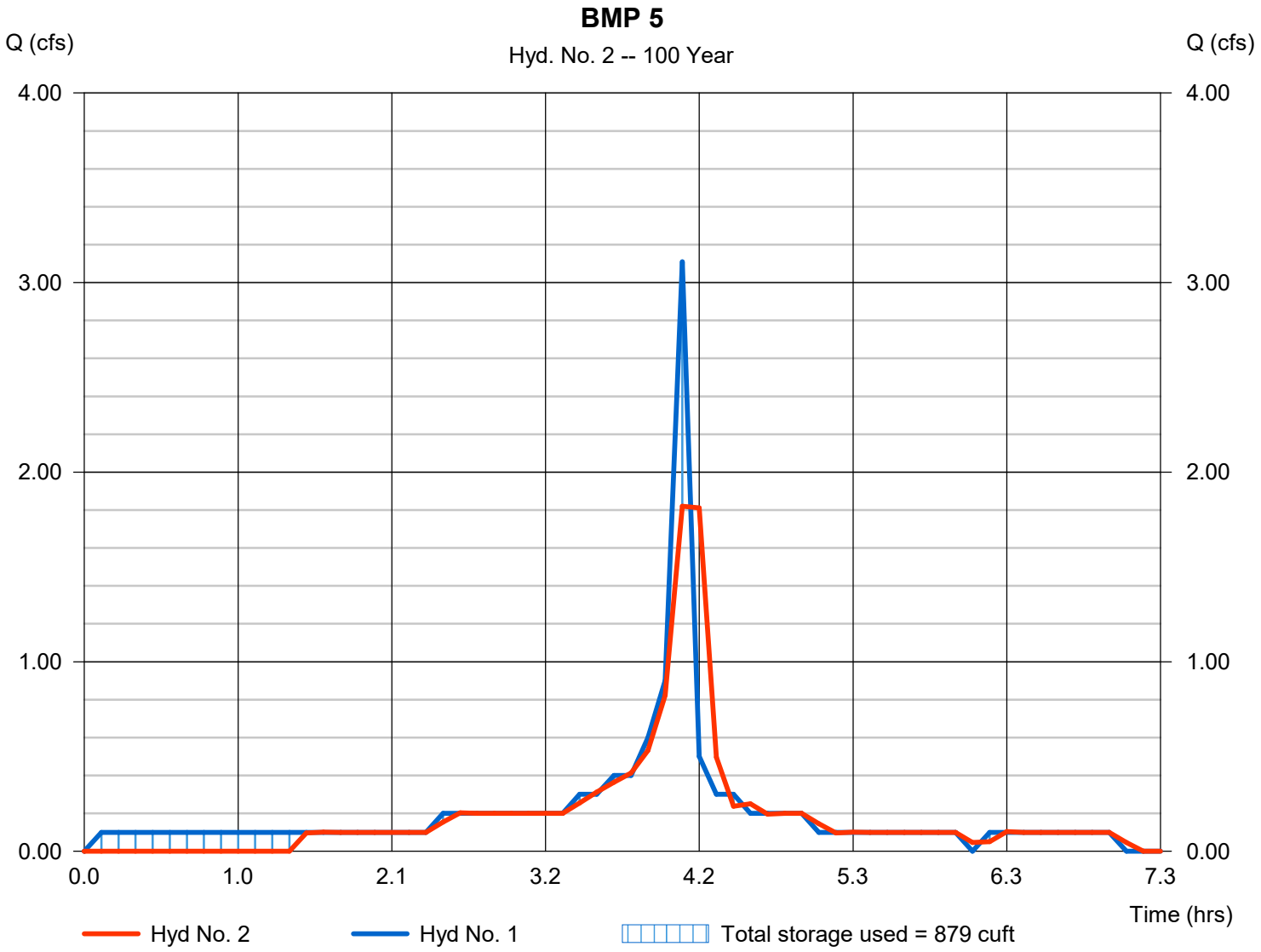
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 5

Hydrograph type	=	Reservoir	Peak discharge	=	1.820 cfs
Storm frequency	=	100 yrs	Time to peak	=	4.08 hrs
Time interval	=	7 min	Hyd. volume	=	5,062 cuft
Inflow hyd. No.	=	1 - DMA 5	Max. Elevation	=	116.50 ft
Reservoir name	=	BMP 5	Max. Storage	=	879 cuft

Storage Indication method used.



Hydrograph Report

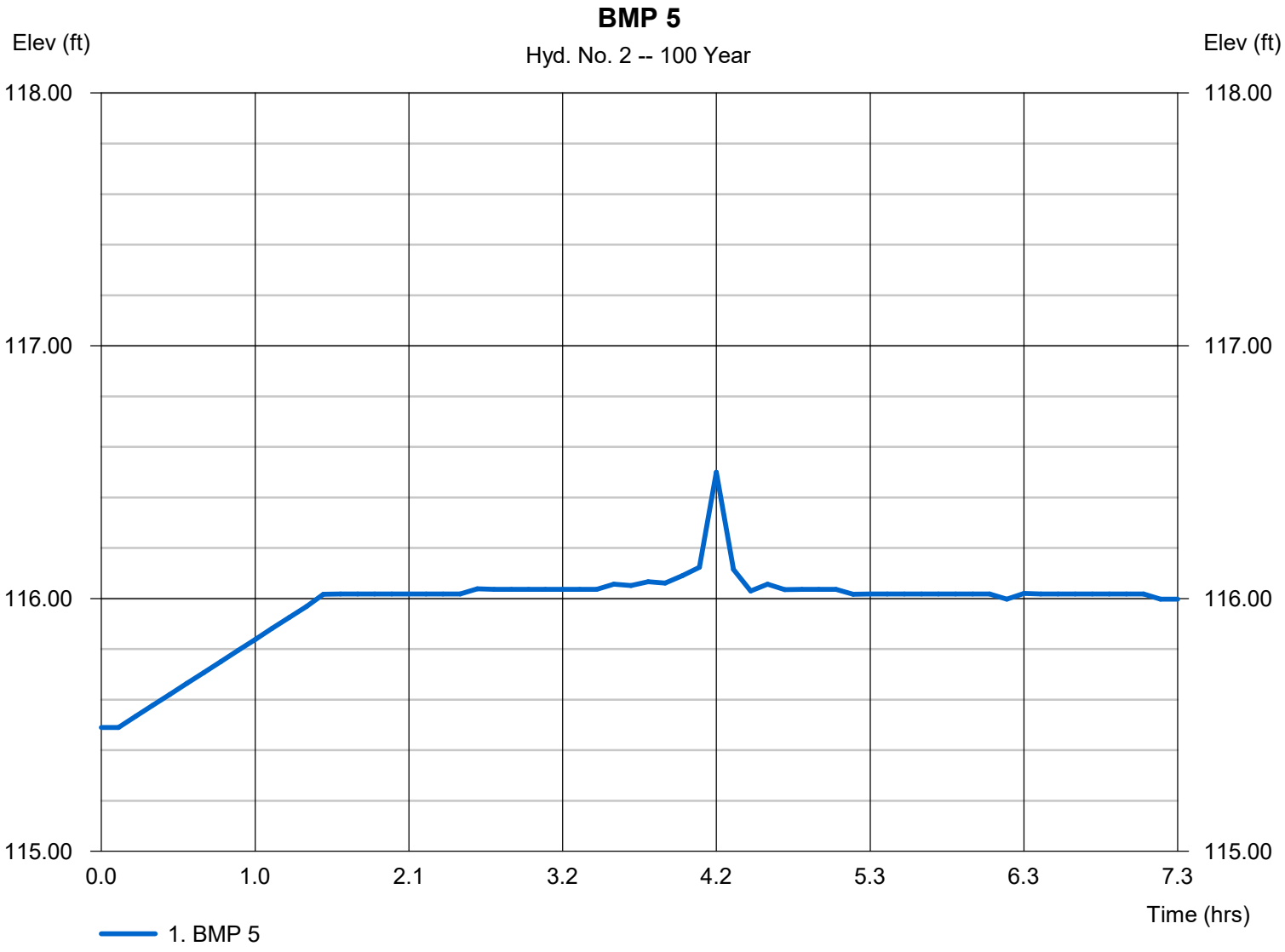
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 5

Hydrograph type	= Reservoir	Peak discharge	= 1.820 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.08 hrs
Time interval	= 7 min	Hyd. volume	= 5,062 cuft
Inflow hyd. No.	= 1 - DMA 5	Max. Elevation	= 116.50 ft
Reservoir name	= BMP 5	Max. Storage	= 879 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 5

Pond Data

UG Chambers -Invert elev. = 115.49 ft, Rise x Span = 0.50 x 10.00 ft, Barrel Len = 96.50 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 116.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	115.49	n/a	0	0
0.05	115.54	n/a	48	48
0.10	115.59	n/a	48	97
0.15	115.64	n/a	48	145
0.20	115.69	n/a	48	193
0.25	115.74	n/a	48	241
0.30	115.79	n/a	48	290
0.35	115.84	n/a	48	338
0.40	115.89	n/a	48	386
0.45	115.94	n/a	48	434
0.50	115.99	n/a	48	483
0.51	116.00	919	5	487
1.01	116.50	1,036	489	976

Culvert / Orifice Structures

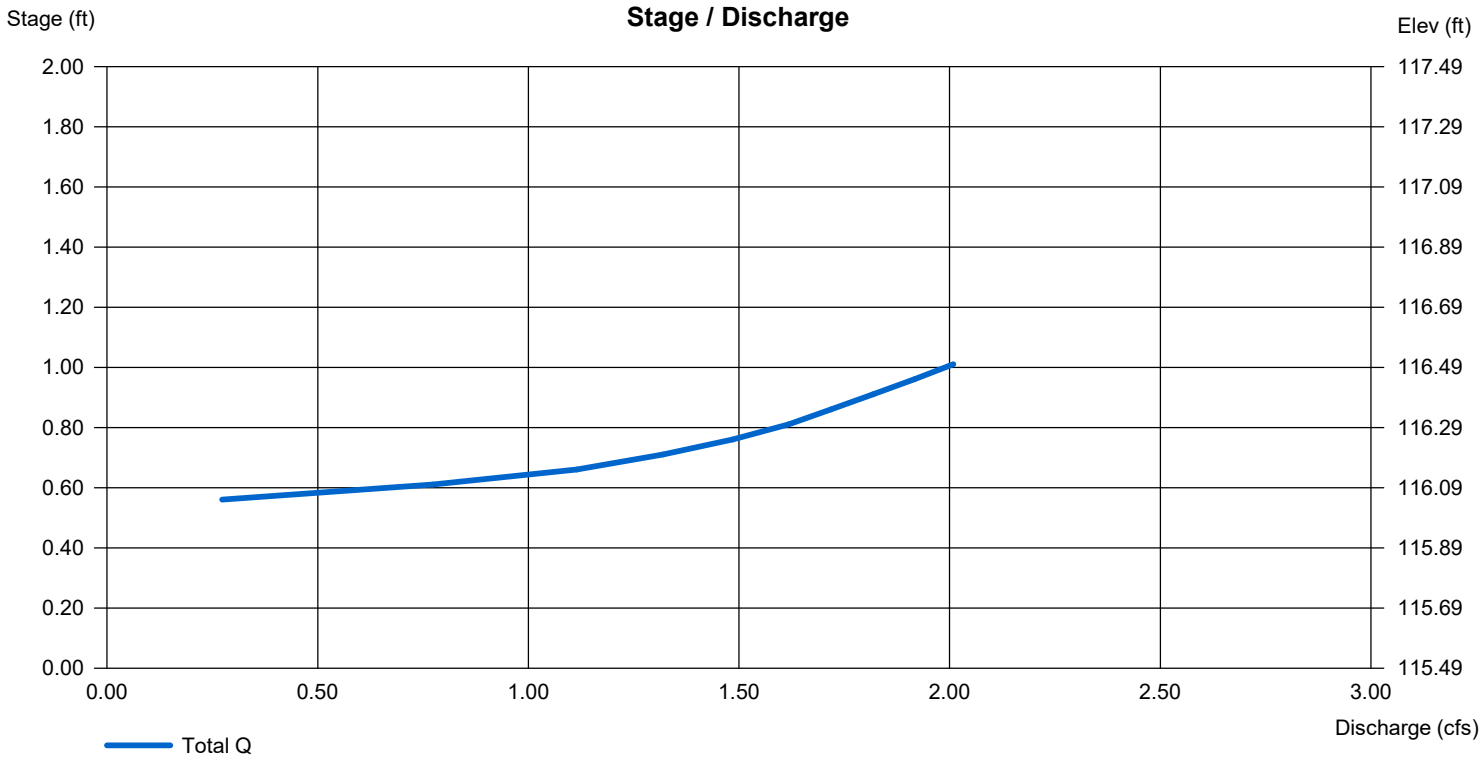
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 10.00	Inactive	Inactive	Inactive
Span (in)	= 10.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 115.49	0.00	0.00	0.00
Length (ft)	= 53.00	0.00	0.00	0.00
Slope (%)	= 2.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	0.00	0.00	0.00
Crest El. (ft)	= 116.00	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).



Hydrograph Report

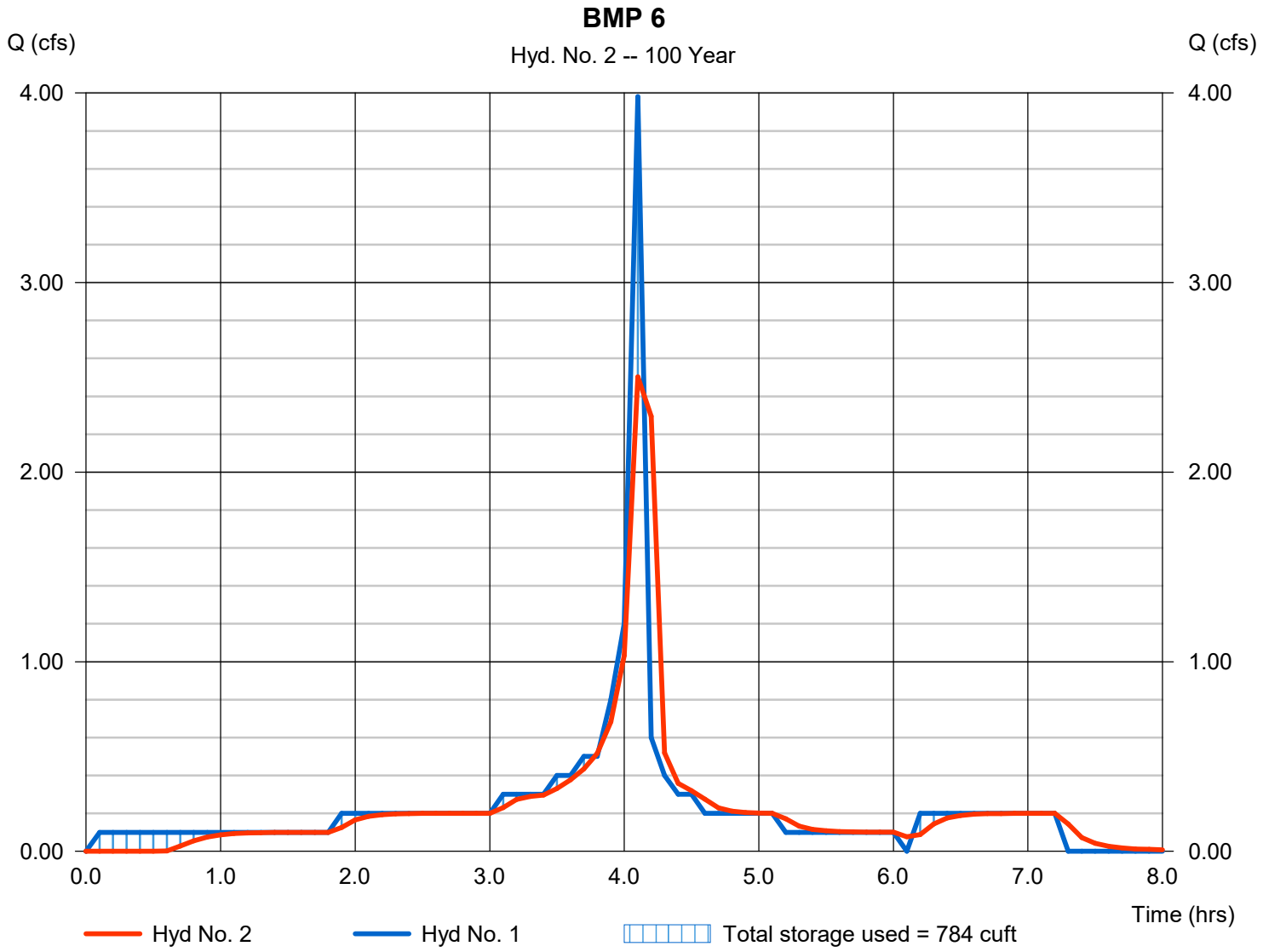
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 2.503 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.10 hrs
Time interval	= 6 min	Hyd. volume	= 6,674 cuft
Inflow hyd. No.	= 1 - Hydrograph 6	Max. Elevation	= 115.36 ft
Reservoir name	= BMP 6	Max. Storage	= 784 cuft

Storage Indication method used.



Hydrograph Report

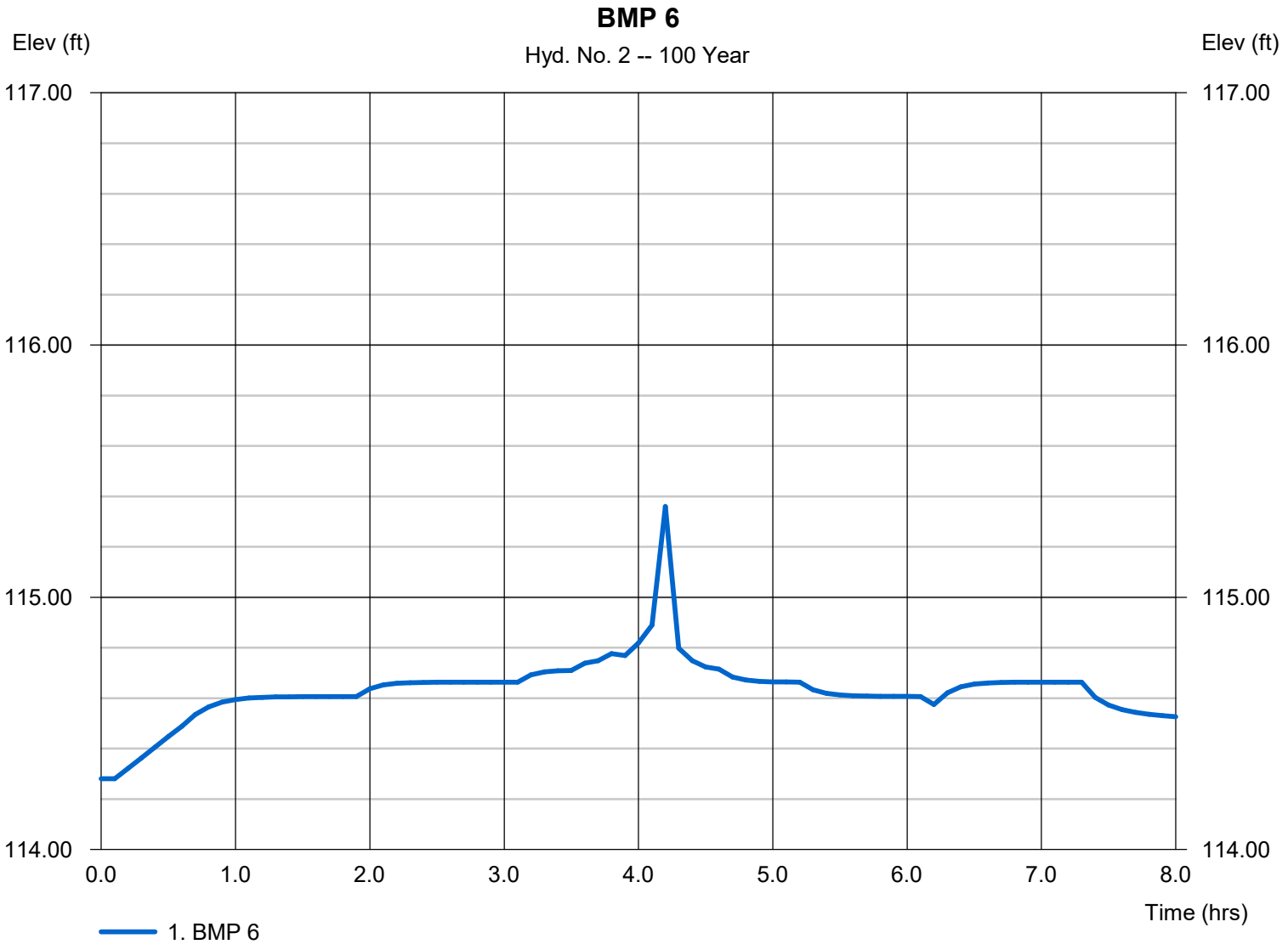
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 Wednesday, 09 / 5 / 2018

Hyd. No. 2

BMP 6

Hydrograph type	= Reservoir	Peak discharge	= 2.503 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.10 hrs
Time interval	= 6 min	Hyd. volume	= 6,674 cuft
Inflow hyd. No.	= 1 - Hydrograph 6	Max. Elevation	= 115.36 ft
Reservoir name	= BMP 6	Max. Storage	= 784 cuft

Storage Indication method used.



Pond Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2018 by Autodesk, Inc. v12 — Wednesday, 09 / 5 / 2018

Pond No. 1 - BMP 6

Pond Data

UG Chambers -Invert elev. = 114.28 ft, Rise x Span = 0.22 x 10.00 ft, Barrel Len = 86.10 ft, No. Barrels = 1, Slope = 0.00%, Headers = No
Contours -User-defined contour areas. Average end area method used for volume calculation. Begining Elevation = 114.51 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	114.28	n/a	0	0
0.02	114.30	n/a	19	19
0.04	114.32	n/a	19	38
0.07	114.35	n/a	19	57
0.09	114.37	n/a	19	76
0.11	114.39	n/a	19	95
0.13	114.41	n/a	19	114
0.15	114.43	n/a	19	133
0.18	114.46	n/a	19	152
0.20	114.48	n/a	19	171
0.22	114.50	n/a	19	189
0.23	114.51	856	4	194
0.48	114.76	856	214	408
1.08	115.36	856	514	921

Culvert / Orifice Structures

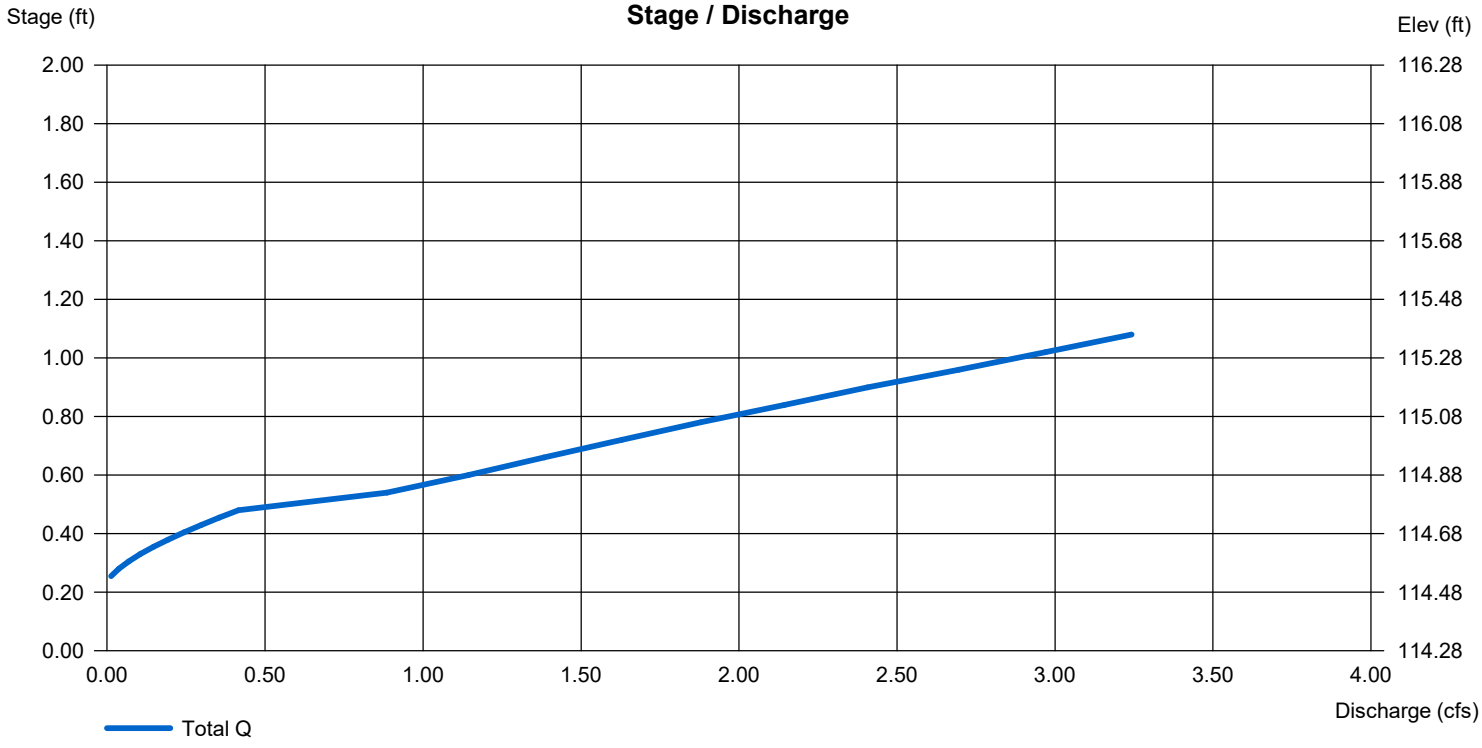
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	Inactive	0.00	0.00
Span (in)	= 6.00	0.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 114.28	0.00	0.00	0.00
Length (ft)	= 26.00	0.00	0.00	0.00
Slope (%)	= 0.50	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.33	1.00	0.00	0.00
Crest El. (ft)	= 114.76	114.51	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	No	No	No

Exfil.(in/hr) = 0.000 (by Wet area)
TW Elev. (ft) = 0.00

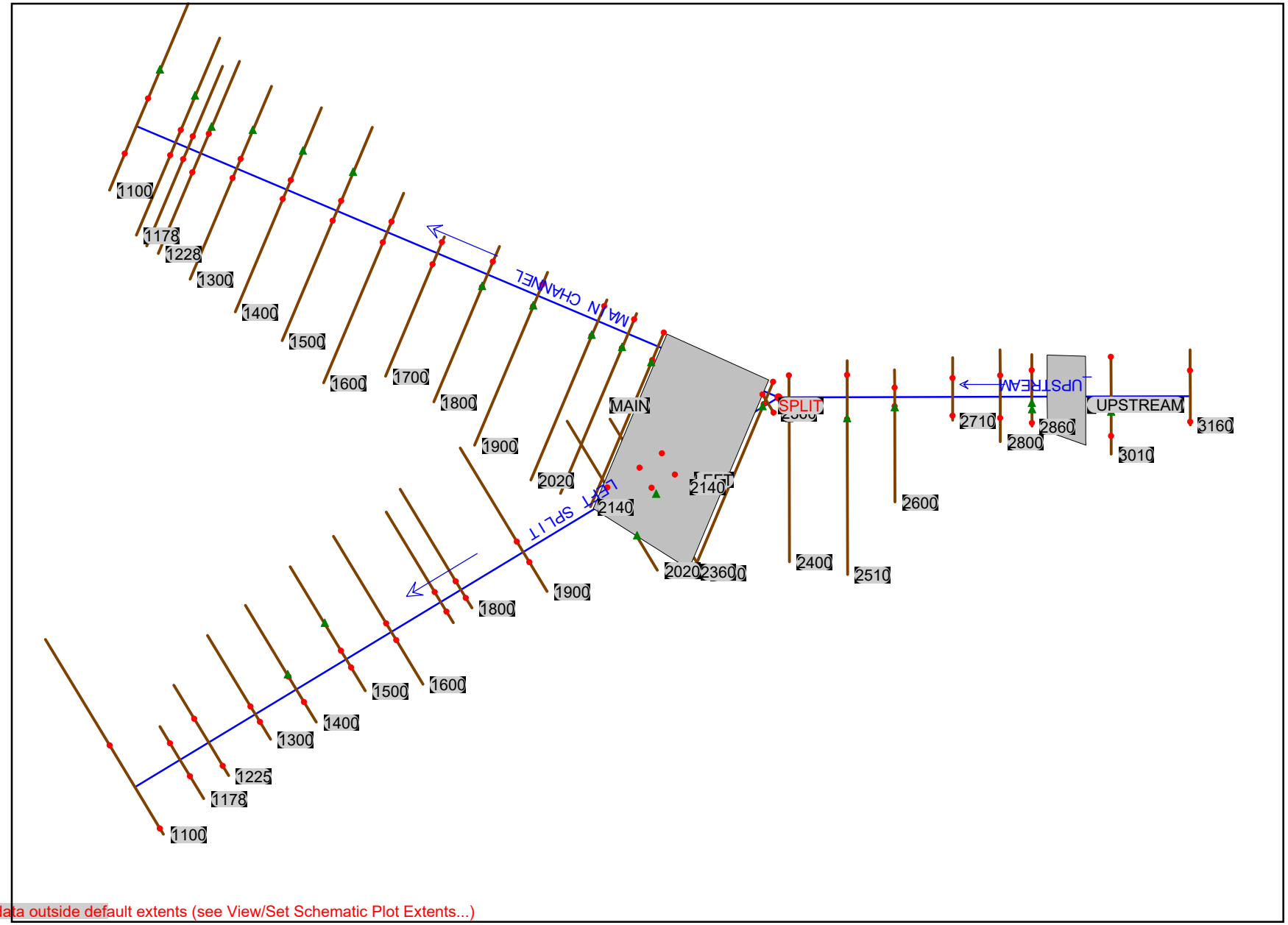
Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Appendix G

HEC RAS Analysis
Existing Conditions Results
Existing Conditions Cross Sections
Proposed Conditions (High N) Results
Proposed Conditions (High N) Cross Sections
Proposed Conditions (Low N) Results
Proposed Conditions (Low N) Cross Sections
Broad Crested Weir Calculations

Existing Conditions



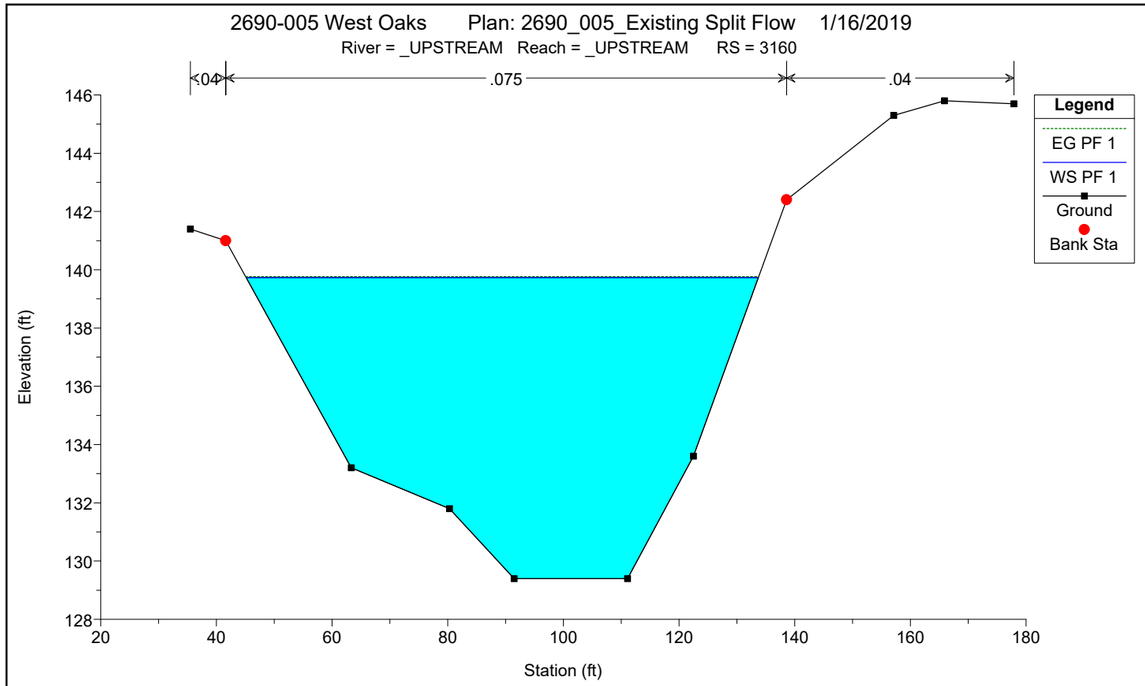
Some schematic data outside default extents (see View/Set Schematic Plot Extents...)

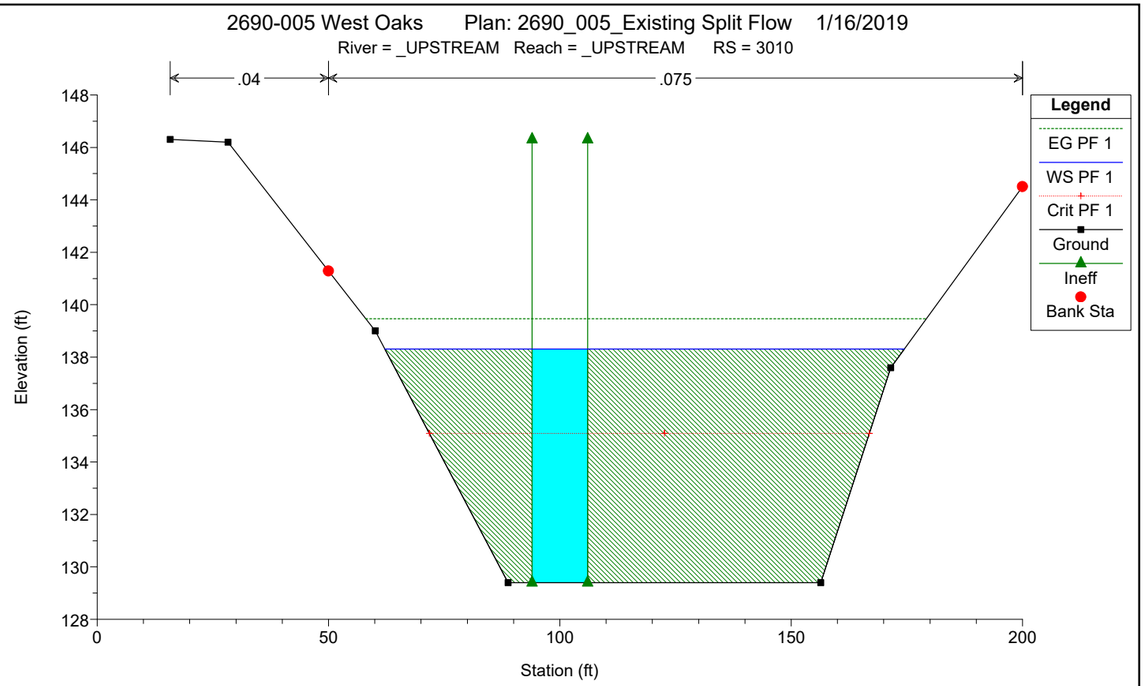
Existing Conditions

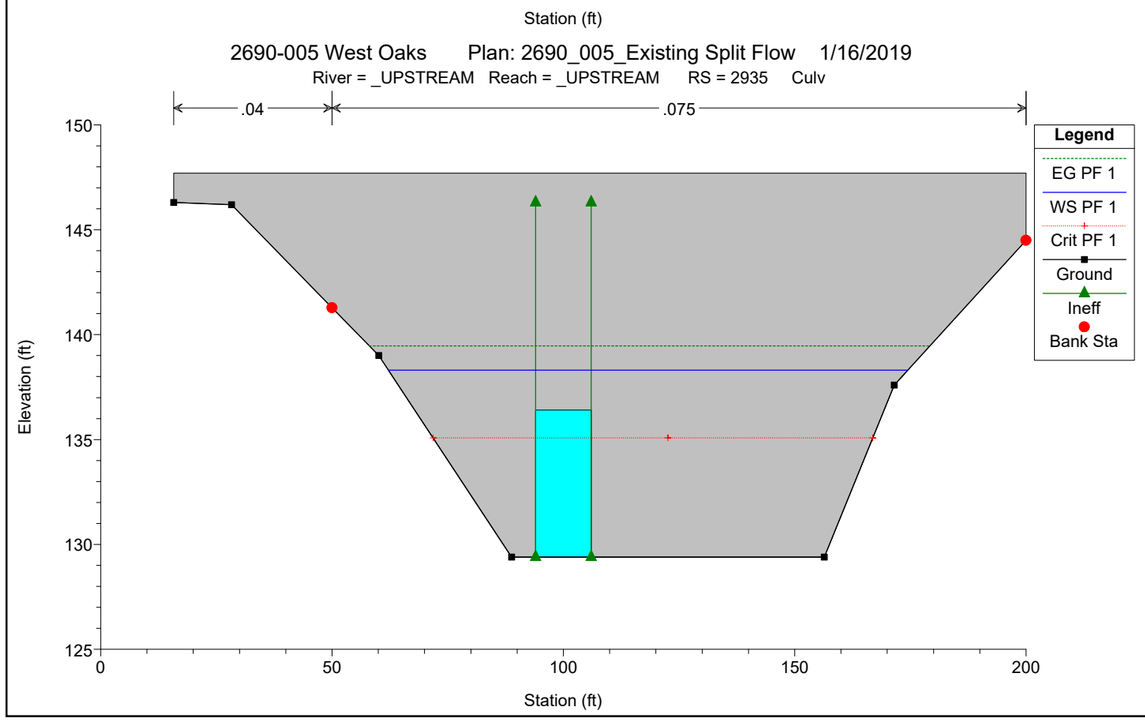
HEC-RAS Plan: ExistingSplitFlow Profile: PF 1

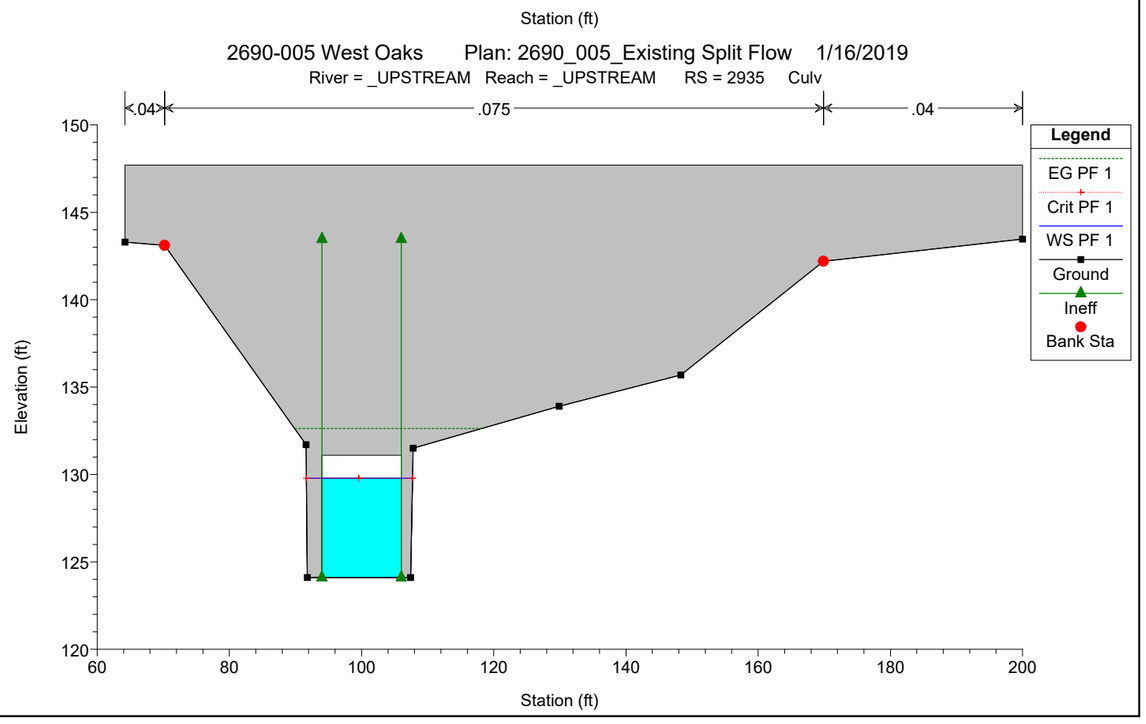
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
_UPSTREAM	_UPSTREAM	3160	PF 1	922.00	129.40	139.73		139.77	0.000457	1.50	615.19	88.58	0.10
_UPSTREAM	_UPSTREAM	3010	PF 1	922.00	129.40	138.31	135.09	139.47	0.010251	8.62	106.94	112.28	0.51
_UPSTREAM	_UPSTREAM	2935		Culvert									
_UPSTREAM	_UPSTREAM	2860	PF 1	922.00	124.10	129.78	129.78	132.62	0.046100	13.54	68.11	16.06	1.00
_UPSTREAM	_UPSTREAM	2800	PF 1	922.00	118.60	127.55		127.85	0.006642	4.38	210.47	39.08	0.33
_UPSTREAM	_UPSTREAM	2710	PF 1	922.00	118.20	126.80		127.17	0.008360	4.90	188.31	34.31	0.37
_UPSTREAM	_UPSTREAM	2600	PF 1	922.00	118.20	126.09	122.35	126.40	0.005697	4.48	206.86	213.77	0.32
_UPSTREAM	_UPSTREAM	2510	PF 1	922.00	118.10	125.47	122.36	125.80	0.007848	4.60	200.43	306.70	0.37
_UPSTREAM	_UPSTREAM	2400	PF 1	922.00	115.50	125.69	120.61	125.70	0.000027	0.77	1566.07	313.14	0.06
MAIN CHANNEL	MAIN	2360	PF 1	879.00	115.40	124.77	120.77	125.61	0.002515	7.34	120.98	331.64	0.47
MAIN CHANNEL	MAIN	2248.50		Culvert									
MAIN CHANNEL	MAIN	2140	PF 1	879.00	115.56	121.04	121.04	123.69	0.016550	13.07	67.26	241.05	1.00
MAIN CHANNEL	MAIN	2080	PF 1	879.00	113.40	118.92	118.92	121.66	0.017557	13.28	66.17	222.22	1.00
MAIN CHANNEL	MAIN	2020	PF 1	879.00	110.30	117.25	114.81	117.72	0.013088	5.50	159.78	284.84	0.47
MAIN CHANNEL	MAIN	1900	PF 1	879.00	109.90	114.10		115.10	0.041156	8.02	109.66	240.68	0.82
MAIN CHANNEL	MAIN	1800	PF 1	879.00	109.60	114.33	113.69	114.39	0.001532	1.55	465.70	251.48	0.16
MAIN CHANNEL	MAIN	1700	PF 1	879.00	108.30	112.78		113.00	0.012821	4.26	232.56	221.08	0.45
MAIN CHANNEL	MAIN	1600	PF 1	879.00	107.30	112.06		112.18	0.005399	2.71	309.35	231.71	0.29
MAIN CHANNEL	MAIN	1500	PF 1	879.00	106.40	111.53	111.01	111.66	0.005210	2.79	312.16	236.91	0.29
MAIN CHANNEL	MAIN	1400	PF 1	879.00	105.90	111.02	110.40	111.14	0.005135	2.87	313.27	285.49	0.29
MAIN CHANNEL	MAIN	1300	PF 1	879.00	105.60	110.40	109.86	110.55	0.006569	3.10	282.49	282.53	0.33
MAIN CHANNEL	MAIN	1228	PF 1	879.00	105.40	109.09	109.09	109.58	0.040563	5.81	164.30	228.65	0.77
MAIN CHANNEL	MAIN	1203	PF 1	879.00	105.20	107.85		108.13	0.013709	3.20	213.48	179.30	0.44
MAIN CHANNEL	MAIN	1178	PF 1	879.00	104.80	107.10	107.10	107.59	0.036678	4.50	161.28	172.47	0.70
MAIN CHANNEL	MAIN	1100	PF 1	879.00	101.50	104.70	104.01	105.02	0.020031	4.55	196.50	114.91	0.55
LEFT SPLIT	LEFT	2360	PF 1	43.00	120.70	121.26	121.26	121.45	0.006535	3.44	12.50	34.89	1.01
LEFT SPLIT	LEFT	2140	PF 1	43.00	116.80	117.11	117.11	117.31	0.021914	3.57	11.86	29.89	1.60
LEFT SPLIT	LEFT	2080	PF 1	43.00	116.00	116.57	116.57	116.73	0.006387	3.28	13.19	102.13	0.99
LEFT SPLIT	LEFT	2020	PF 1	43.00	114.60	115.20	115.20	115.37	0.006220	3.29	13.41	56.10	0.98
LEFT SPLIT	LEFT	1900	PF 1	43.00	111.80	112.24	112.24	112.43	0.006357	3.42	12.58	34.98	1.01
LEFT SPLIT	LEFT	1800	PF 1	43.00	110.70	111.26	111.25	111.45	0.005799	3.42	12.64	33.49	0.97
LEFT SPLIT	LEFT	1700	PF 1	43.00	110.60	111.03	111.03	111.21	0.006352	3.43	12.56	34.89	1.01
LEFT SPLIT	LEFT	1600	PF 1	43.00	110.10	110.59		110.62	0.001607	1.69	32.27	64.99	0.50
LEFT SPLIT	LEFT	1500	PF 1	43.00	109.70	110.19	110.19	110.36	0.005629	3.36	13.77	44.87	0.95
LEFT SPLIT	LEFT	1400	PF 1	43.00	109.10	109.70	109.58	109.78	0.002527	2.31	18.59	46.45	0.64
LEFT SPLIT	LEFT	1300	PF 1	43.00	108.80	109.28	109.28	109.45	0.007731	3.58	15.69	52.36	1.10
LEFT SPLIT	LEFT	1225	PF 1	43.00	106.80	107.49		107.57	0.009055	2.25	19.11	37.60	0.56
LEFT SPLIT	LEFT	1178	PF 1	43.00	105.50	106.22		106.30	0.141241	2.10	20.02	48.09	0.57
LEFT SPLIT	LEFT	1100	PF 1	43.00	101.50	102.60	102.04	102.62	0.020004	1.18	36.12	46.97	0.24

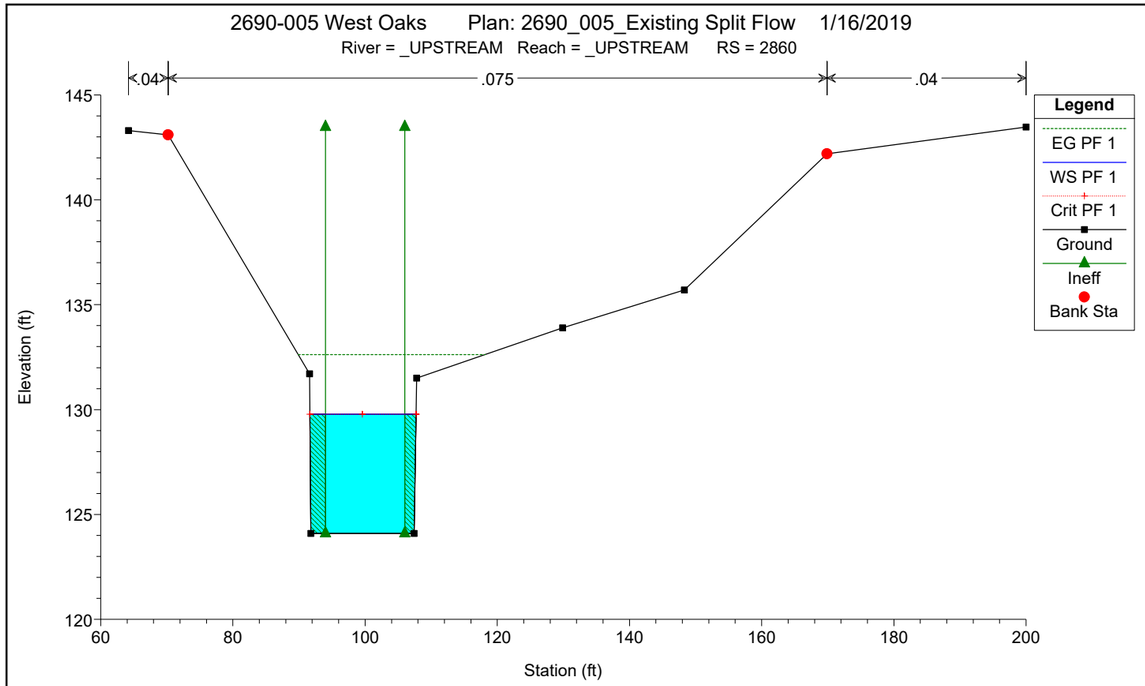
Existing Conditions

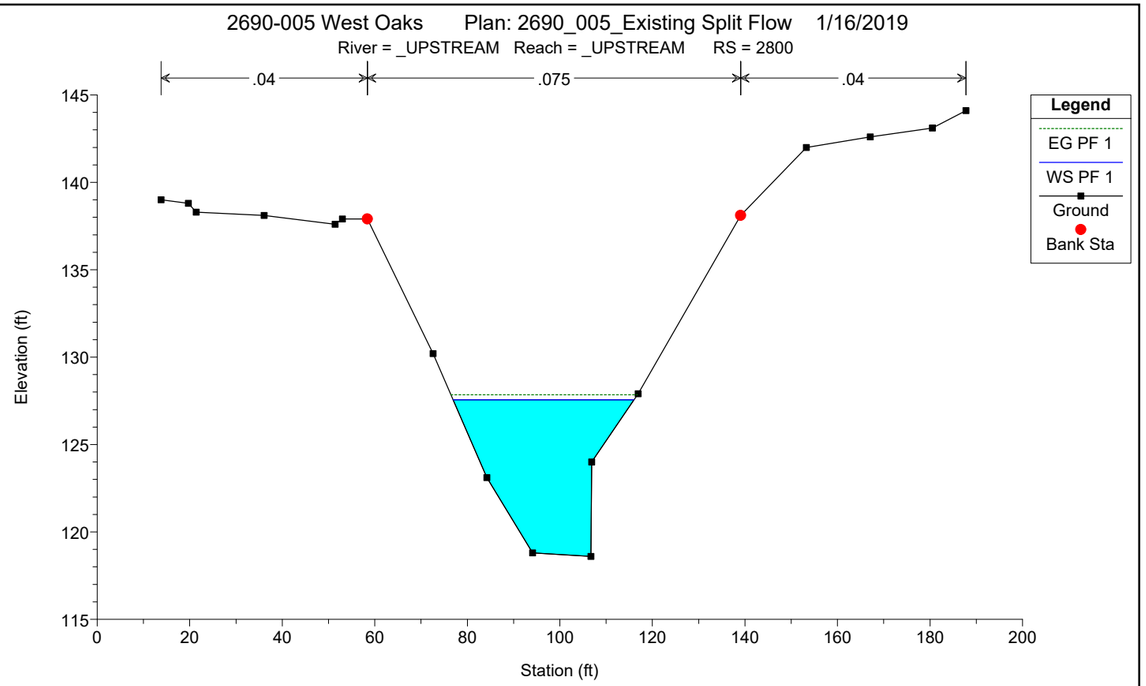


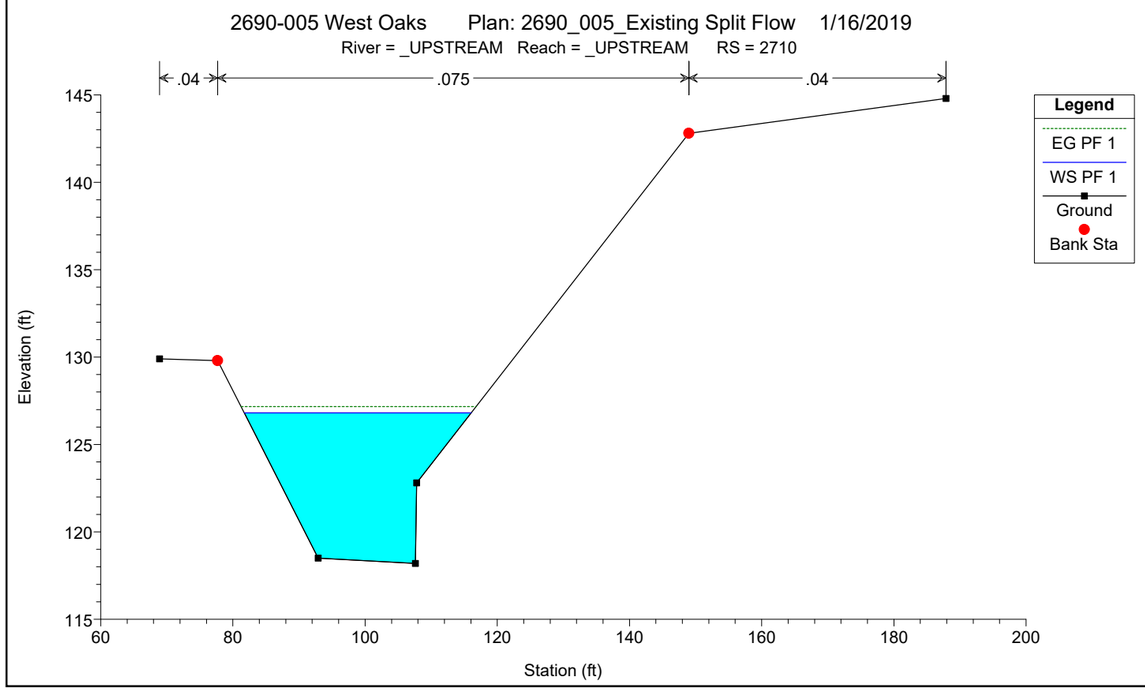


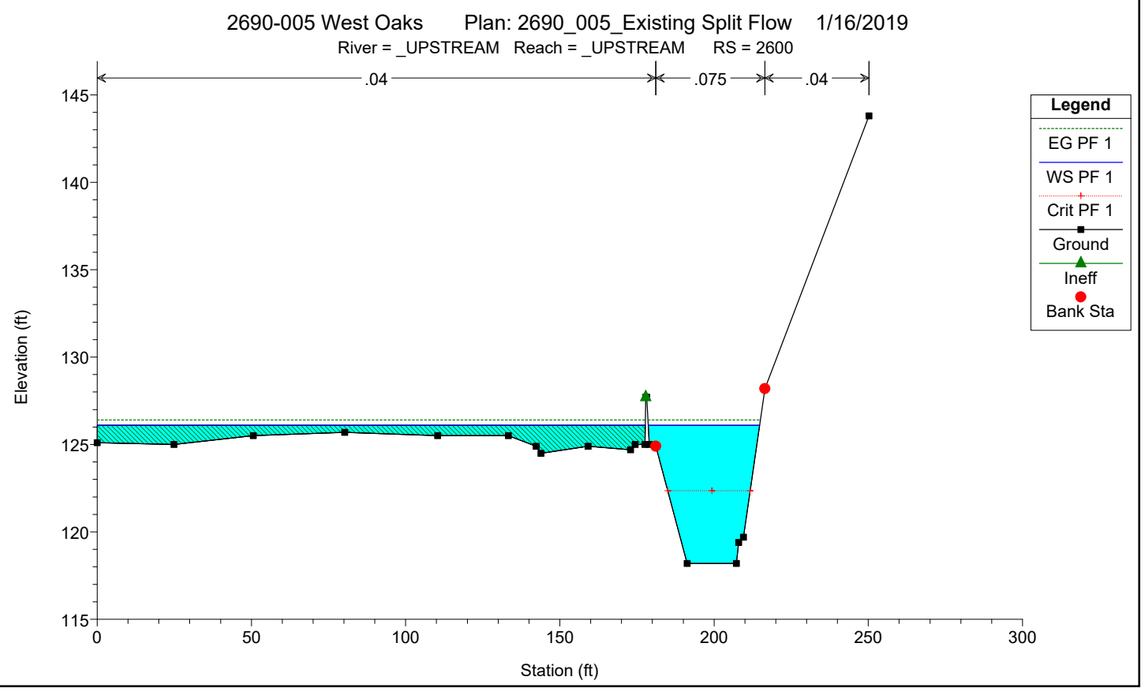


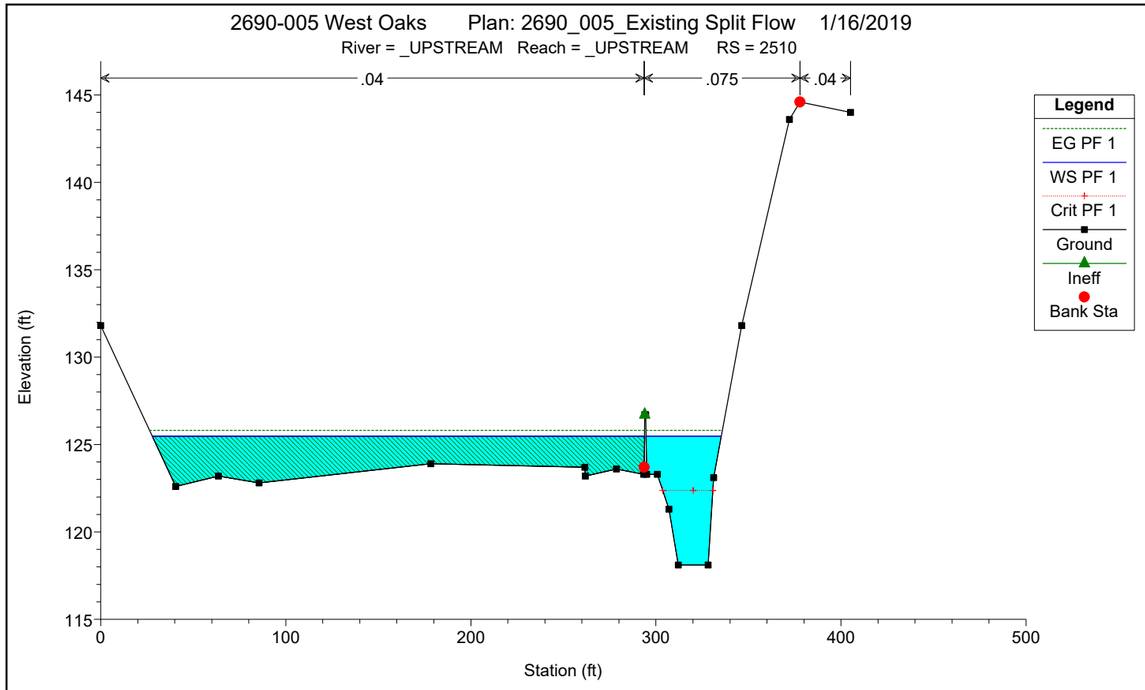


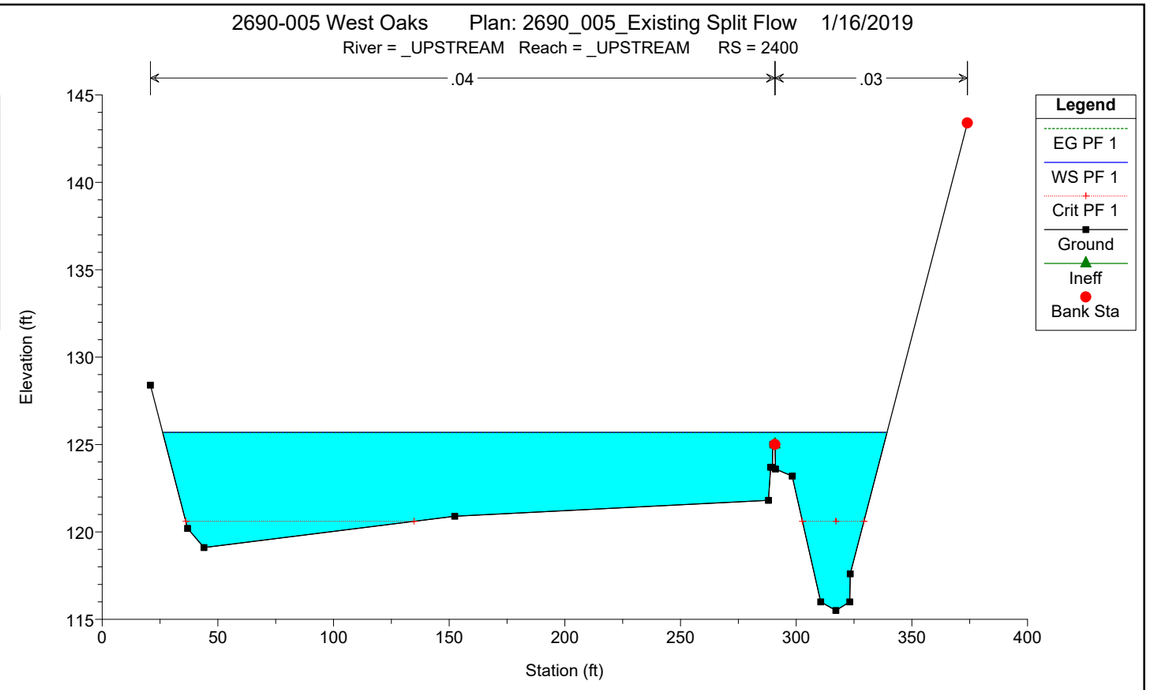

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2860
.04
.075
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

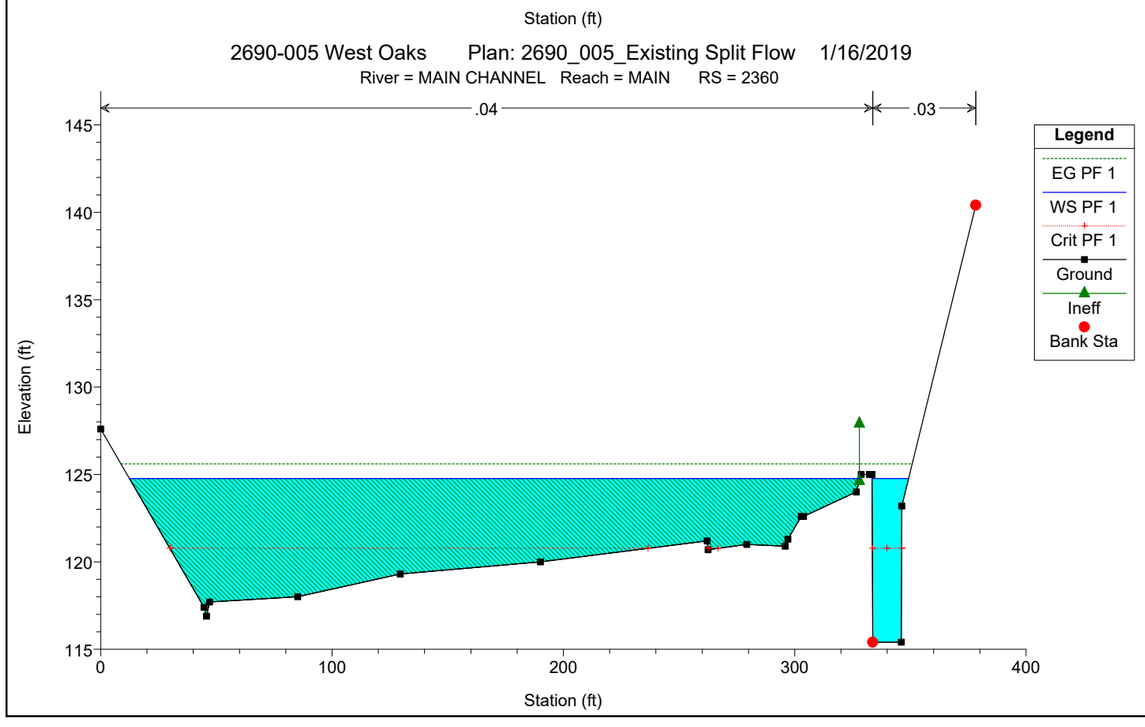

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2800
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

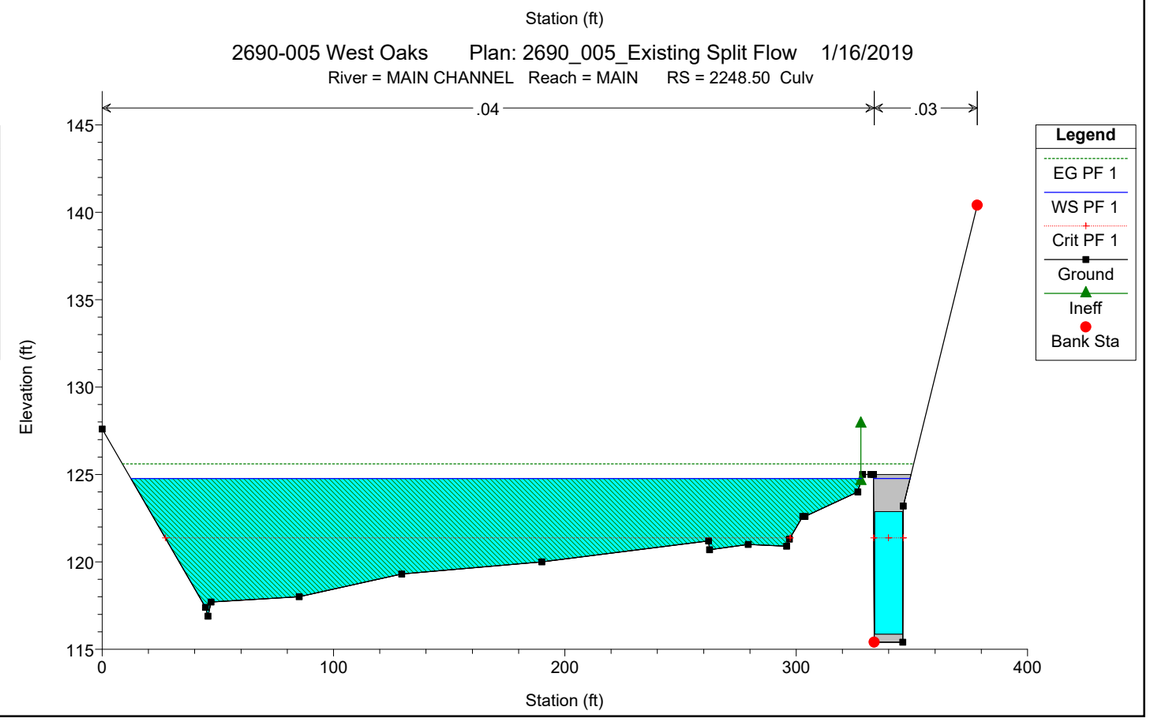

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2710
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2600
.04
.075
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2510
.04
.075
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

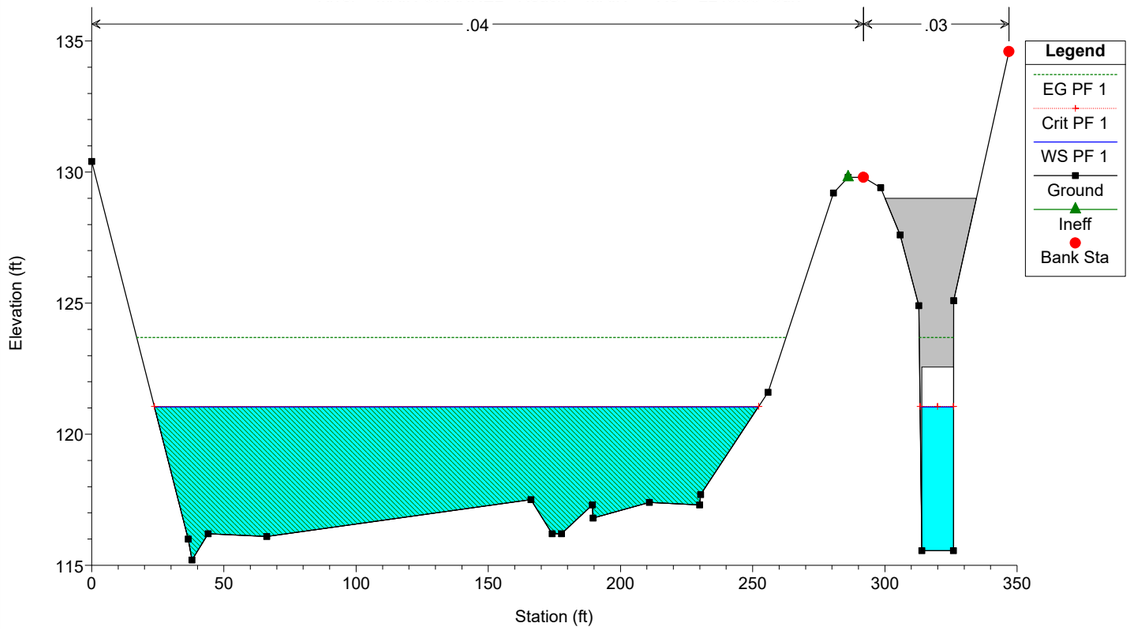

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2400
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2360
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

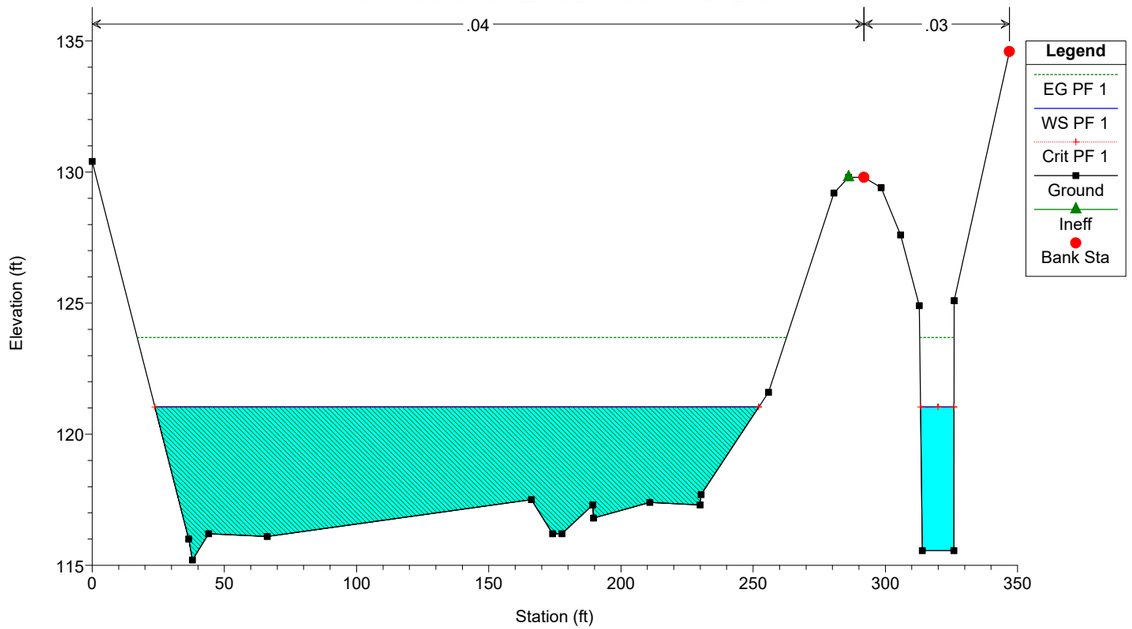
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv



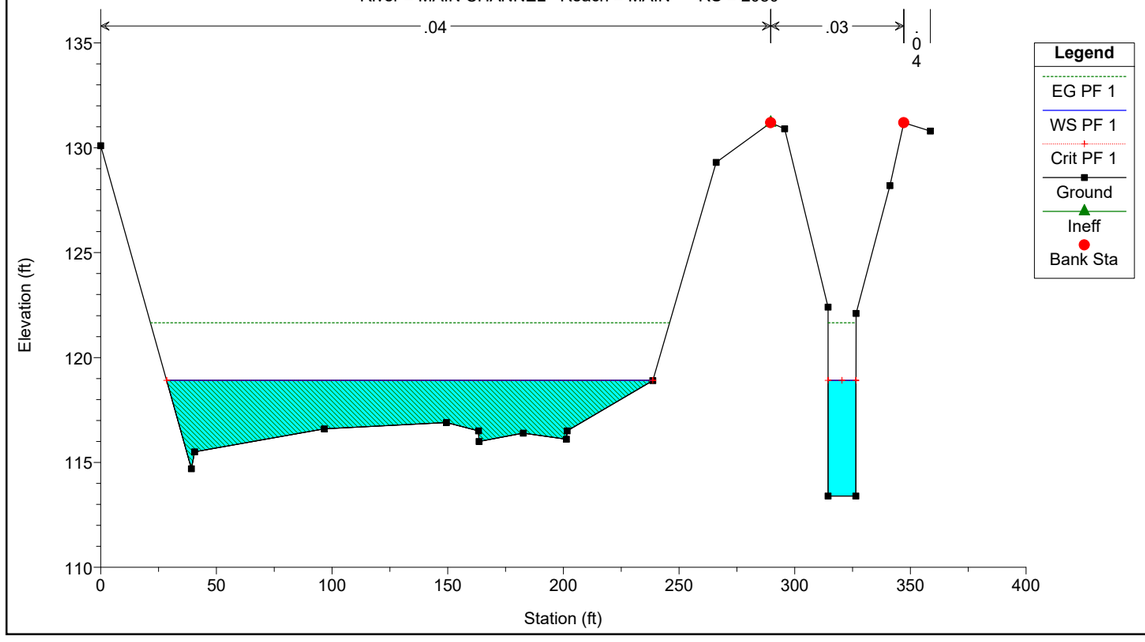
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2140



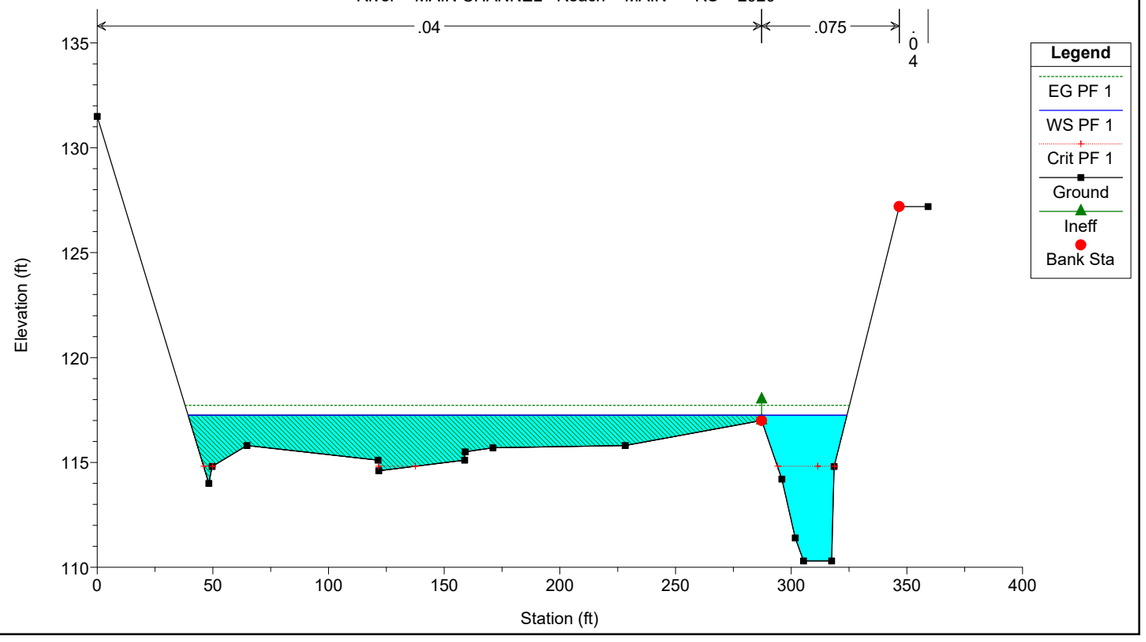
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

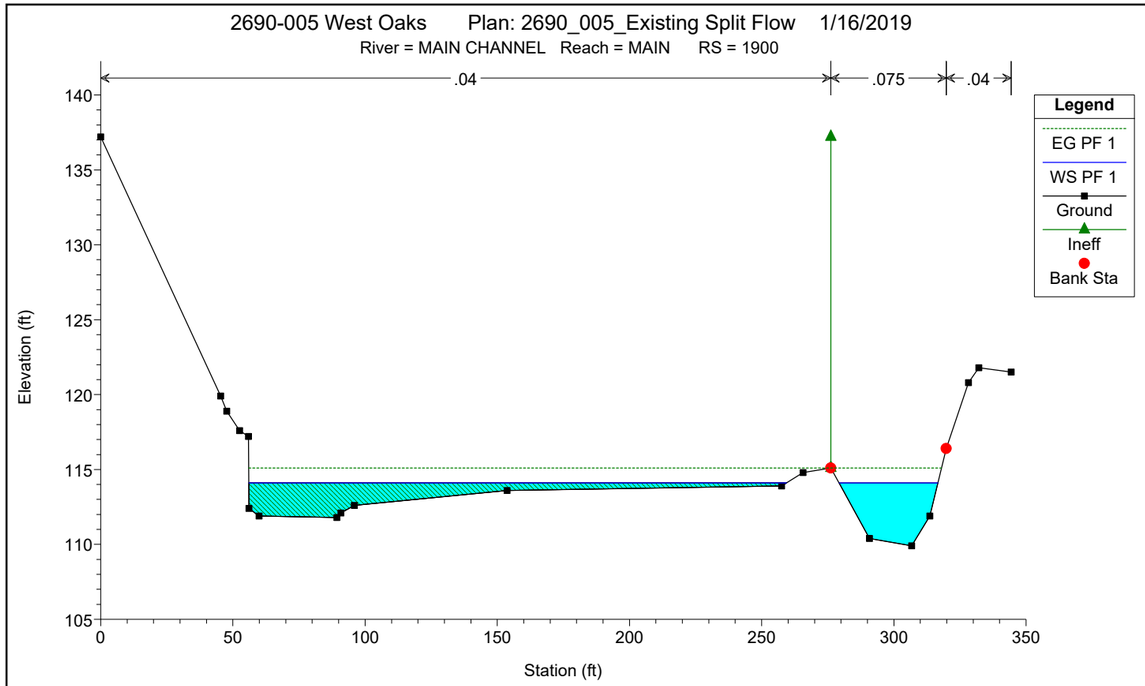
River = MAIN CHANNEL Reach = MAIN RS = 2080

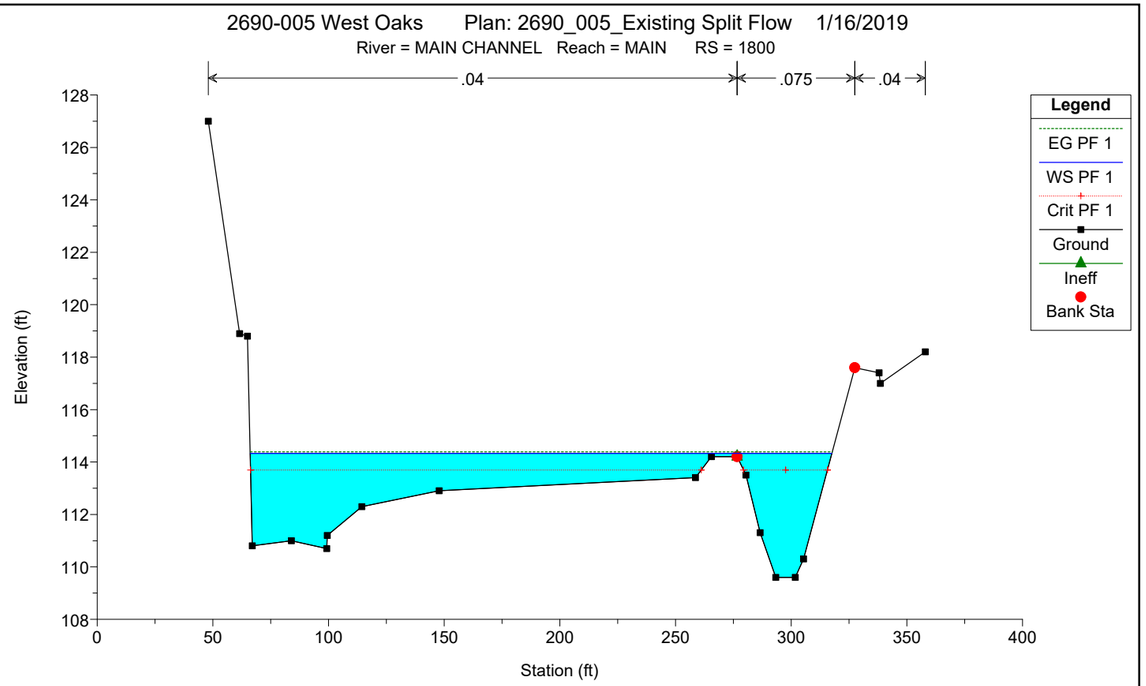


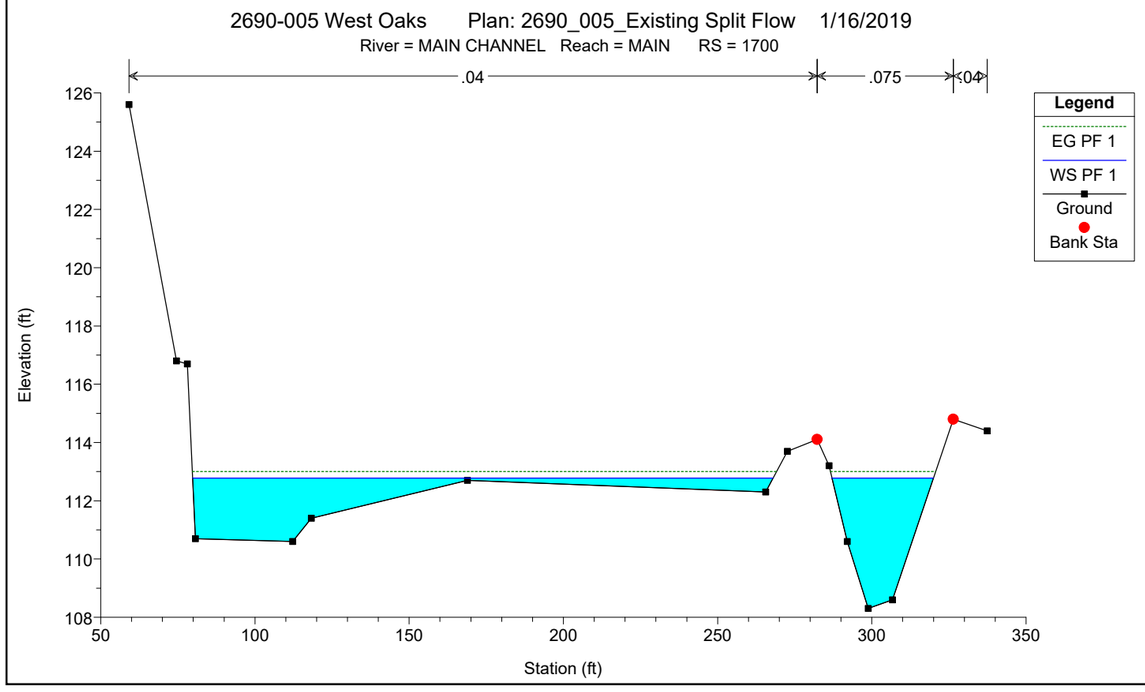
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

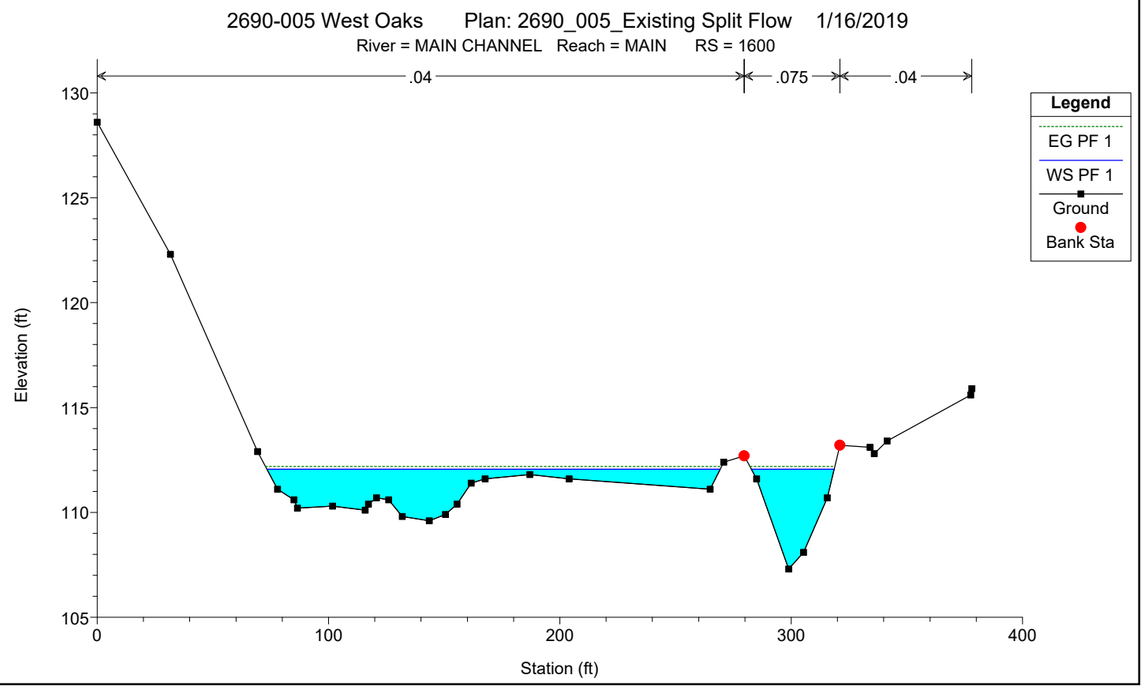
River = MAIN CHANNEL Reach = MAIN RS = 2020

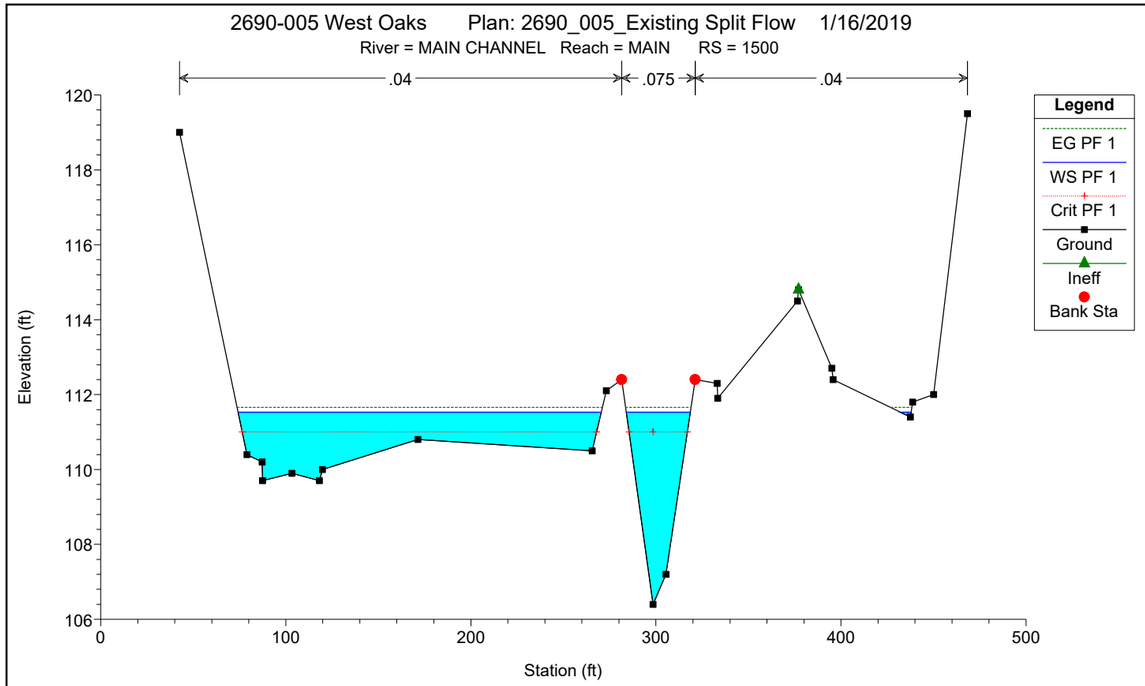


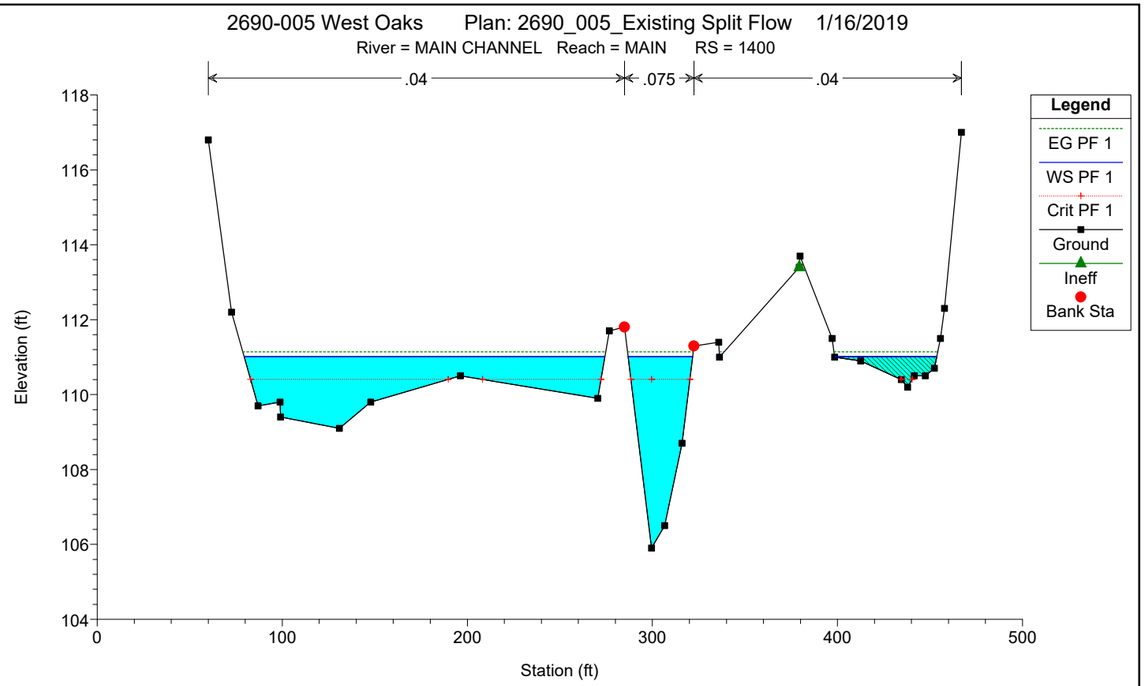

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1900
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

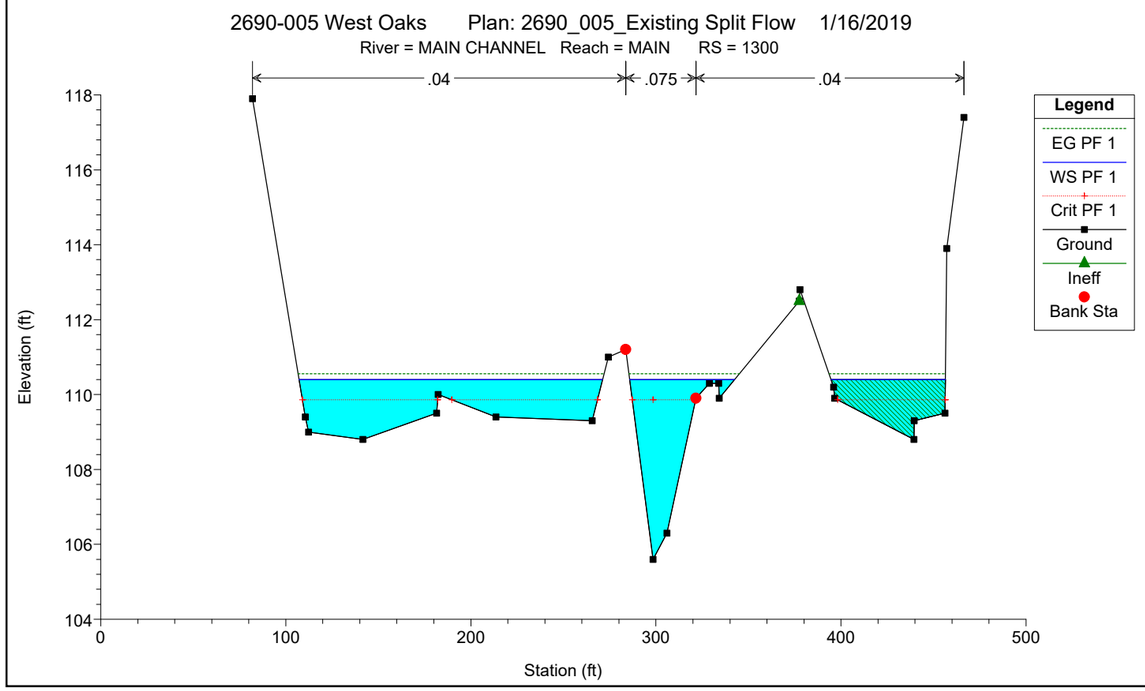

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1800
.04
.075
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

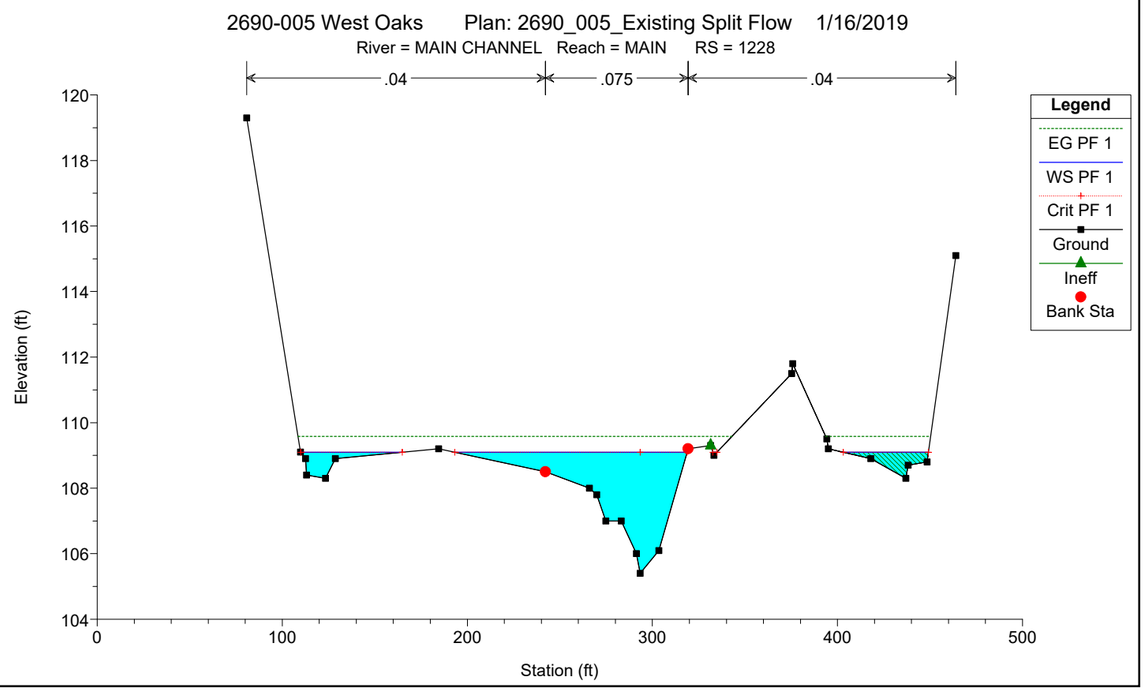

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1700
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

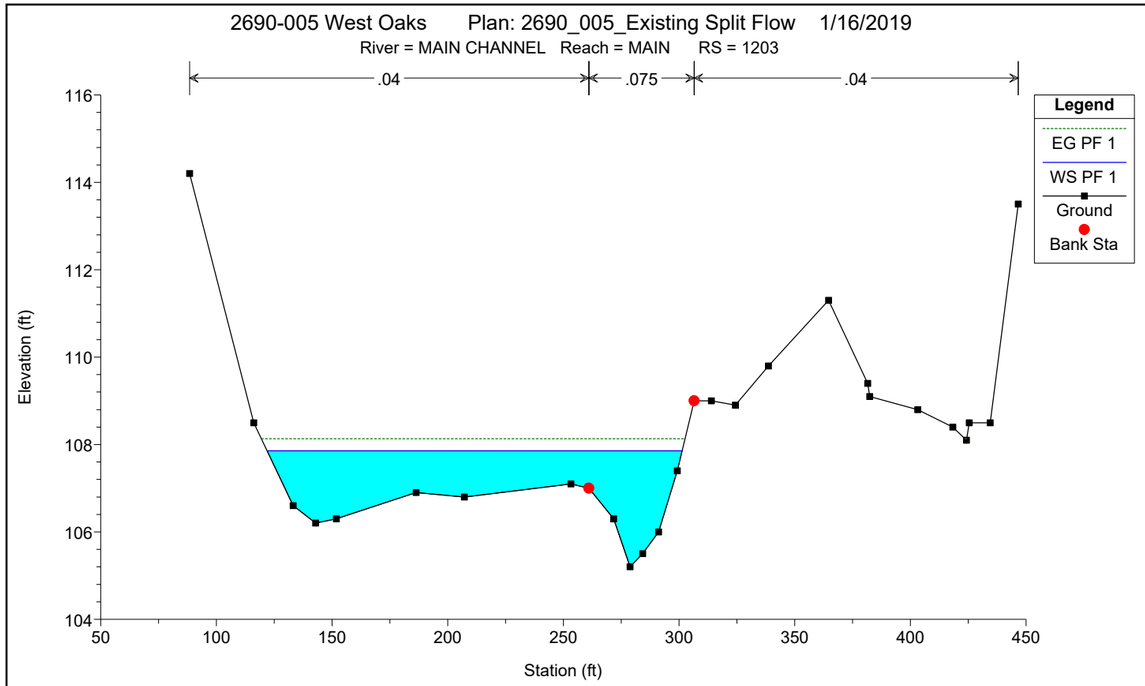

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1600
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

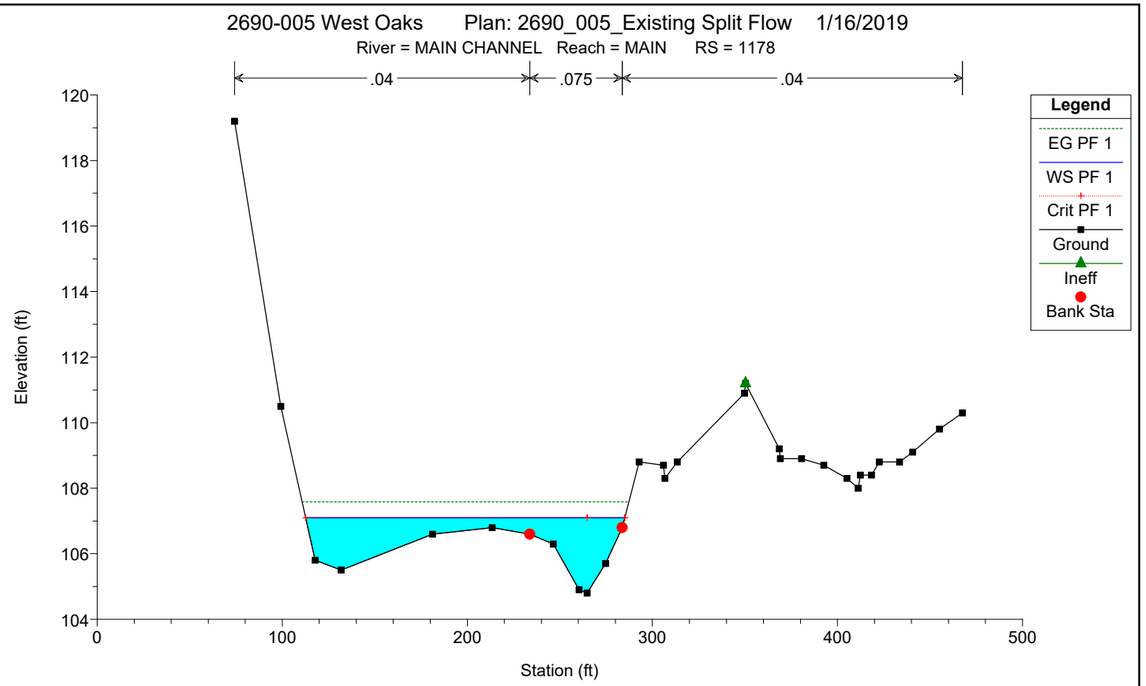

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1500
.04
.075
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

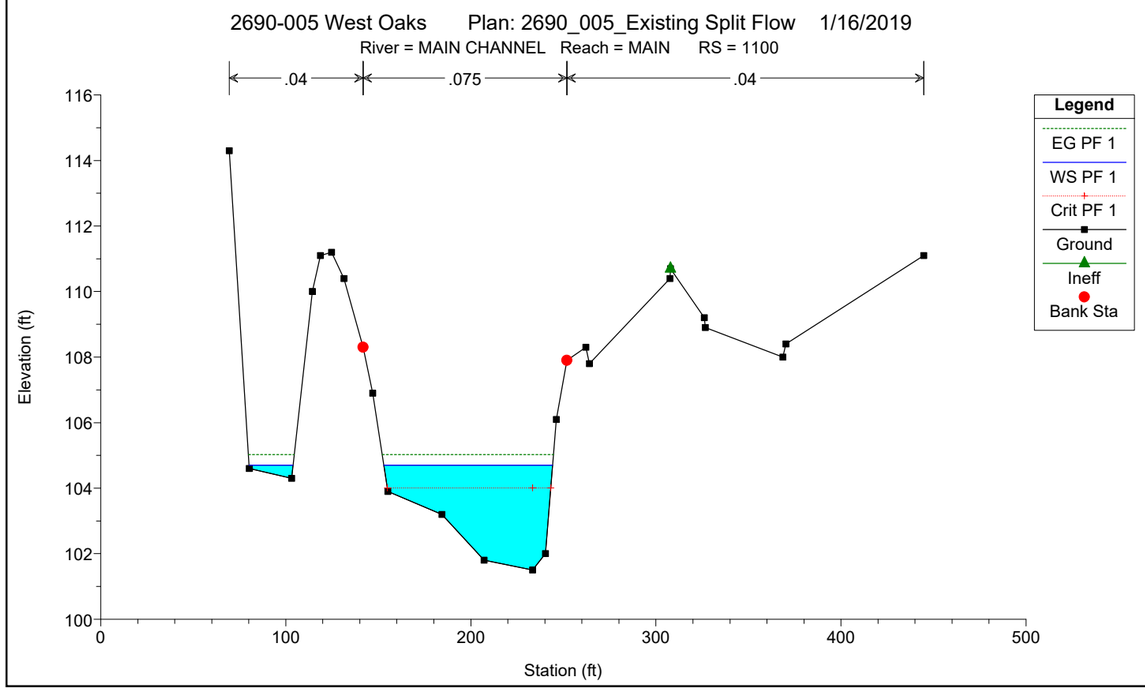

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1400
.04
.075
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

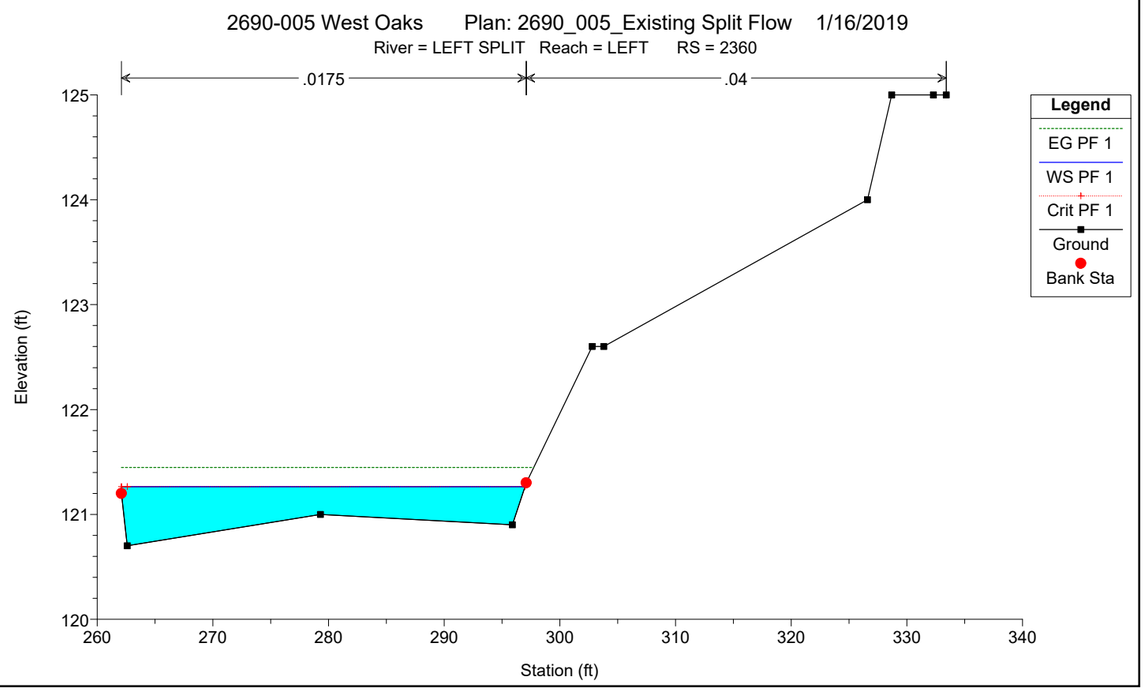

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1300
.04
.075
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1228
.04
.075
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1203
.04
.075
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

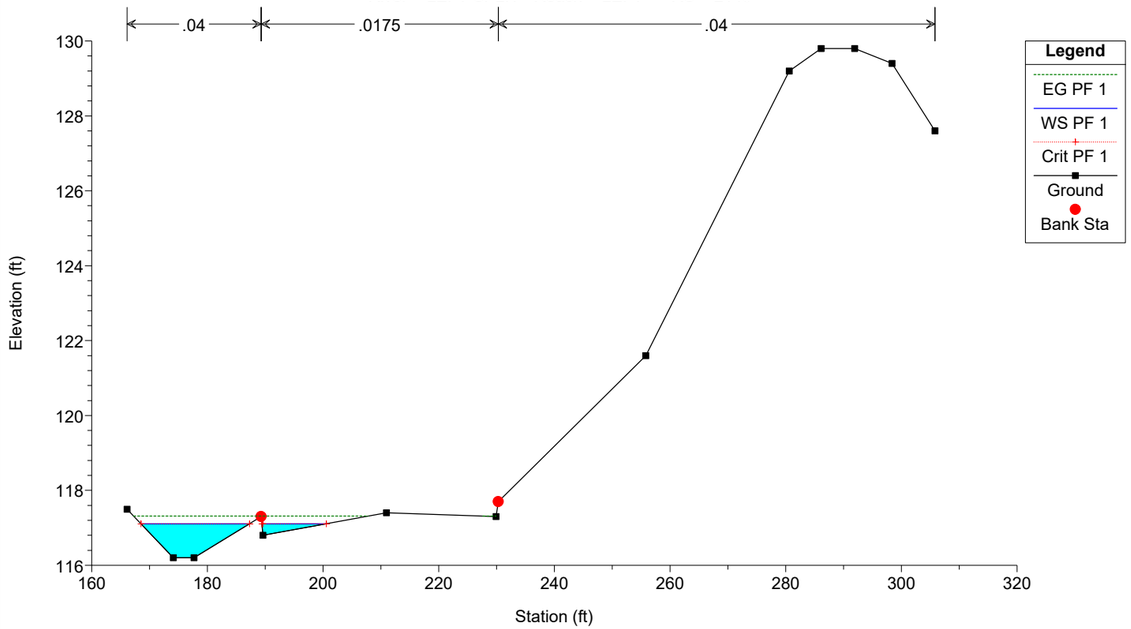

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1178
.04
.075
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1100
.04
.075
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 2360
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

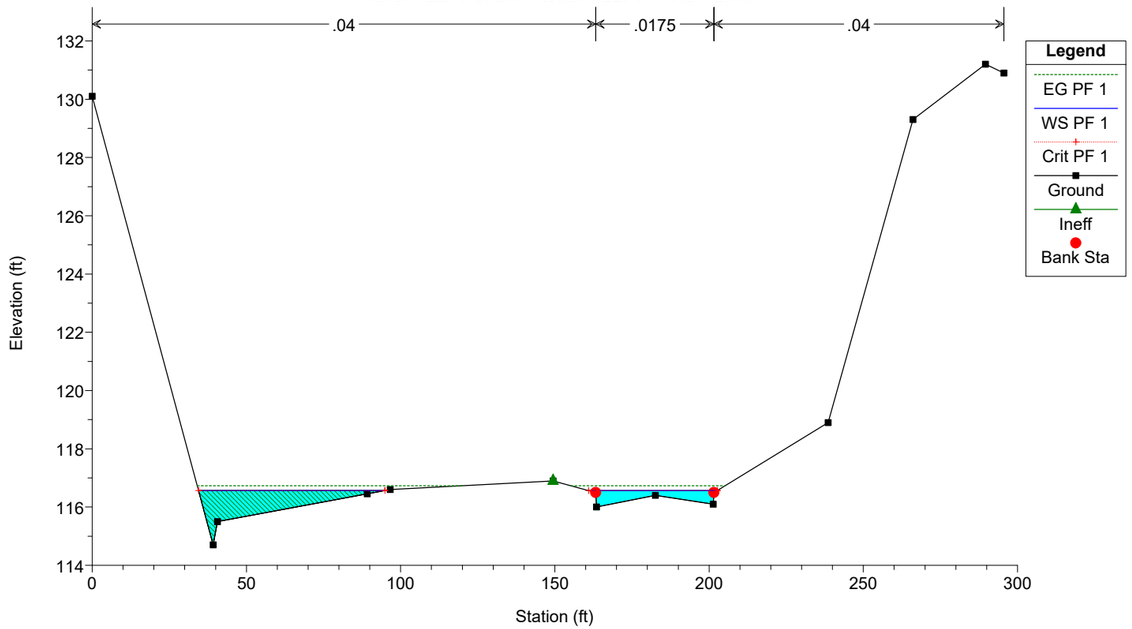
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2140



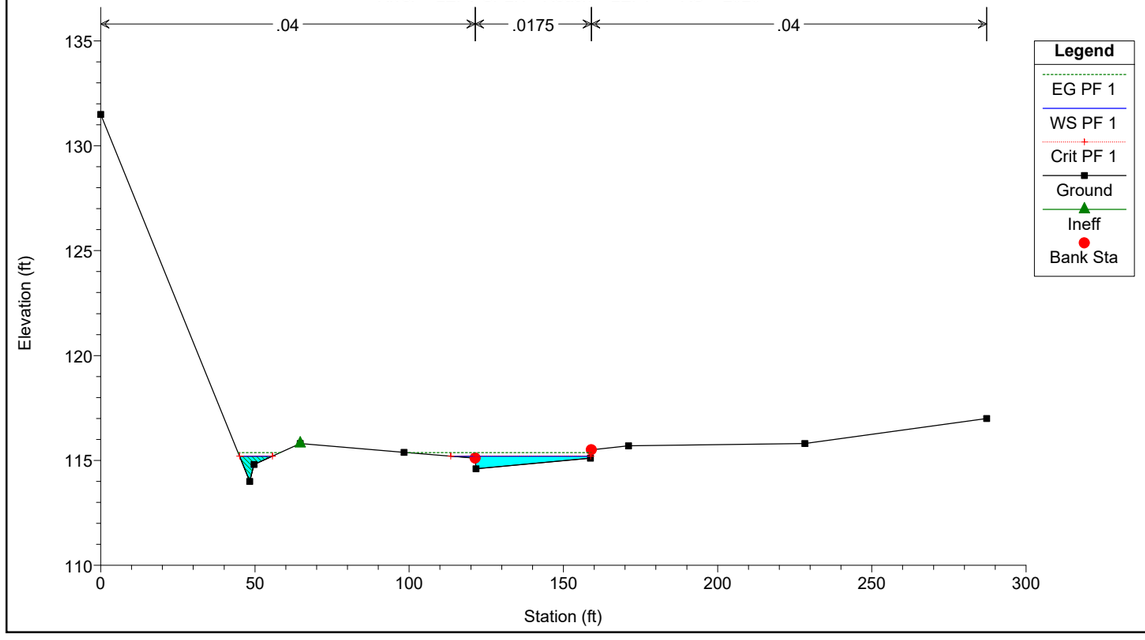
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2080



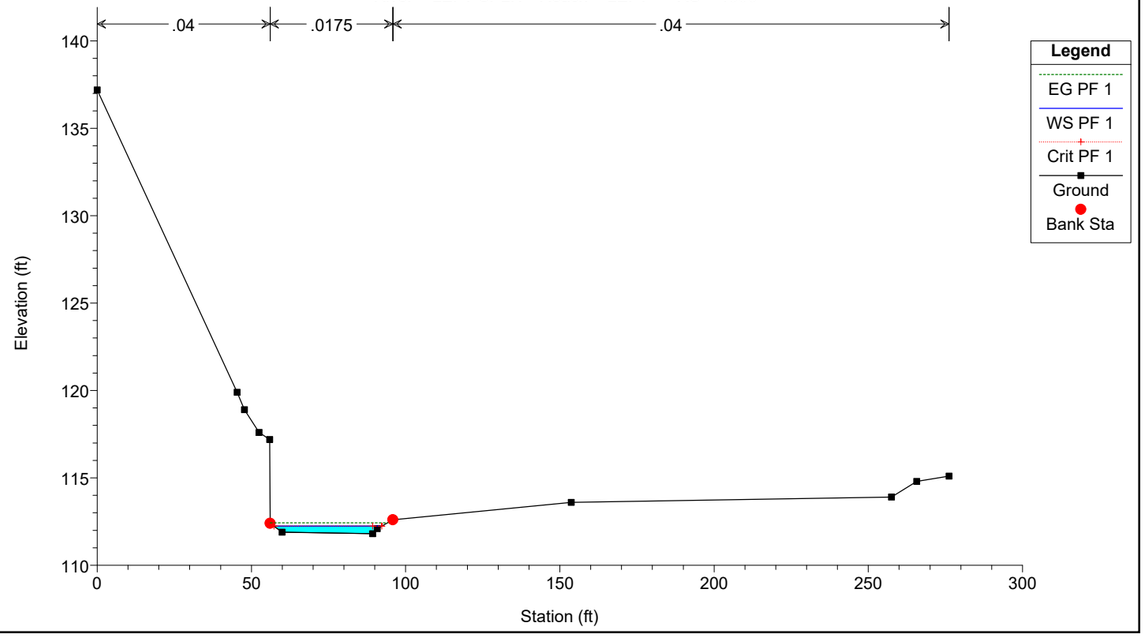
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

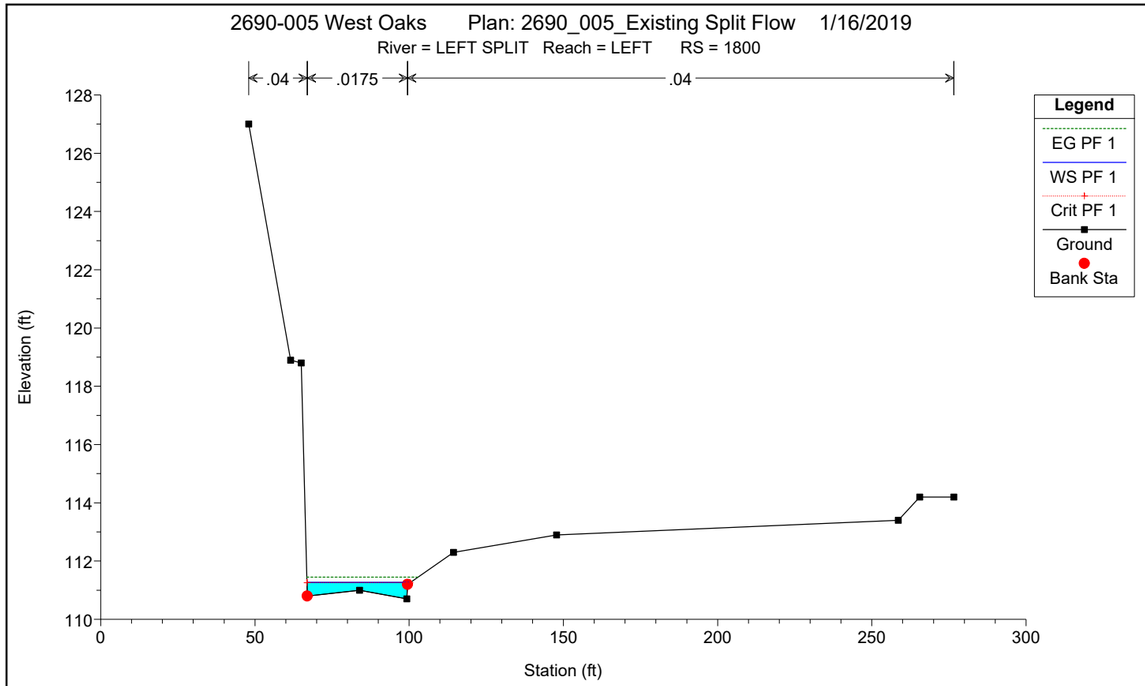
River = LEFT SPLIT Reach = LEFT RS = 2020

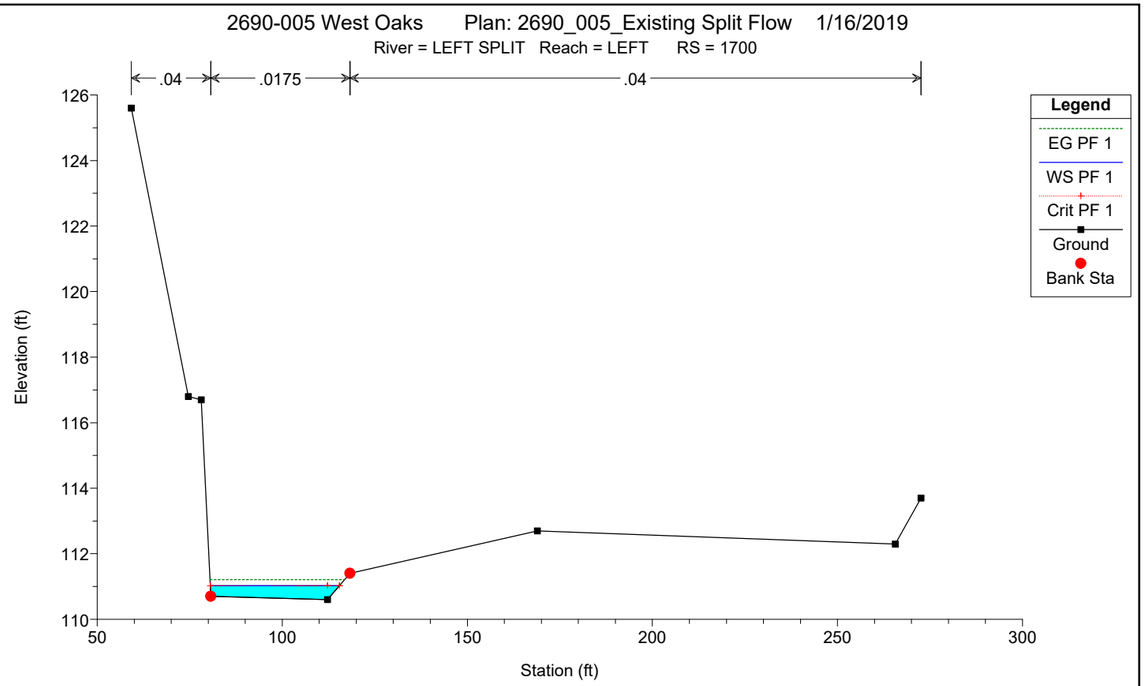


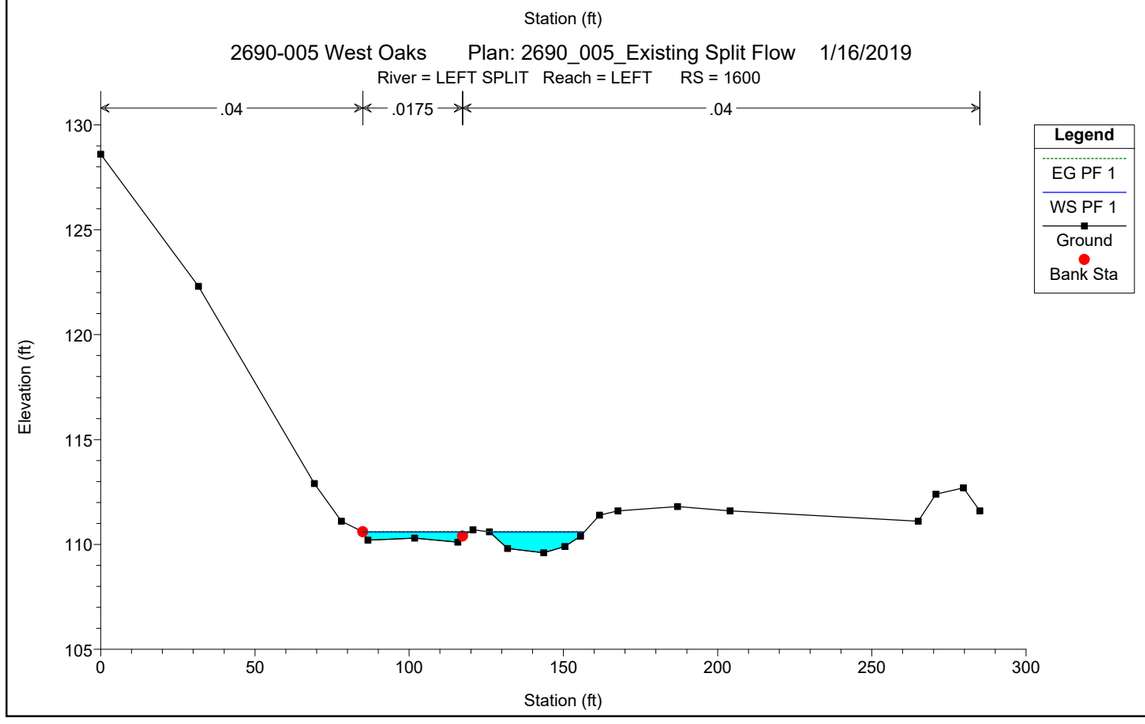
2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019

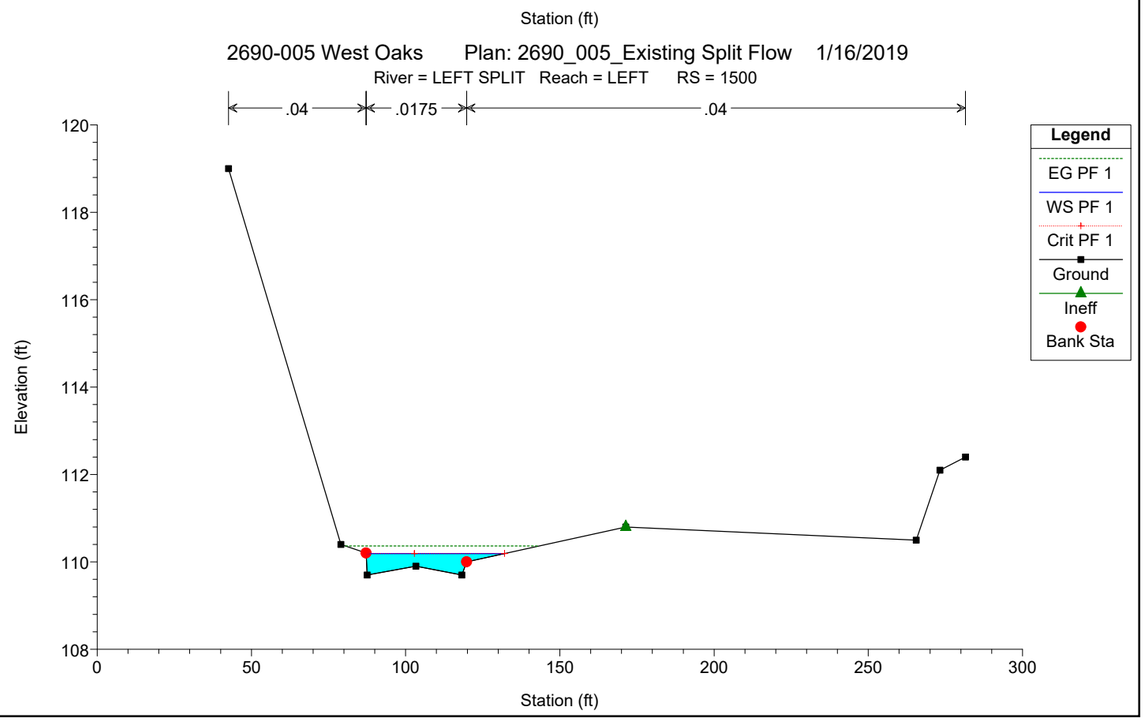
River = LEFT SPLIT Reach = LEFT RS = 1900

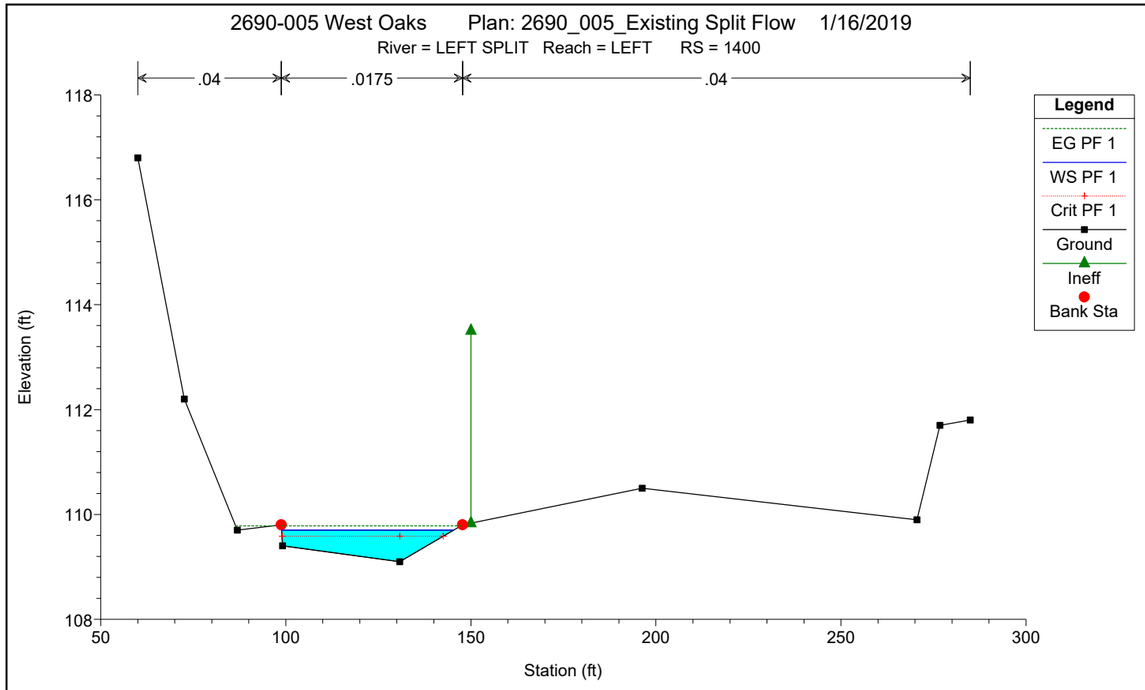


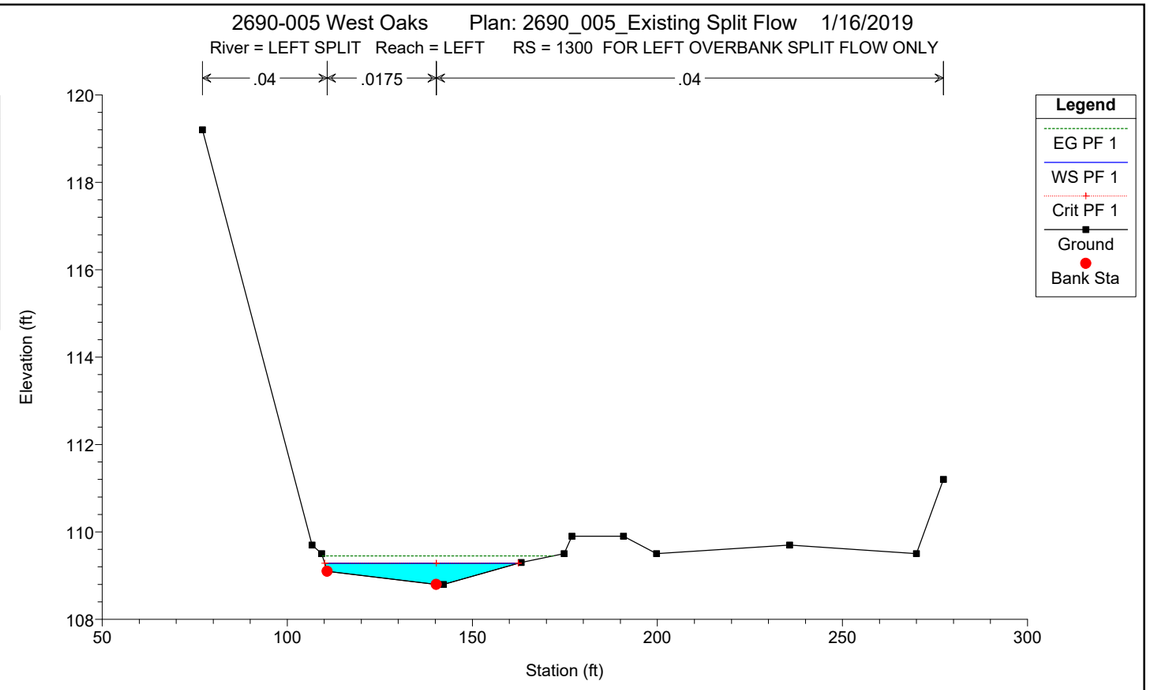

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1800
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

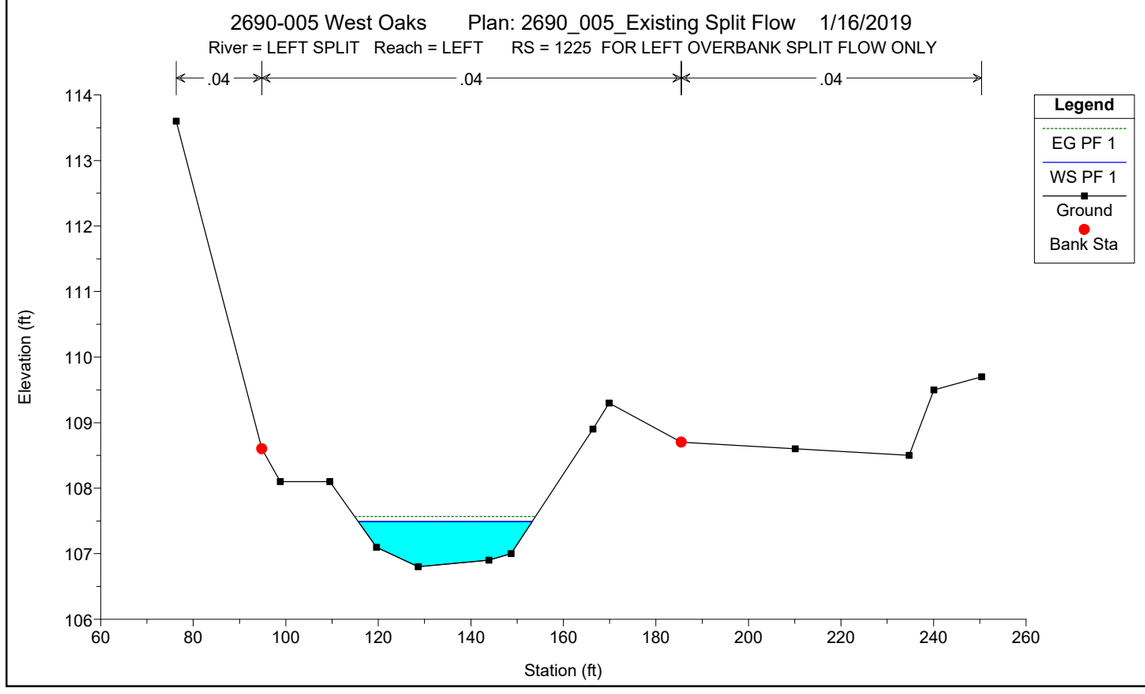

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1700
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

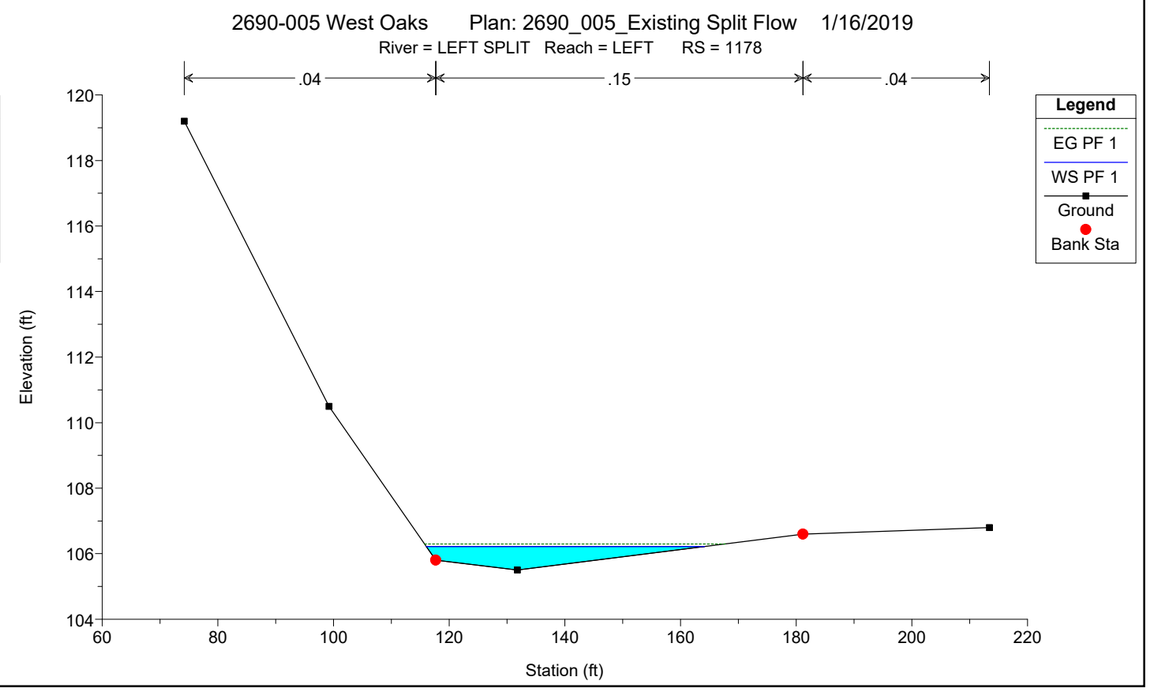

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1600
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

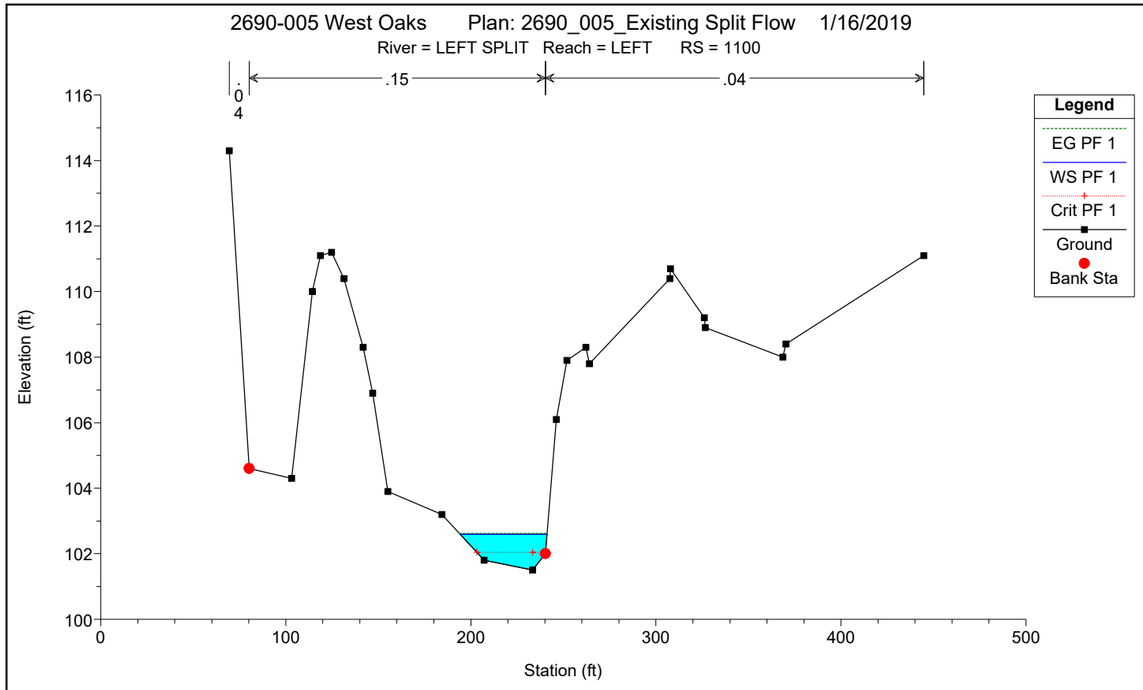

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1500
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1400
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

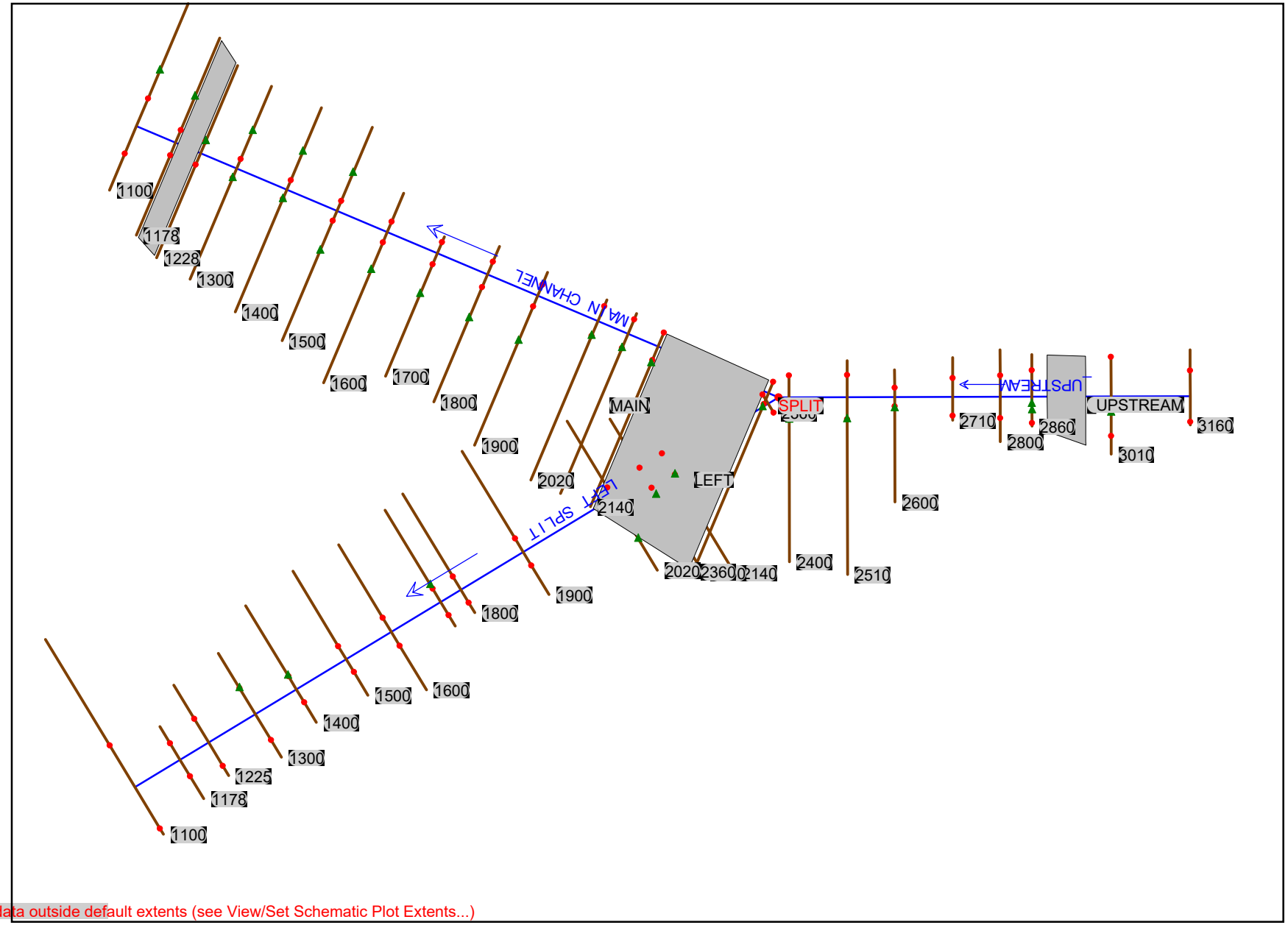

2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1300 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1225 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1178
.04
.15
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Existing Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1100
.15
.04
0
4
Elevation (ft)
Station (ft)
116
114
112
110
108
106
104
102
100
0
100
200
300
400
500
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

Proposed Conditions



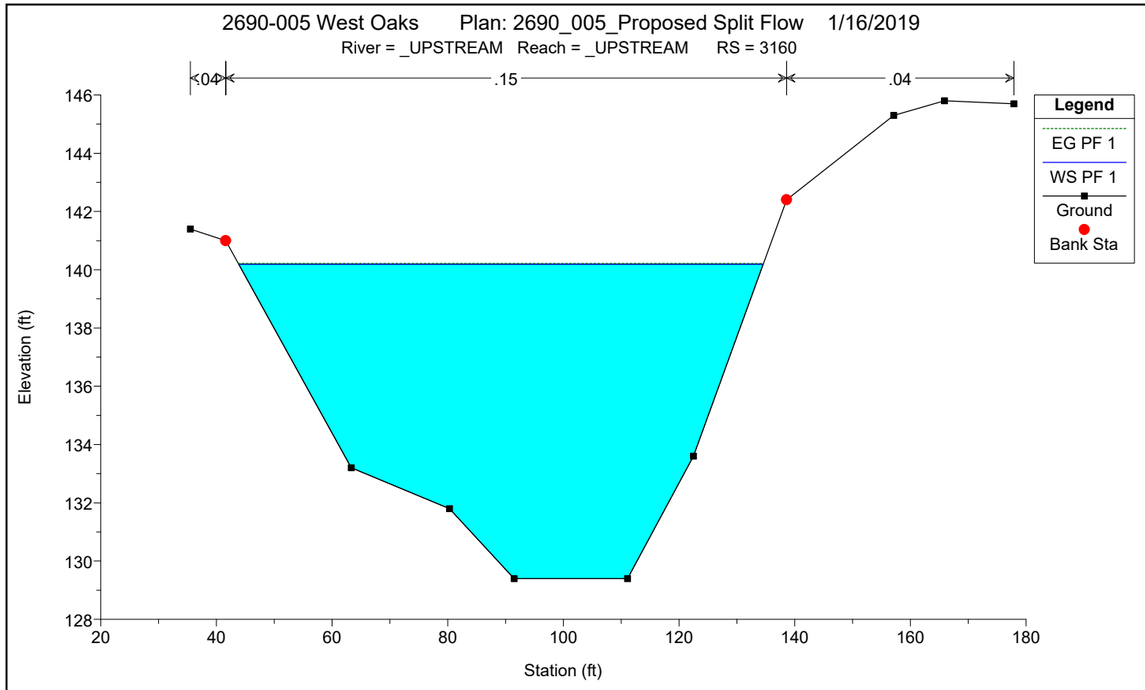
Some schematic data outside default extents (see View/Set Schematic Plot Extents...)

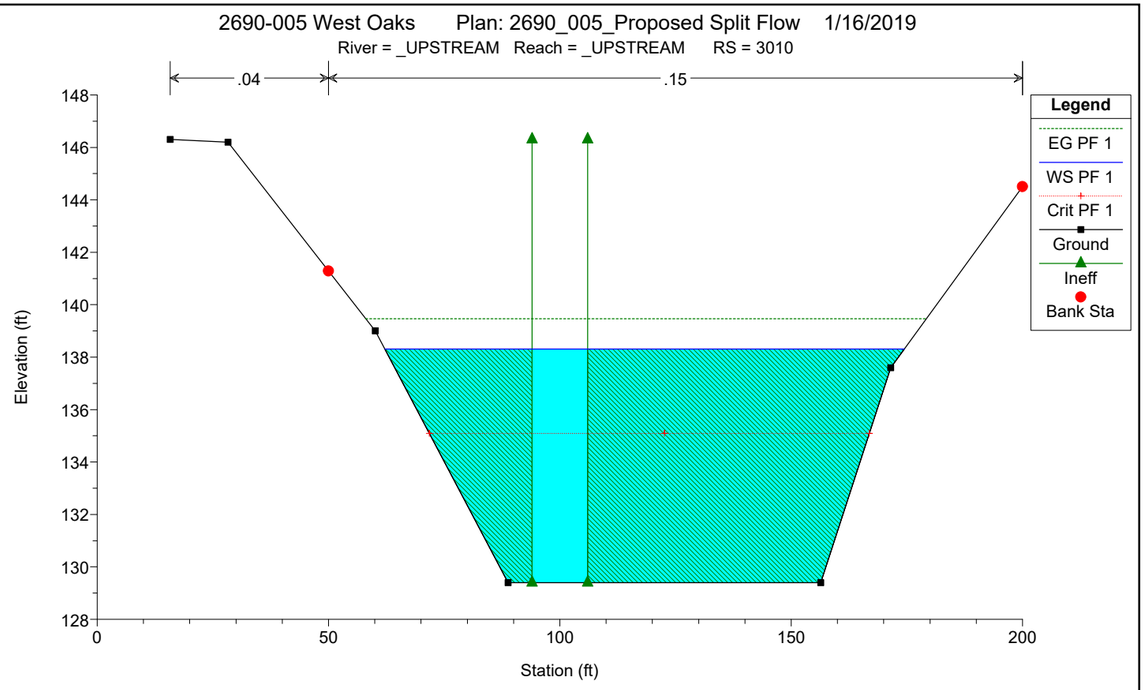
Proposed Conditions - High N

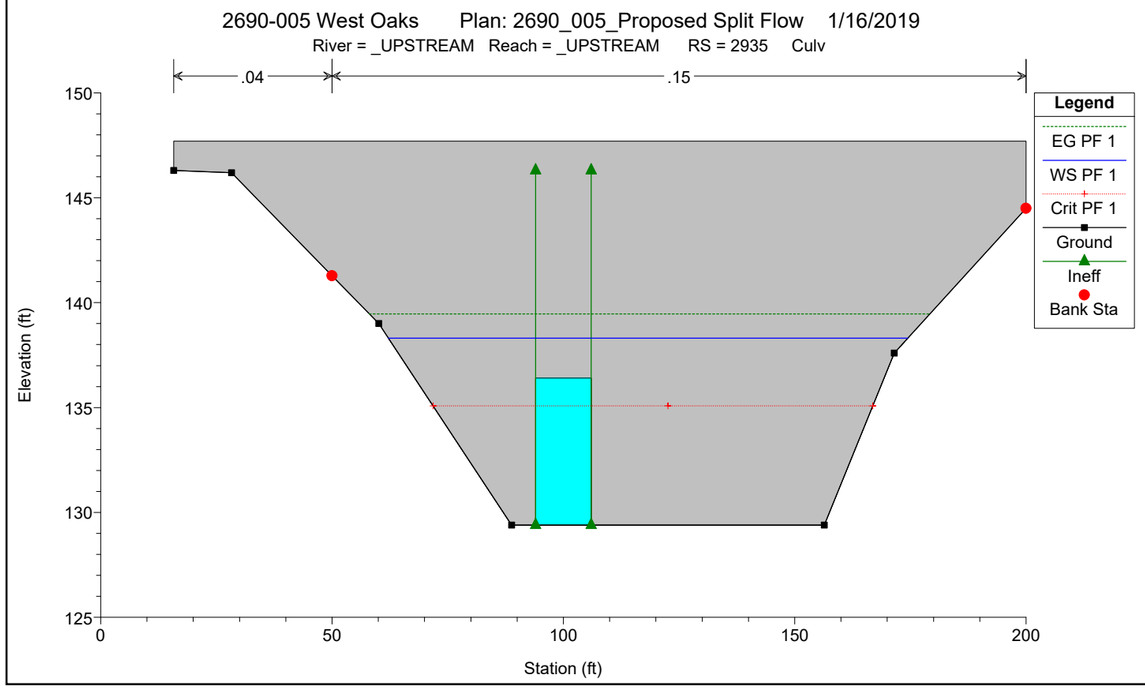
HEC-RAS Plan: Proposed_Split Flow Profile: PF 1

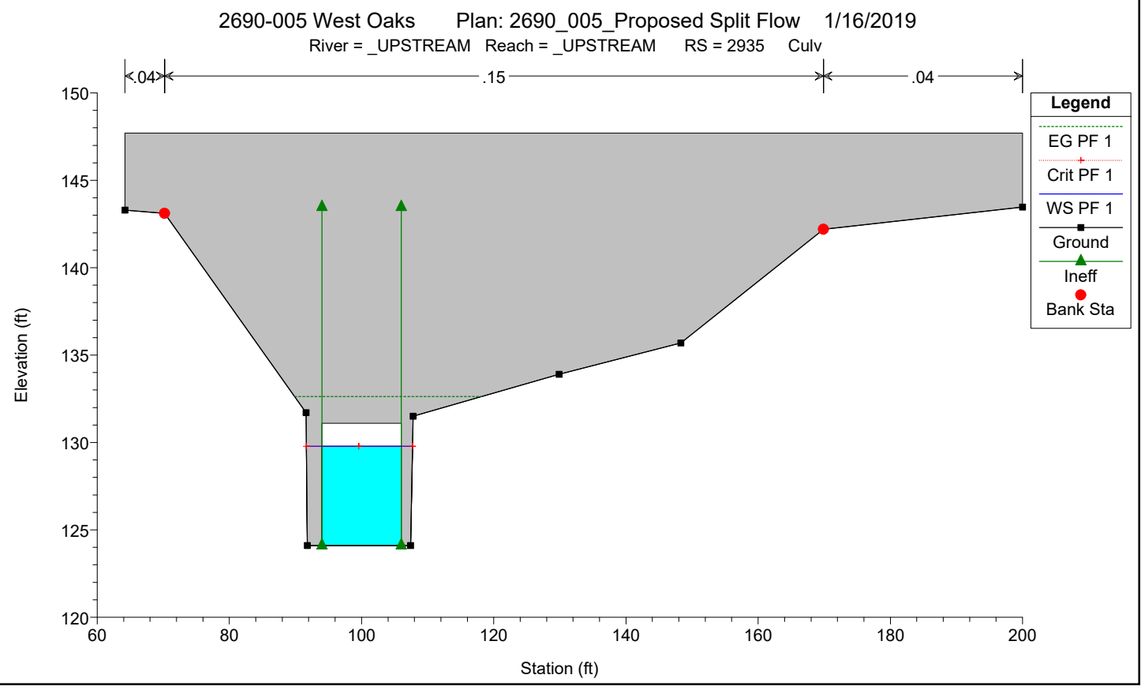
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
_UPSTREAM	_UPSTREAM	3160	PF 1	922.00	129.40	140.19		140.22	0.001521	1.40	656.37	90.70	0.09
_UPSTREAM	_UPSTREAM	3010	PF 1	922.00	129.40	138.31	135.09	139.47	0.041003	8.62	106.94	112.28	0.51
_UPSTREAM	_UPSTREAM	2935		Culvert									
_UPSTREAM	_UPSTREAM	2860	PF 1	922.00	124.10	129.78	129.78	132.62	0.184400	13.54	68.11	16.06	1.00
_UPSTREAM	_UPSTREAM	2800	PF 1	922.00	118.60	129.86		129.99	0.009361	2.96	310.98	48.00	0.21
_UPSTREAM	_UPSTREAM	2710	PF 1	922.00	118.20	128.78		128.98	0.013770	3.50	263.07	41.06	0.24
_UPSTREAM	_UPSTREAM	2600	PF 1	922.00	118.20	127.34	122.35	127.55	0.012154	3.62	252.89	150.64	0.24
_UPSTREAM	_UPSTREAM	2510	PF 1	922.00	118.10	125.62		125.93	0.028787	4.47	206.49	179.23	0.35
_UPSTREAM	_UPSTREAM	2400	PF 1	922.00	115.50	125.54		125.71	0.000523	3.34	276.70	312.56	0.25
MAIN CHANNEL	MAIN	2360	PF 1	879.00	115.40	124.77	120.77	125.61	0.002515	7.34	120.98	331.64	0.47
MAIN CHANNEL	MAIN	2248.50		Culvert									
MAIN CHANNEL	MAIN	2140	PF 1	879.00	115.56	121.04	121.04	123.69	0.016550	13.07	67.26	241.05	1.00
MAIN CHANNEL	MAIN	2080	PF 1	879.00	113.40	118.92	118.92	121.66	0.017557	13.28	66.17	222.22	1.00
MAIN CHANNEL	MAIN	2020	PF 1	879.00	110.30	117.31	114.81	117.76	0.050540	5.44	161.67	285.10	0.46
MAIN CHANNEL	MAIN	1900	PF 1	879.00	109.90	116.12		116.29	0.004974	1.82	322.19	179.52	0.15
MAIN CHANNEL	MAIN	1800	PF 1	879.00	109.60	115.41		115.66	0.008014	2.09	275.22	170.24	0.19
MAIN CHANNEL	MAIN	1700	PF 1	879.00	108.30	114.51		114.80	0.010017	2.27	255.85	236.43	0.21
MAIN CHANNEL	MAIN	1600	PF 1	879.00	107.30	113.75		114.00	0.006334	1.91	288.06	193.99	0.17
MAIN CHANNEL	MAIN	1500	PF 1	879.00	106.40	113.28	111.18	113.47	0.004290	1.63	326.99	287.45	0.14
MAIN CHANNEL	MAIN	1400	PF 1	879.00	105.90	110.91	110.64	112.07	0.192183	8.66	101.54	269.85	0.89
MAIN CHANNEL	MAIN	1300	PF 1	879.00	105.60	111.28	110.56	111.34	0.001154	0.75	531.43	321.04	0.07
MAIN CHANNEL	MAIN	1228	PF 1	879.00	105.40	109.64	109.10	109.83	0.015135	2.50	269.06	278.78	0.26
MAIN CHANNEL	MAIN	1203		Bridge									
MAIN CHANNEL	MAIN	1178	PF 1	879.00	104.80	107.28	107.22	107.76	0.027862	2.14	192.91	174.02	0.31
MAIN CHANNEL	MAIN	1100	PF 1	879.00	101.50	105.53	104.01	105.70	0.020025	2.77	293.74	120.89	0.29
LEFT SPLIT	LEFT	2360	PF 1	43.00	120.70	121.26	121.26	121.45	0.006535	3.44	12.50	34.89	1.01
LEFT SPLIT	LEFT	2140	PF 1	43.00	116.80	117.54	117.54	117.71	0.006522	3.23	13.32	197.56	1.00
LEFT SPLIT	LEFT	2080	PF 1	43.00	116.00	116.57	116.57	116.73	0.006387	3.28	13.19	126.35	0.99
LEFT SPLIT	LEFT	2020	PF 1	43.00	114.60	115.16	115.16	115.28	0.005738	2.95	21.67	108.29	0.93
LEFT SPLIT	LEFT	1900	PF 1	43.00	112.00	112.30	112.30	112.44	0.006821	3.05	14.10	49.09	1.00
LEFT SPLIT	LEFT	1800	PF 1	43.00	111.00	111.92		111.95	0.000410	1.30	33.09	50.07	0.28
LEFT SPLIT	LEFT	1700	PF 1	43.00	111.00	111.71	111.71	111.89	0.006251	3.38	12.81	108.09	1.00
LEFT SPLIT	LEFT	1600	PF 1	43.00	110.50	110.85		110.93	0.002819	2.25	19.49	57.61	0.67
LEFT SPLIT	LEFT	1500	PF 1	43.00	110.00	110.44	110.44	110.57	0.006529	2.97	15.33	58.42	0.98
LEFT SPLIT	LEFT	1400	PF 1	43.00	109.00	109.64	109.62	109.77	0.005346	2.91	14.80	73.39	0.90
LEFT SPLIT	LEFT	1300	PF 1	43.00	109.00	109.18	109.18	109.27	0.007503	2.36	18.22	113.58	0.98
LEFT SPLIT	LEFT	1225	PF 1	43.00	106.80	107.49		107.57	0.009055	2.25	19.11	37.60	0.56
LEFT SPLIT	LEFT	1178	PF 1	43.00	105.50	106.22		106.30	0.141241	2.10	20.02	48.09	0.57
LEFT SPLIT	LEFT	1100	PF 1	43.00	101.50	102.60	102.04	102.62	0.020004	1.18	36.12	46.97	0.24

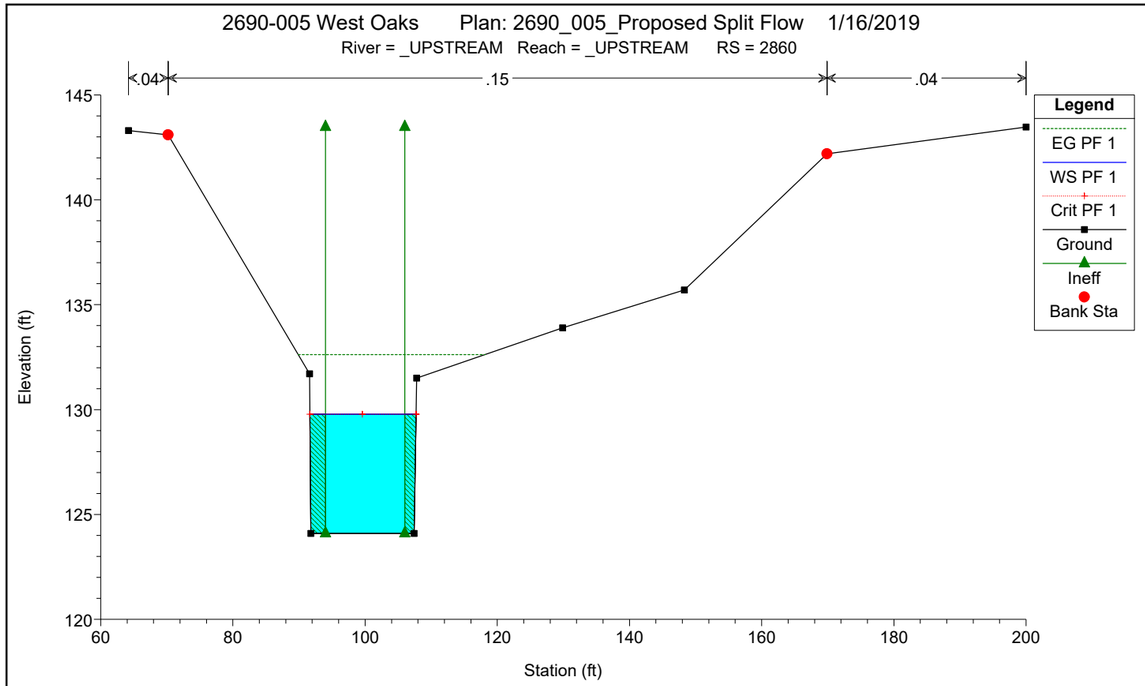
Proposed Conditions - High N

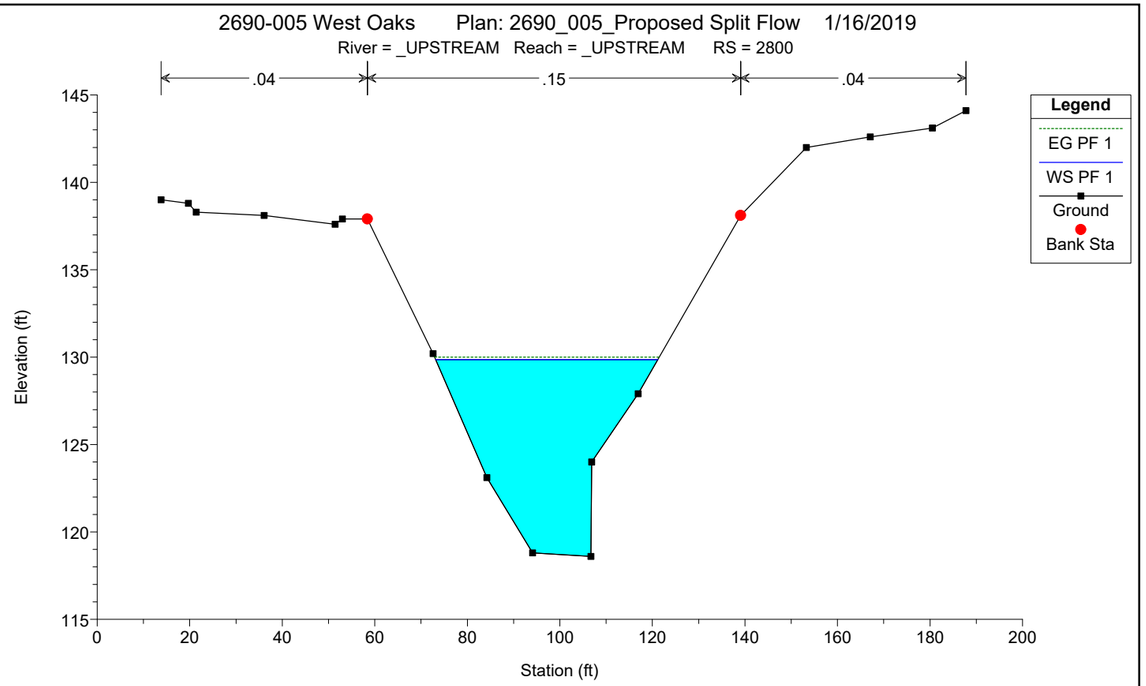


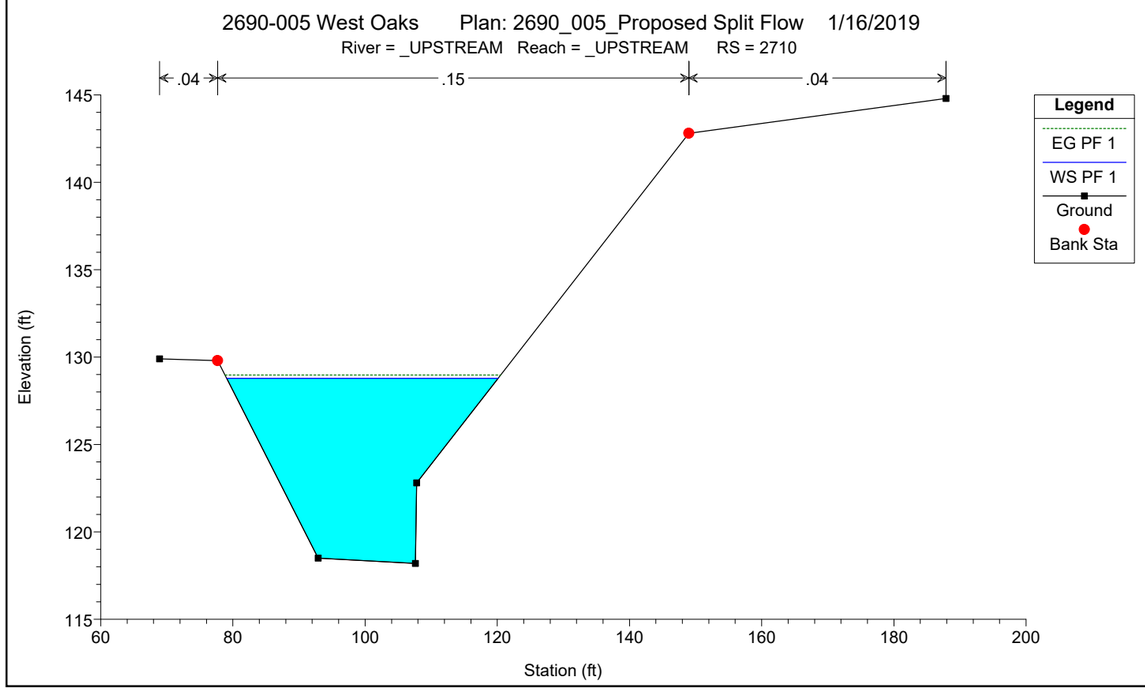


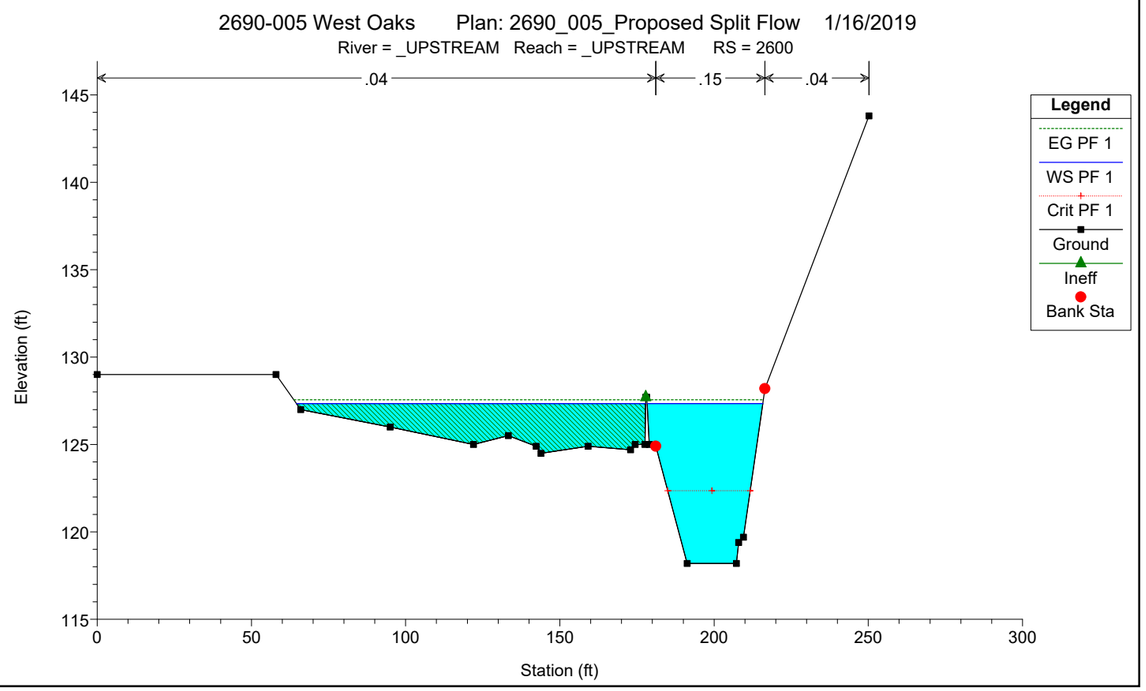


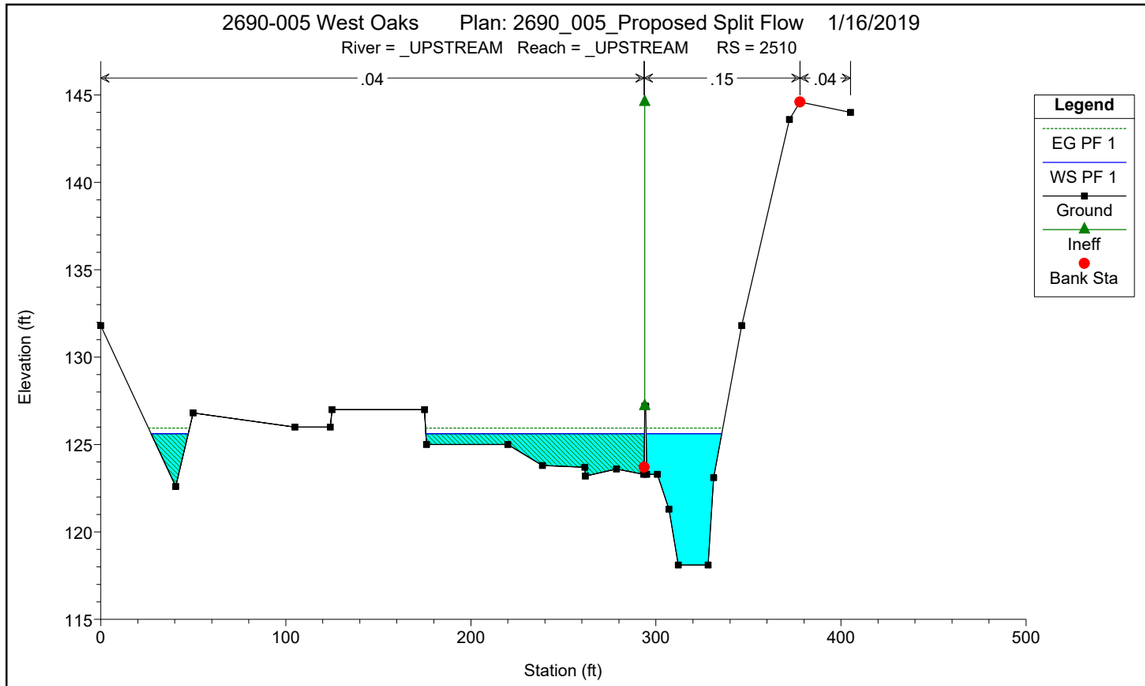


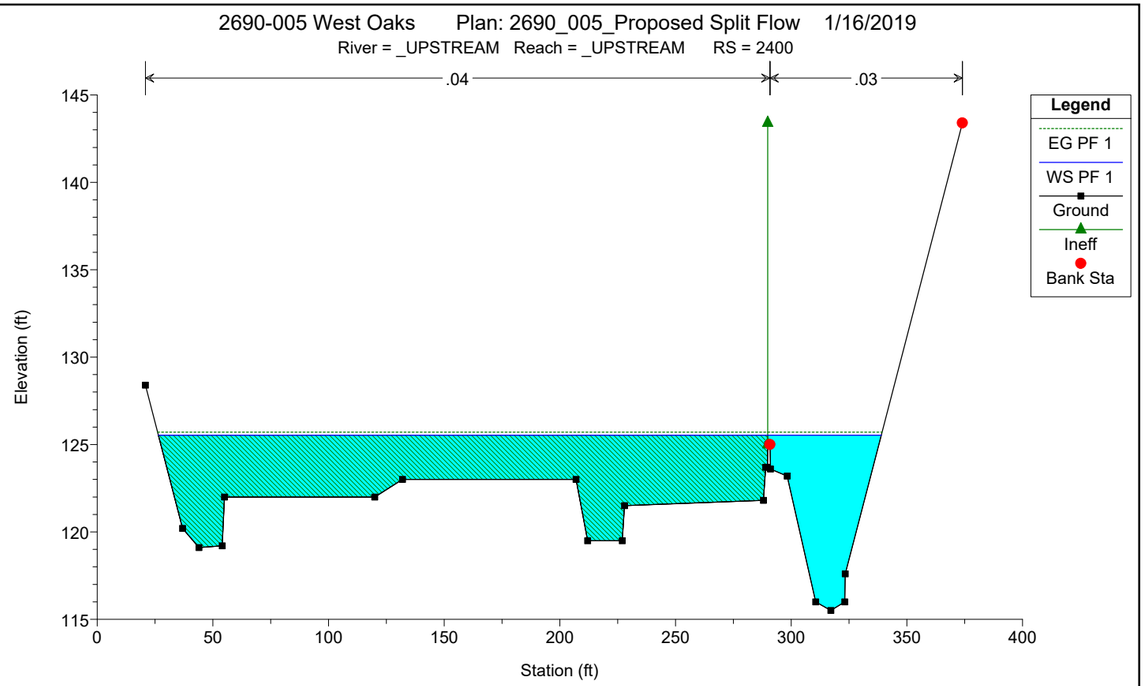

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2860
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

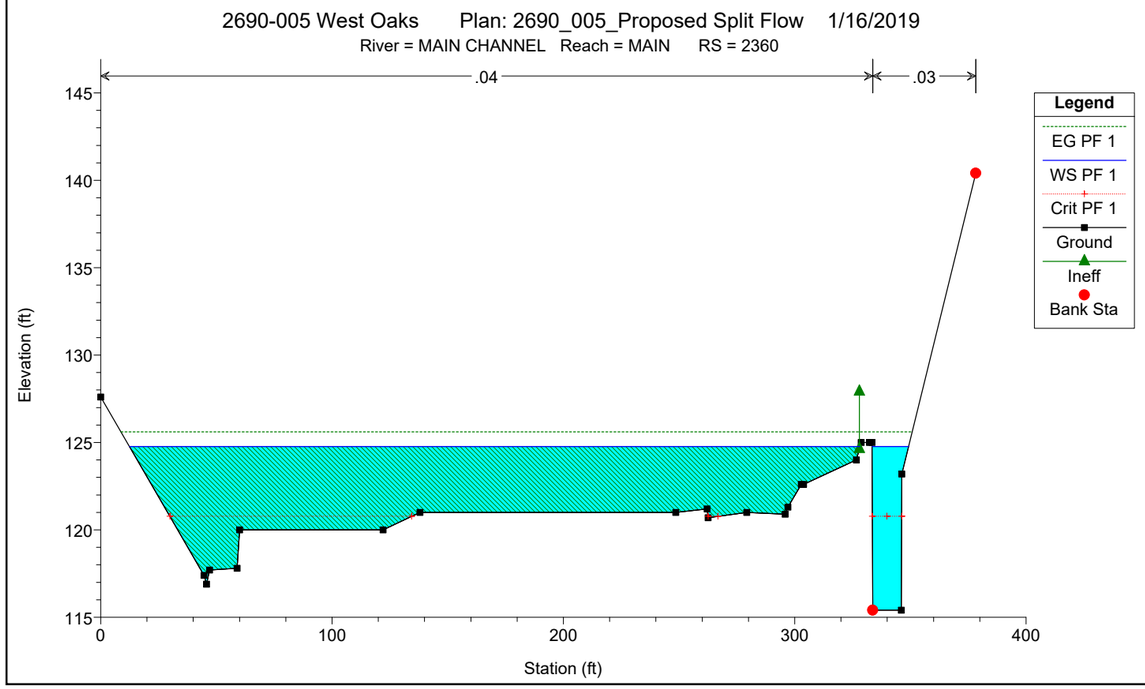

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2800
.04
.15
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

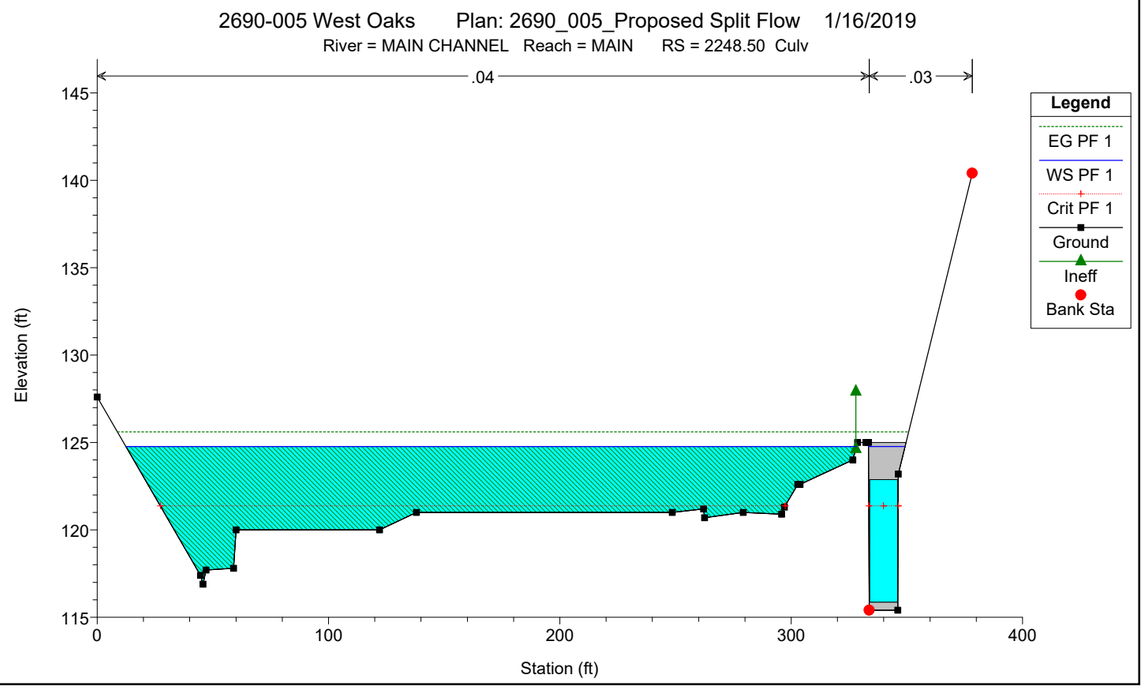

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2710
.04
.15
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2600
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2510
.04
.15
.04
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

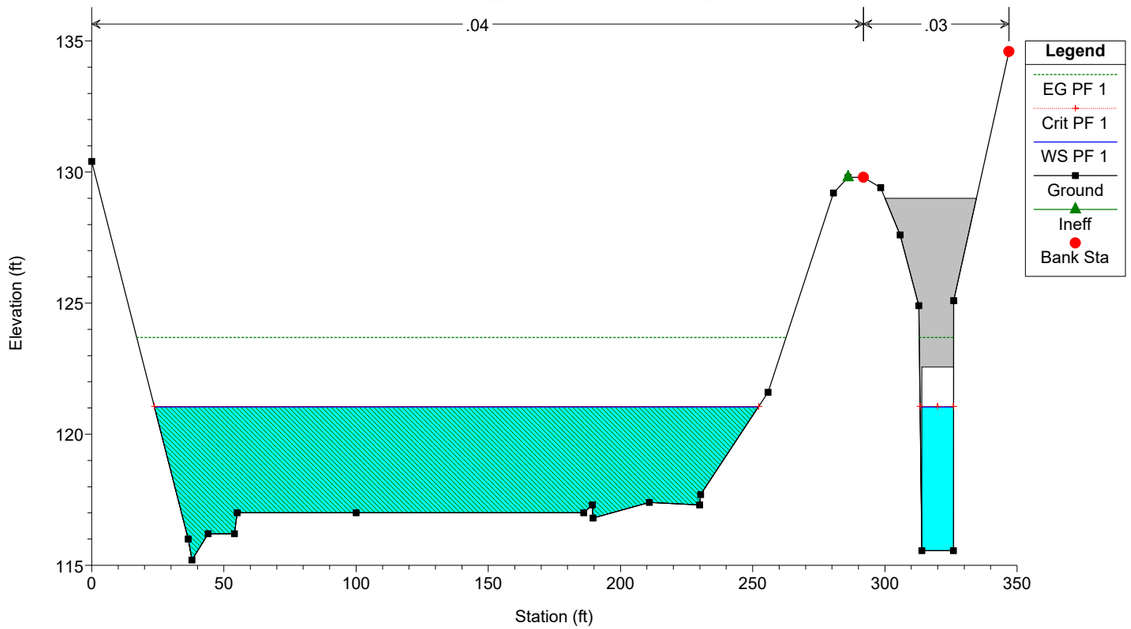

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2400
.04
.03
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2360
.04
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv
.04
.03
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

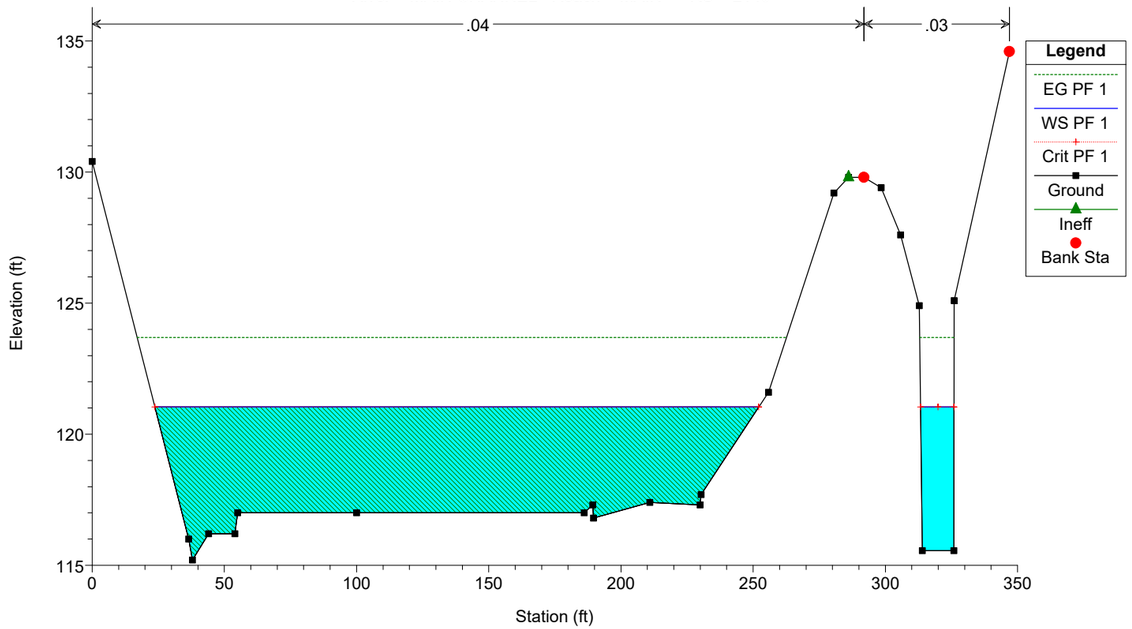
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv



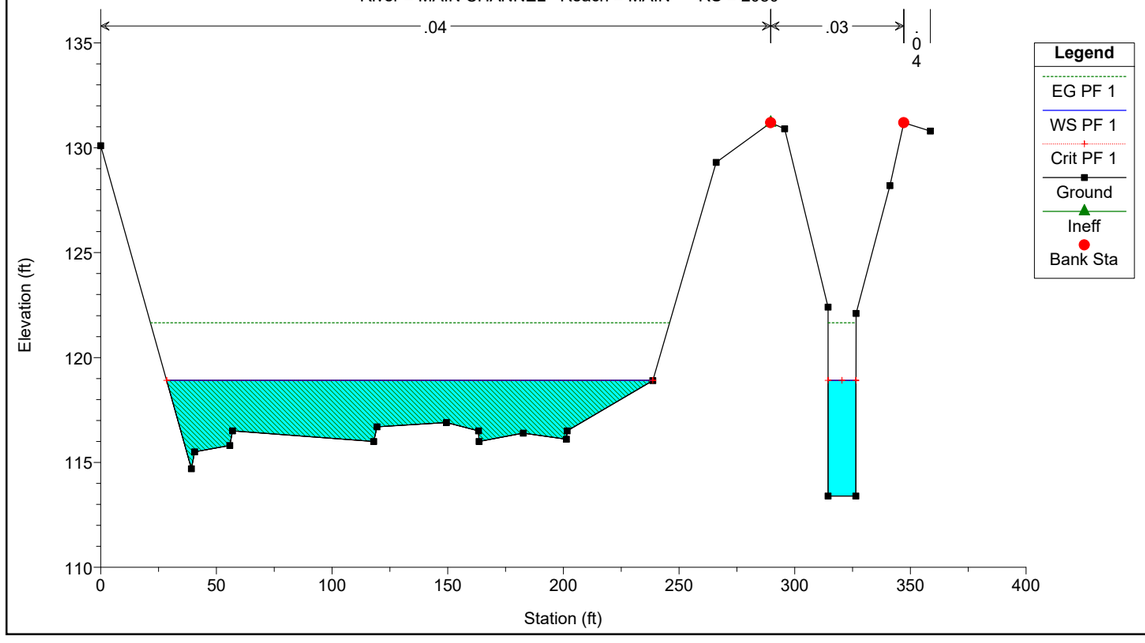
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2140



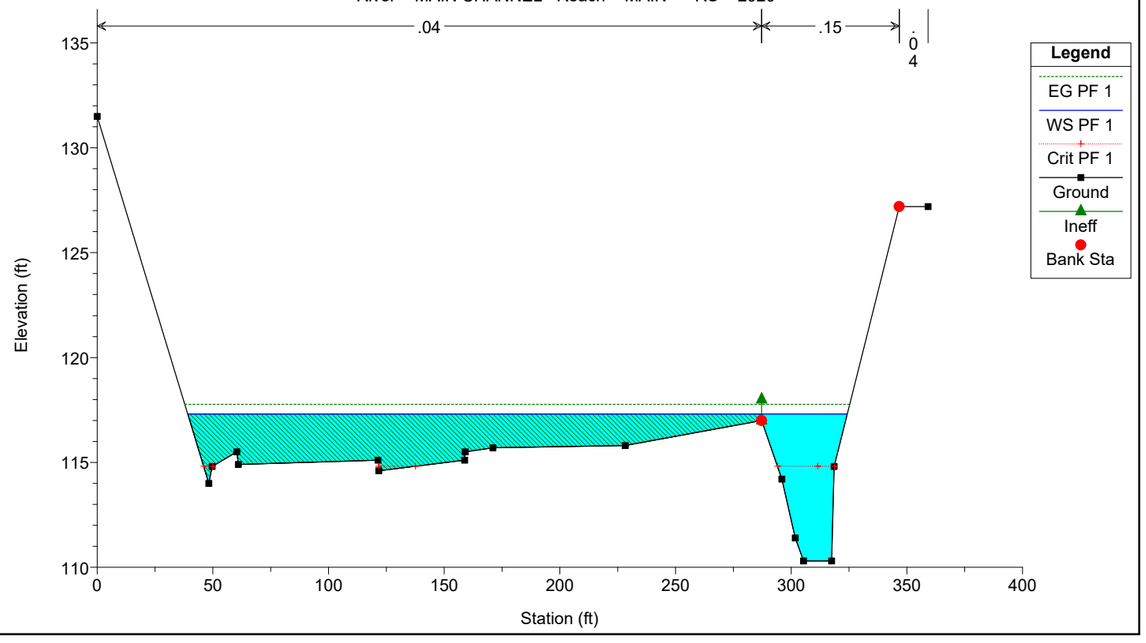
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2080



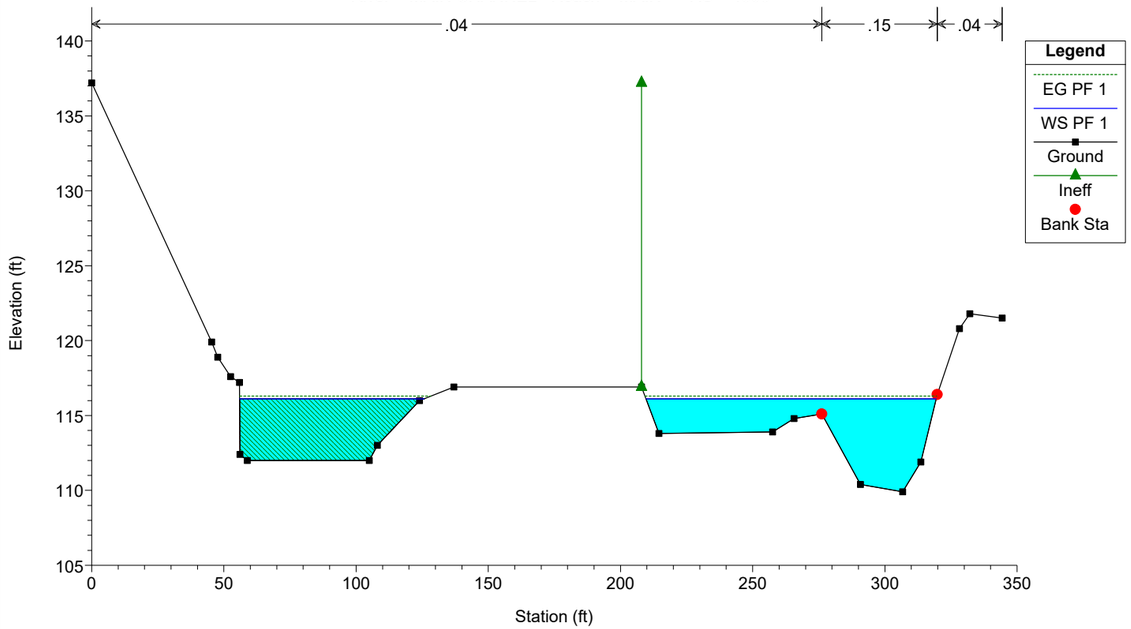
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2020



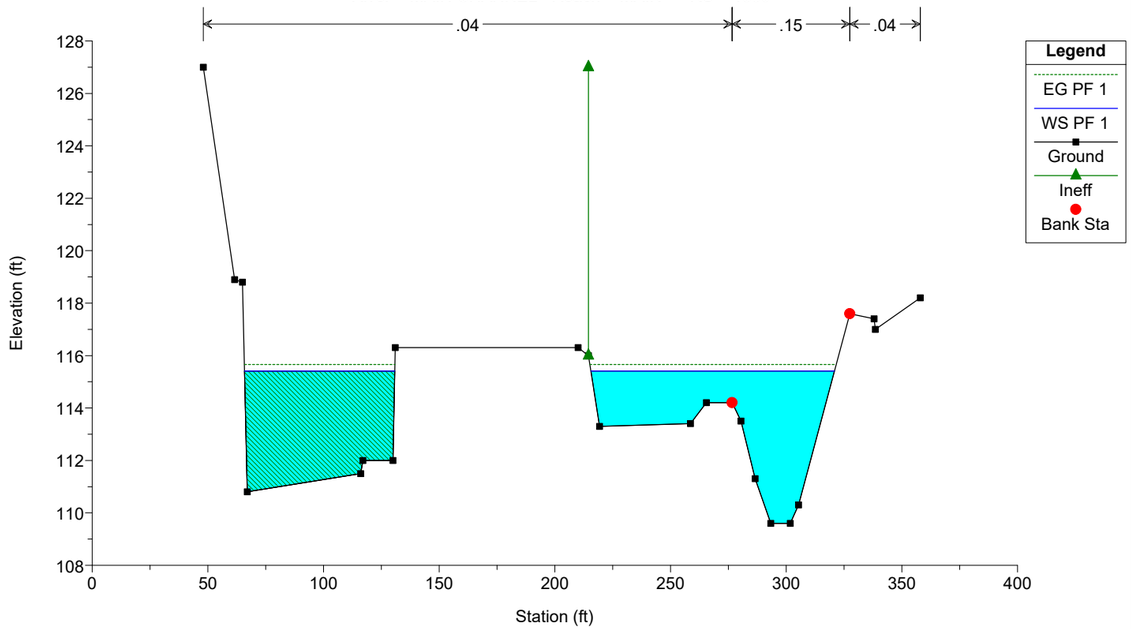
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 1900



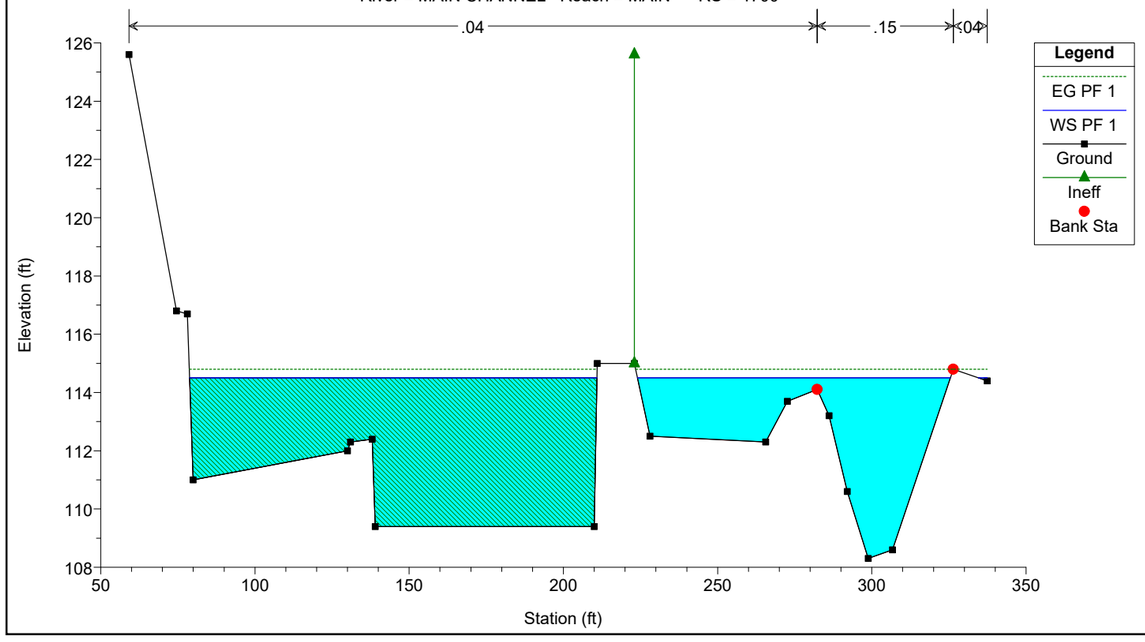
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 1800



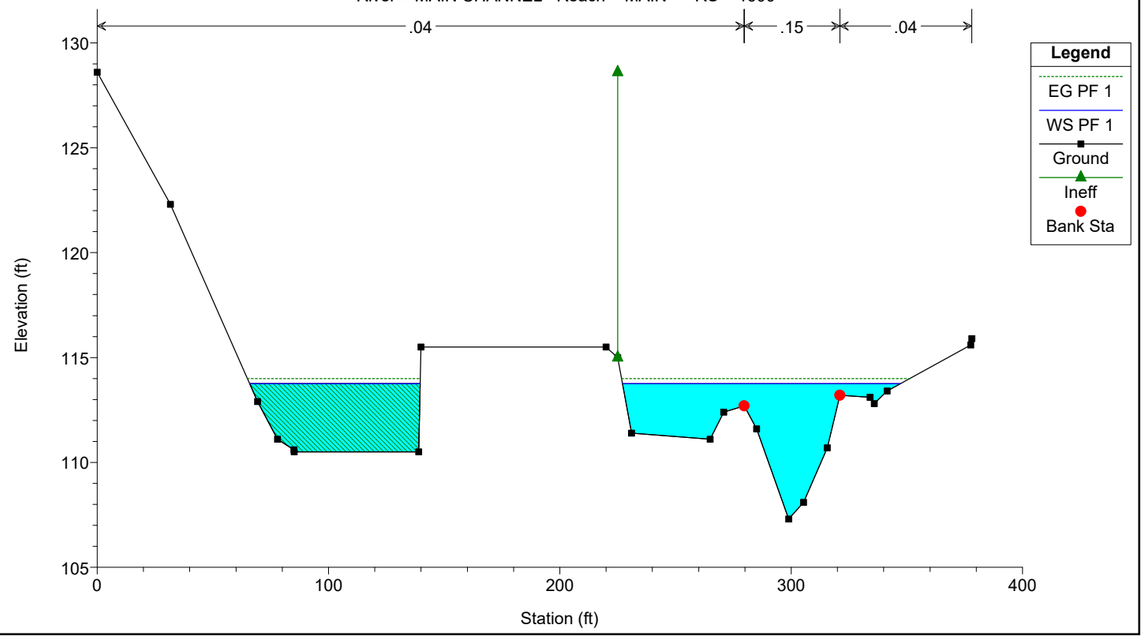
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

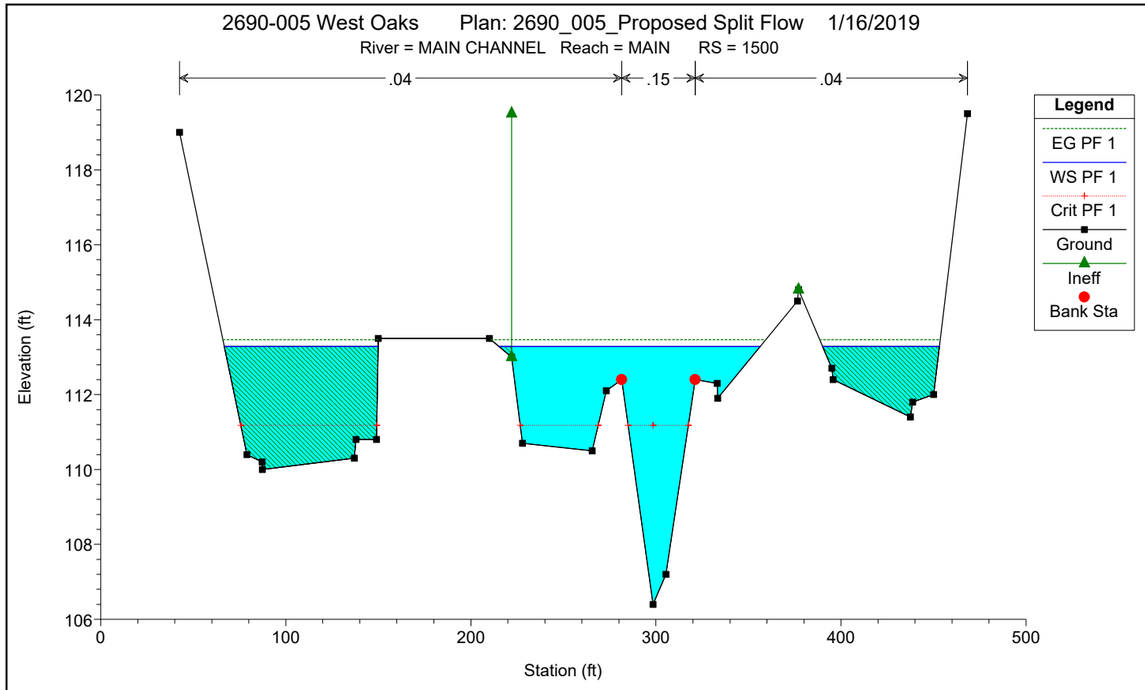
River = MAIN CHANNEL Reach = MAIN RS = 1700

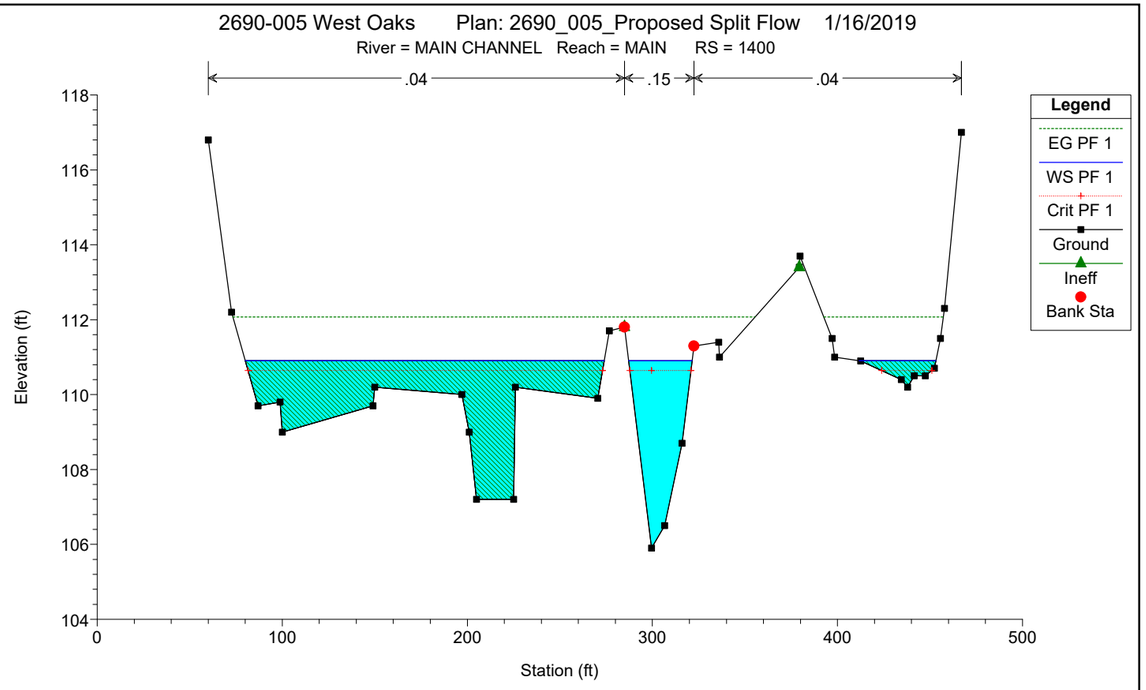


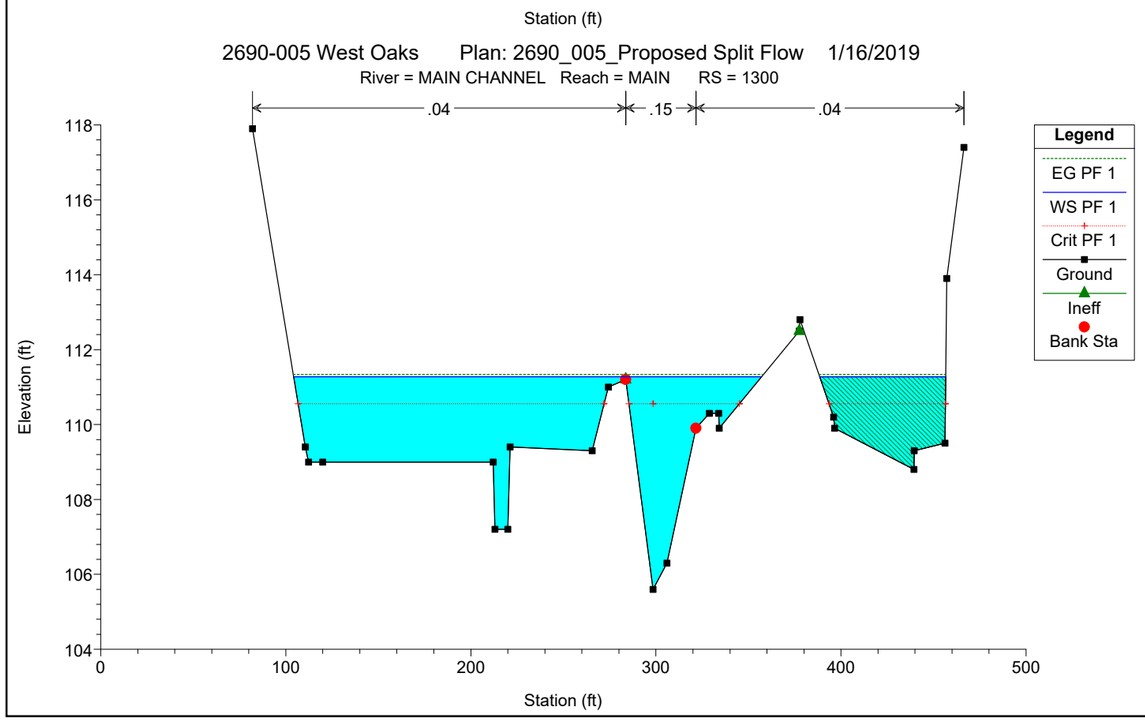
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

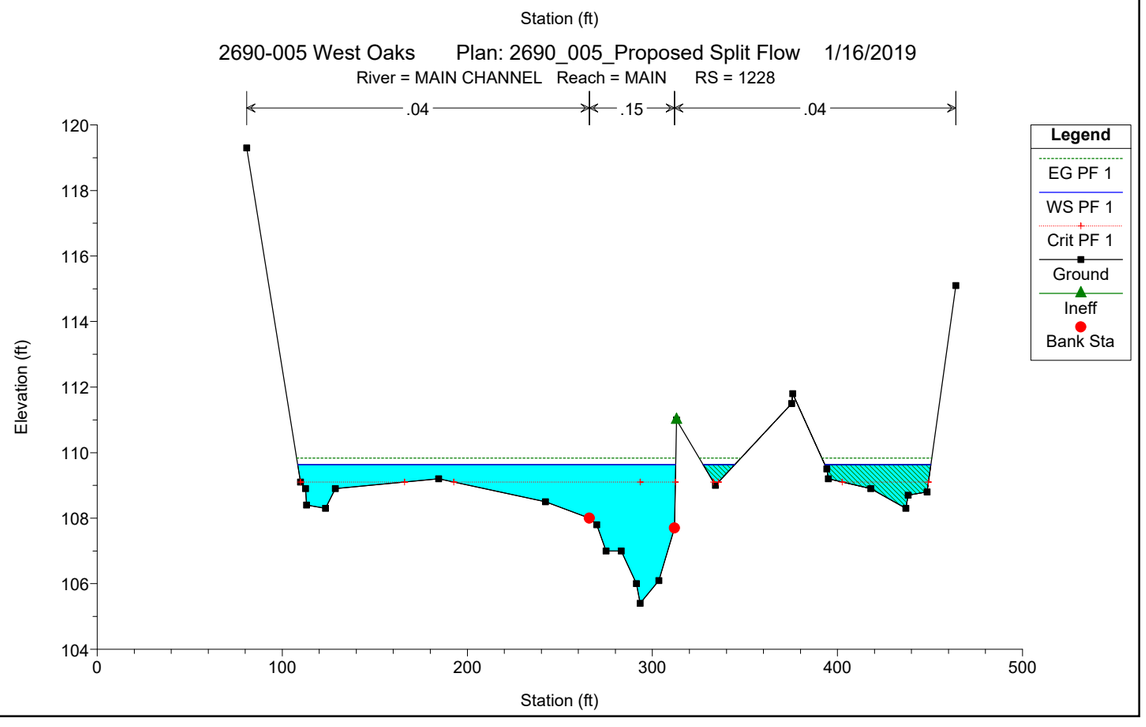
River = MAIN CHANNEL Reach = MAIN RS = 1600

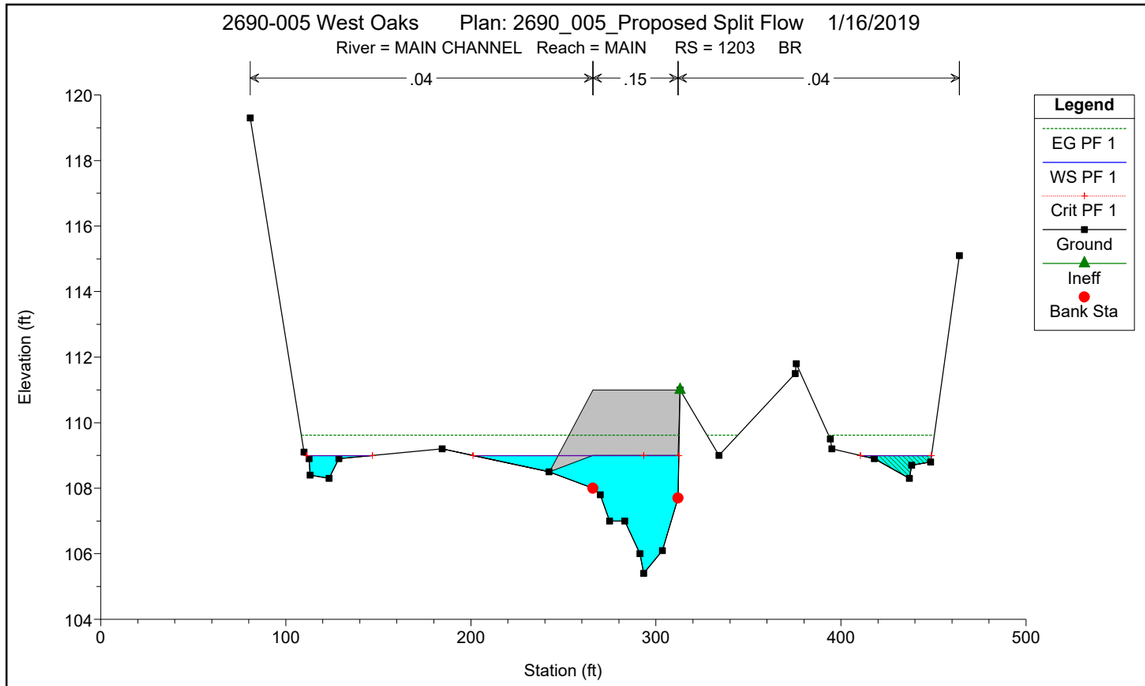


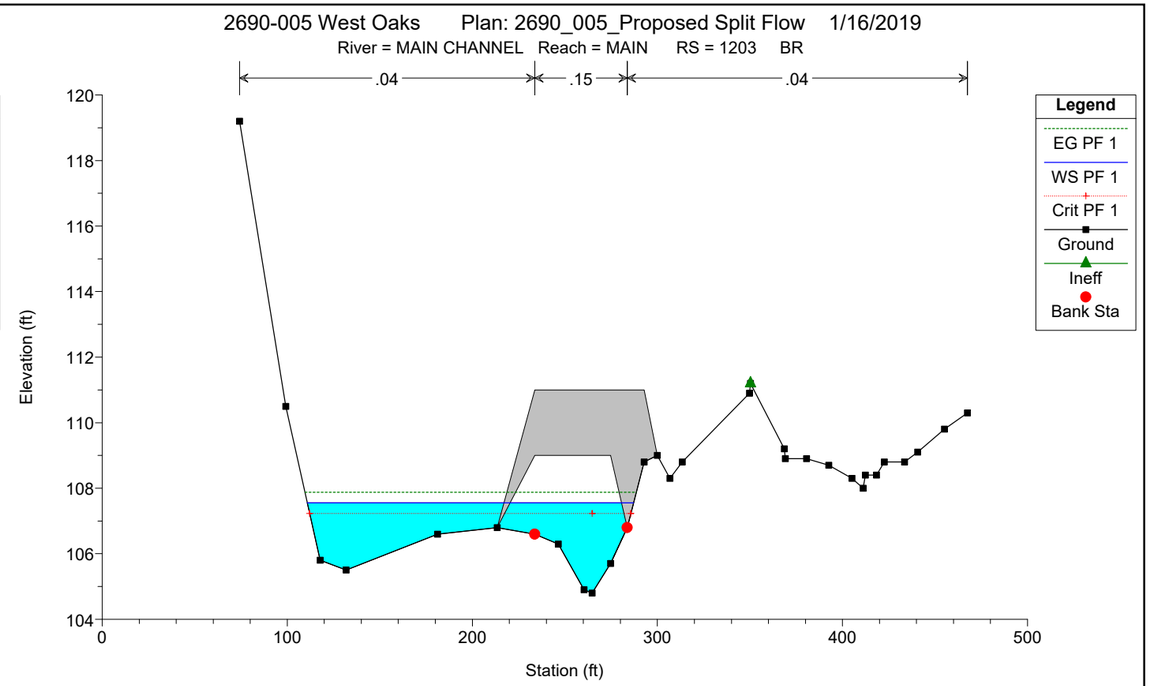

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1500
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

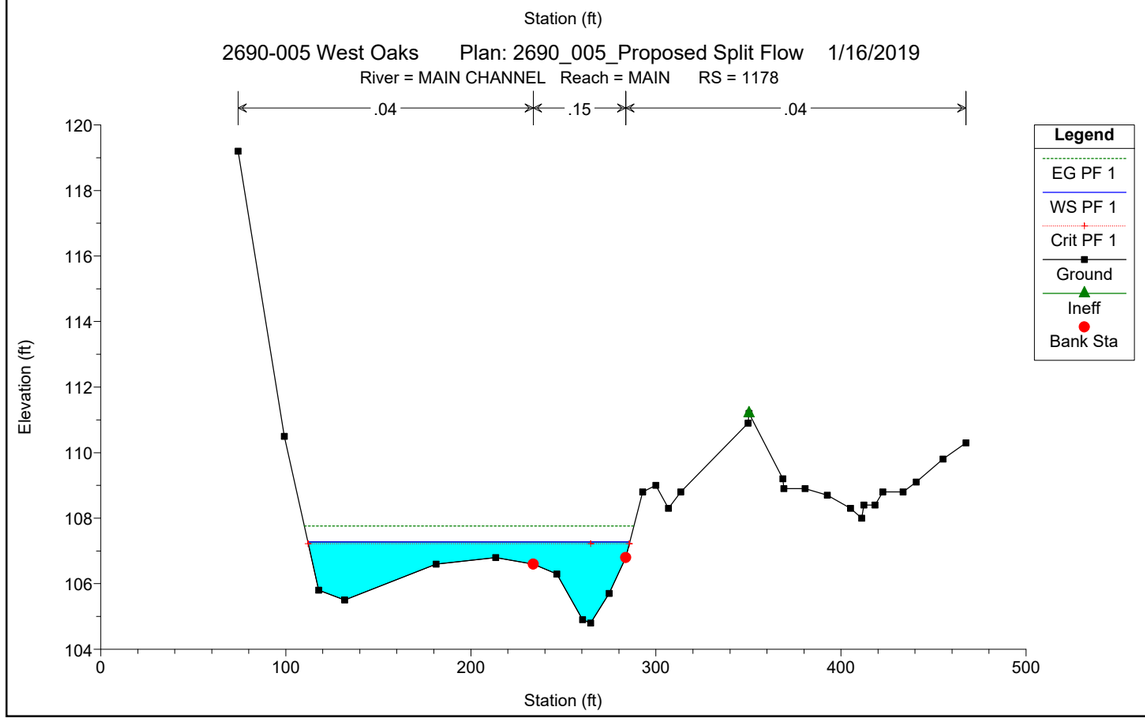

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1400
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

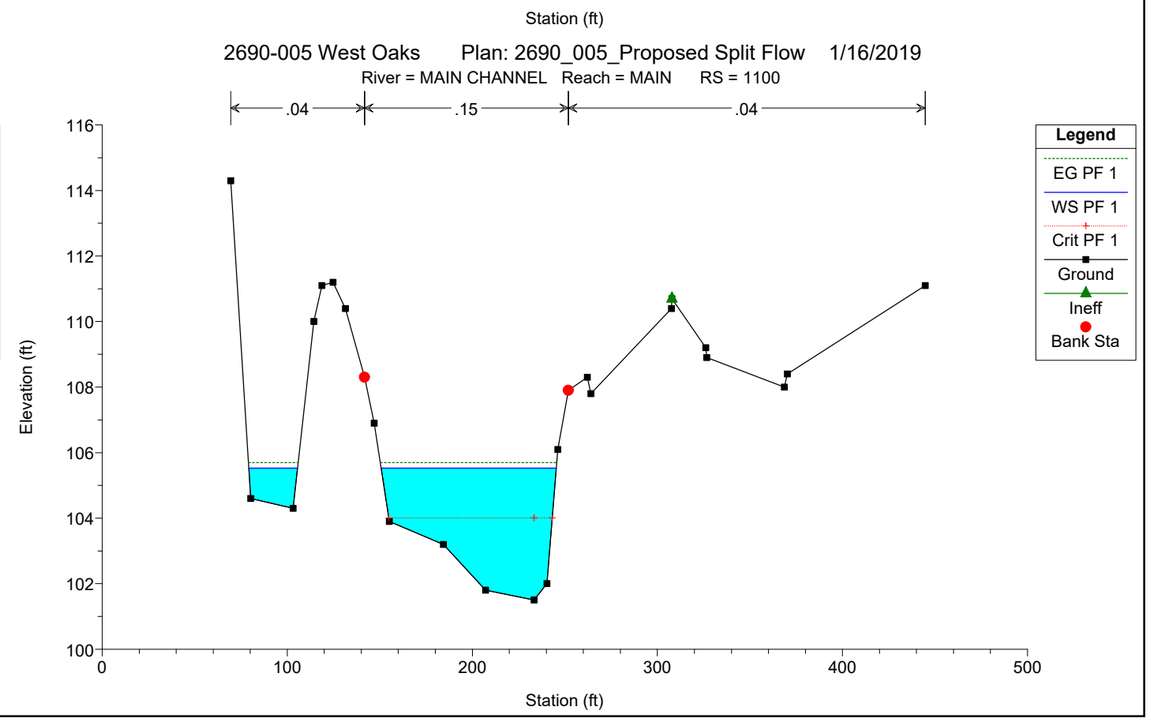

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1300
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1228
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1203 BR
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

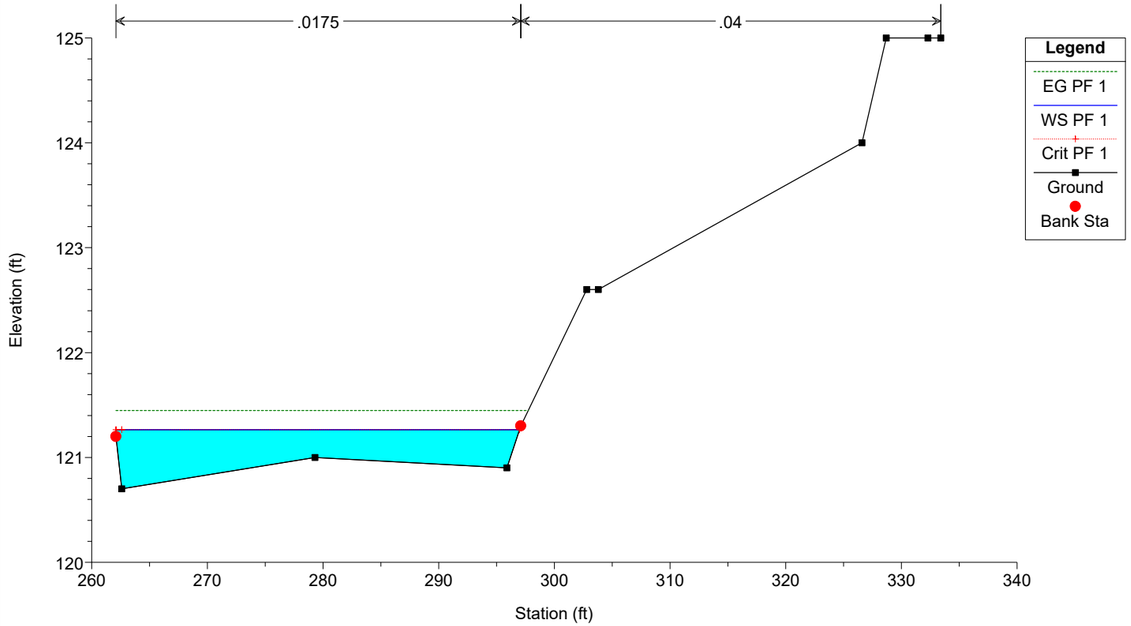

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1203 BR
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1178
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1100
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

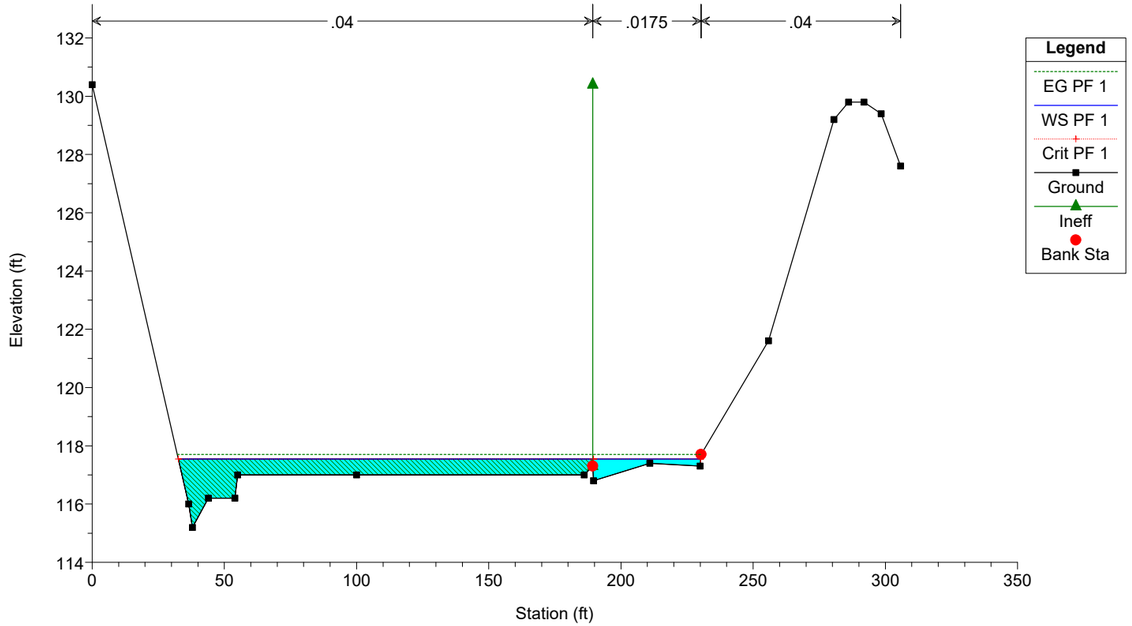
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2360



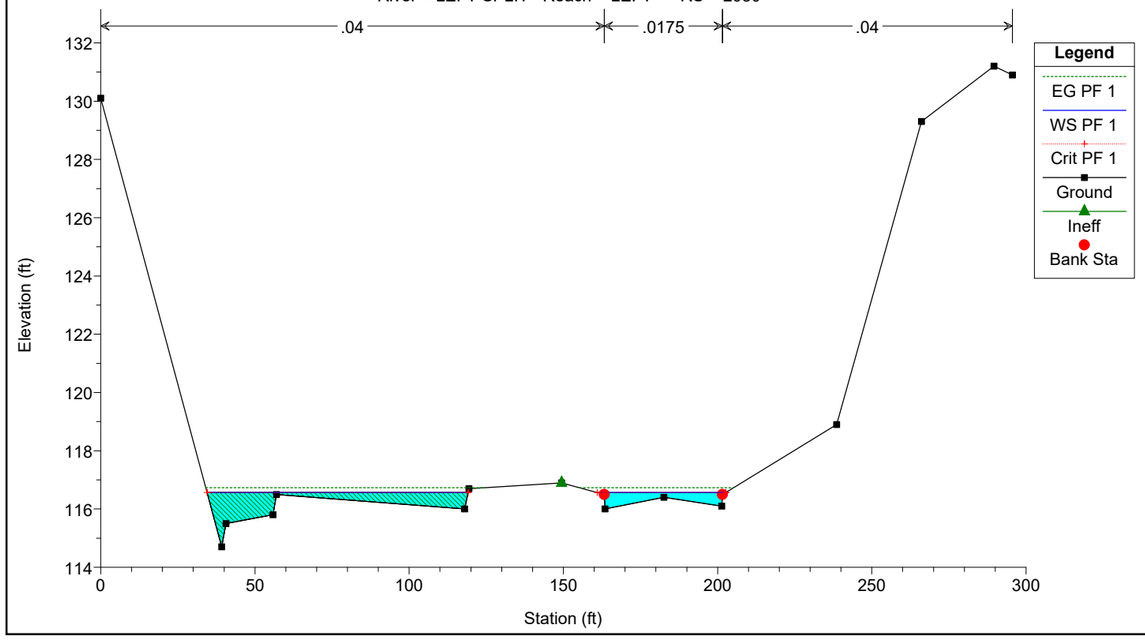
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2140



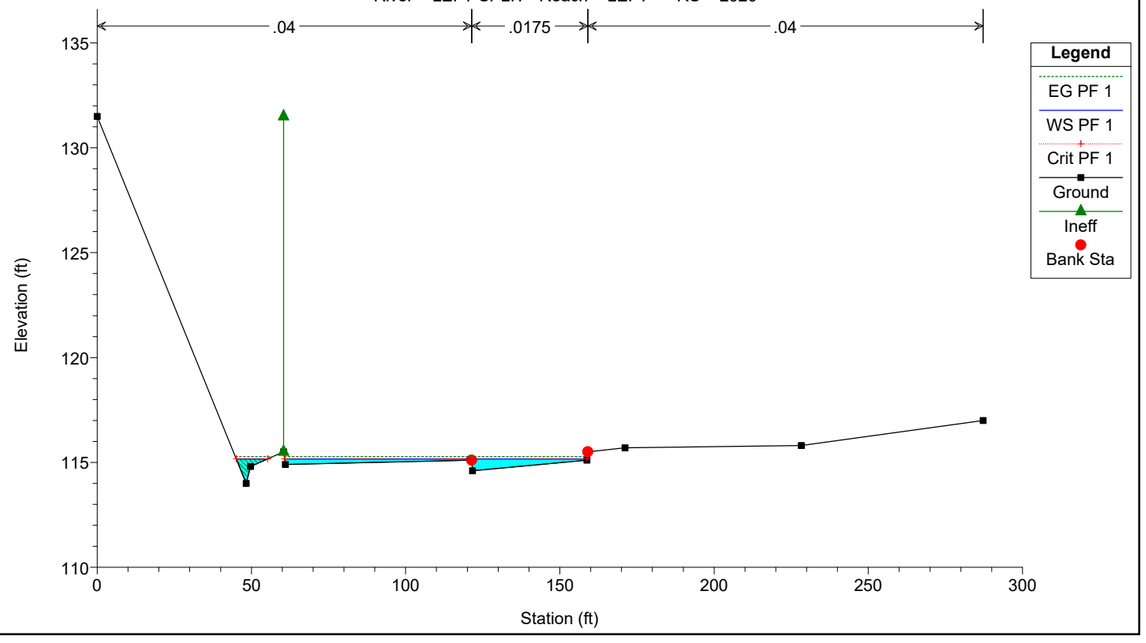
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2080



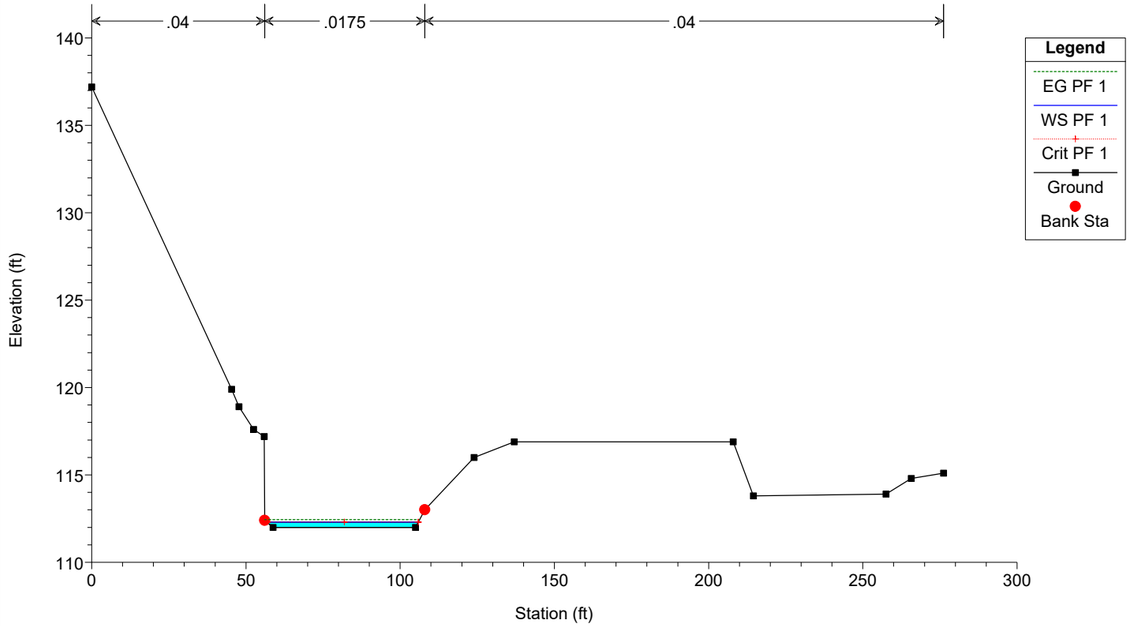
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 2020



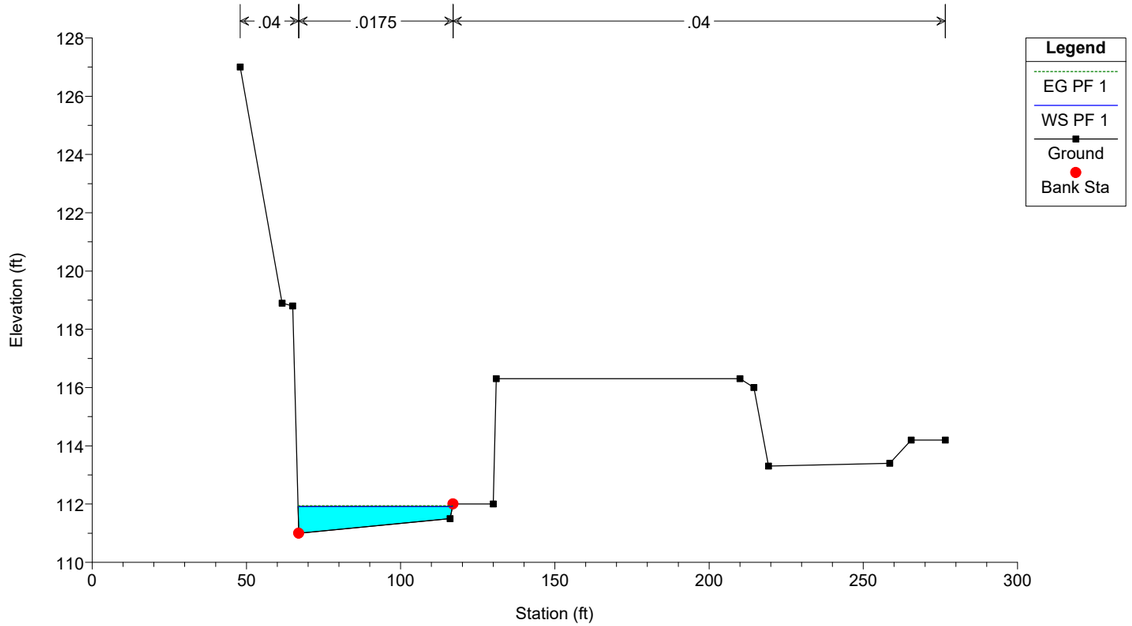
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 1900



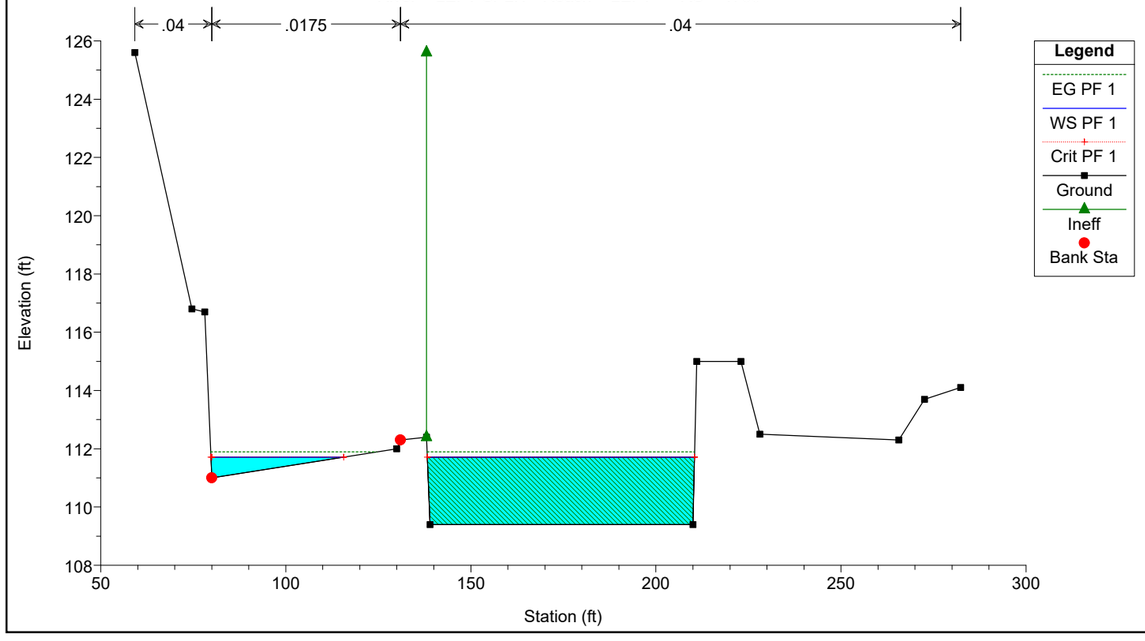
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

River = LEFT SPLIT Reach = LEFT RS = 1800



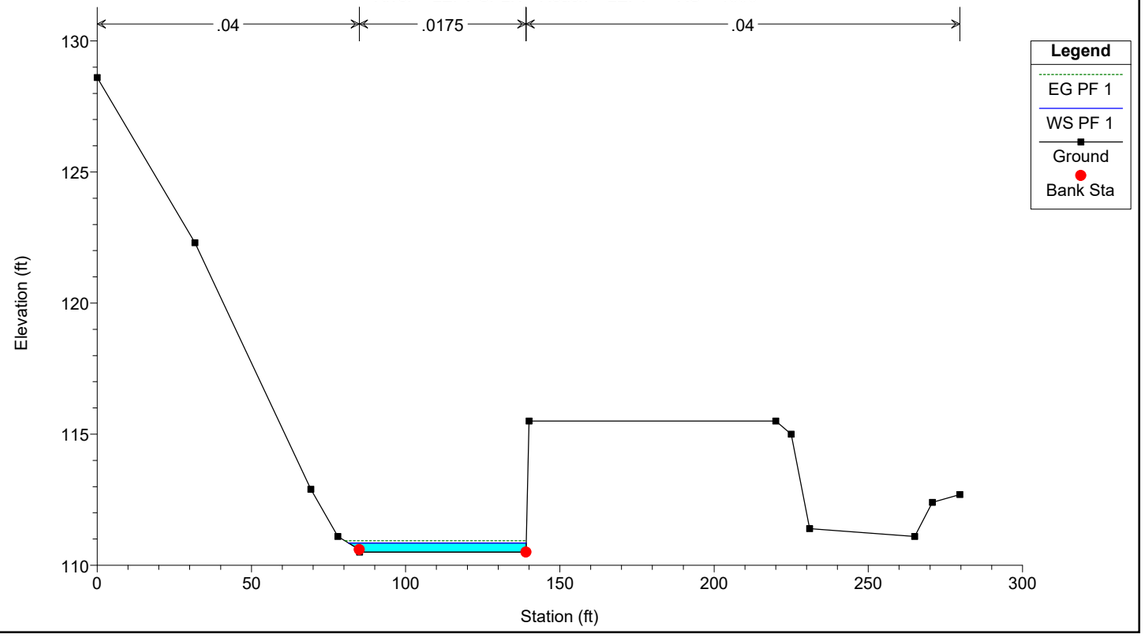
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

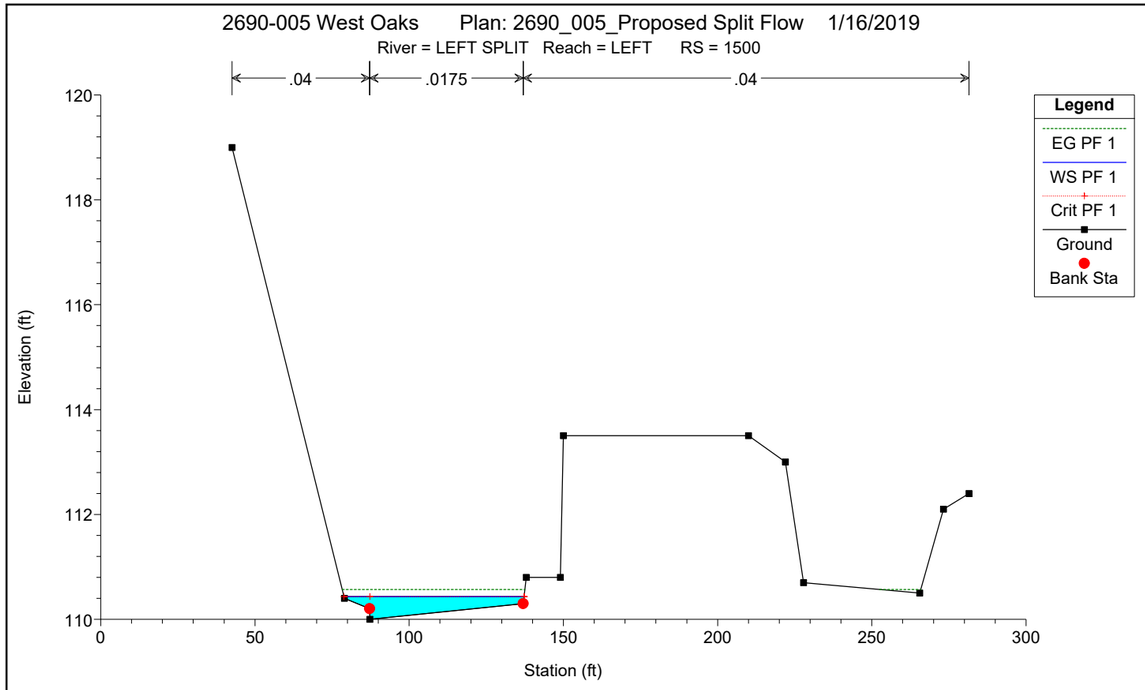
River = LEFT SPLIT Reach = LEFT RS = 1700

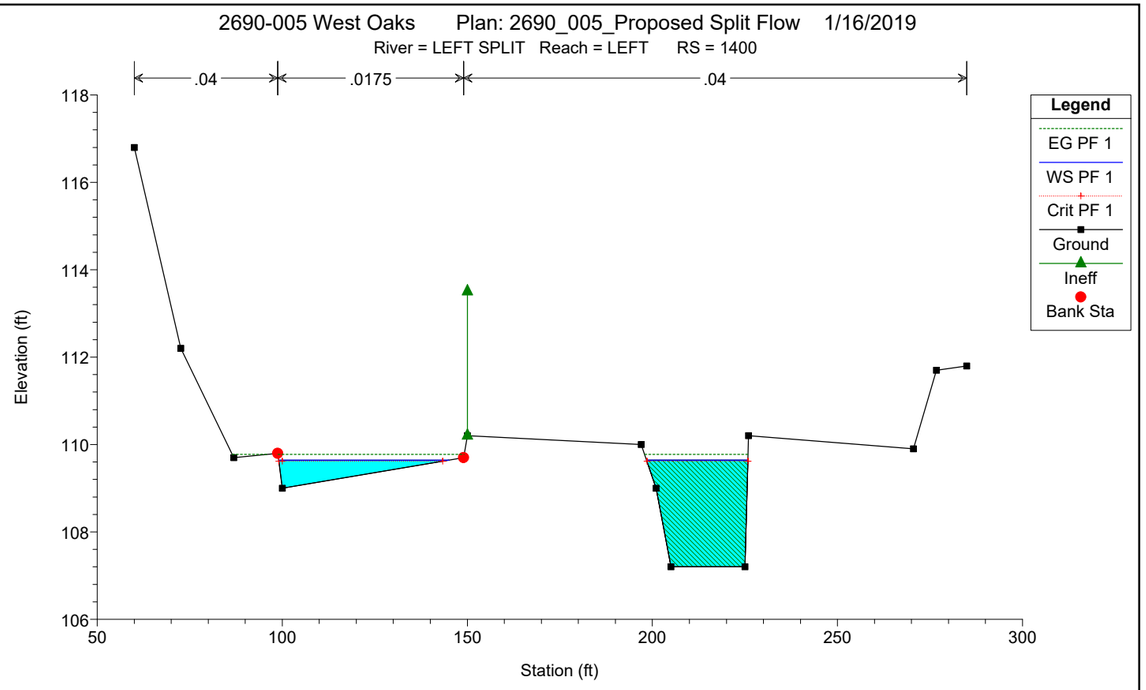


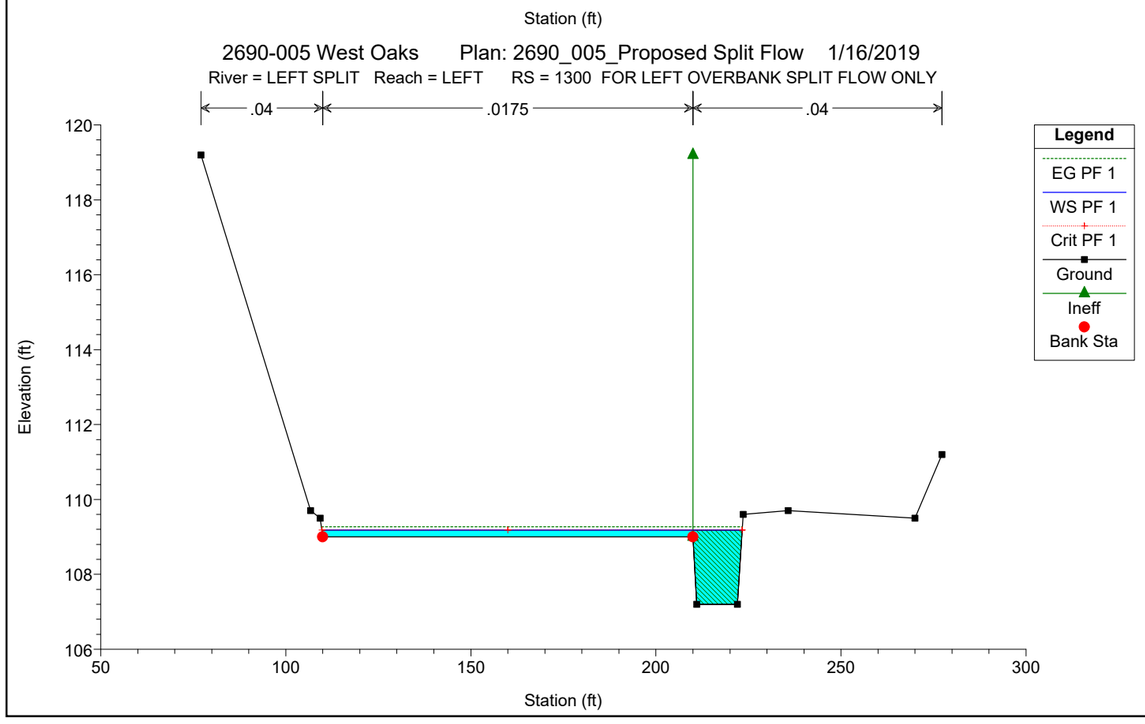
2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019

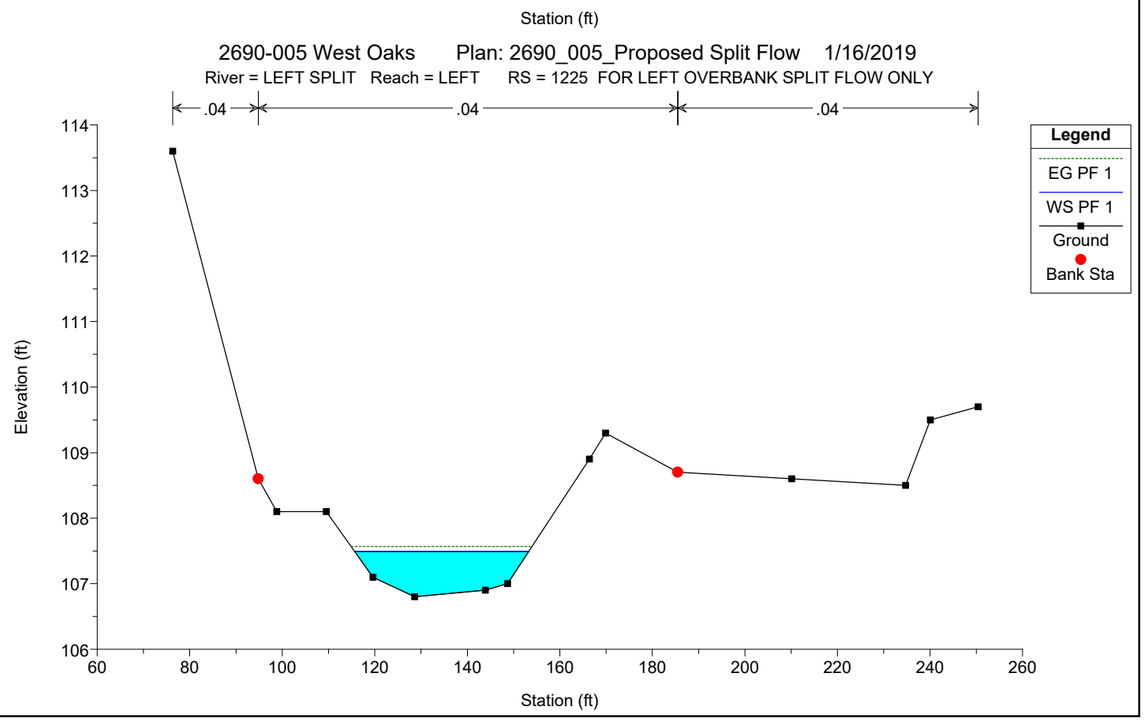
River = LEFT SPLIT Reach = LEFT RS = 1600

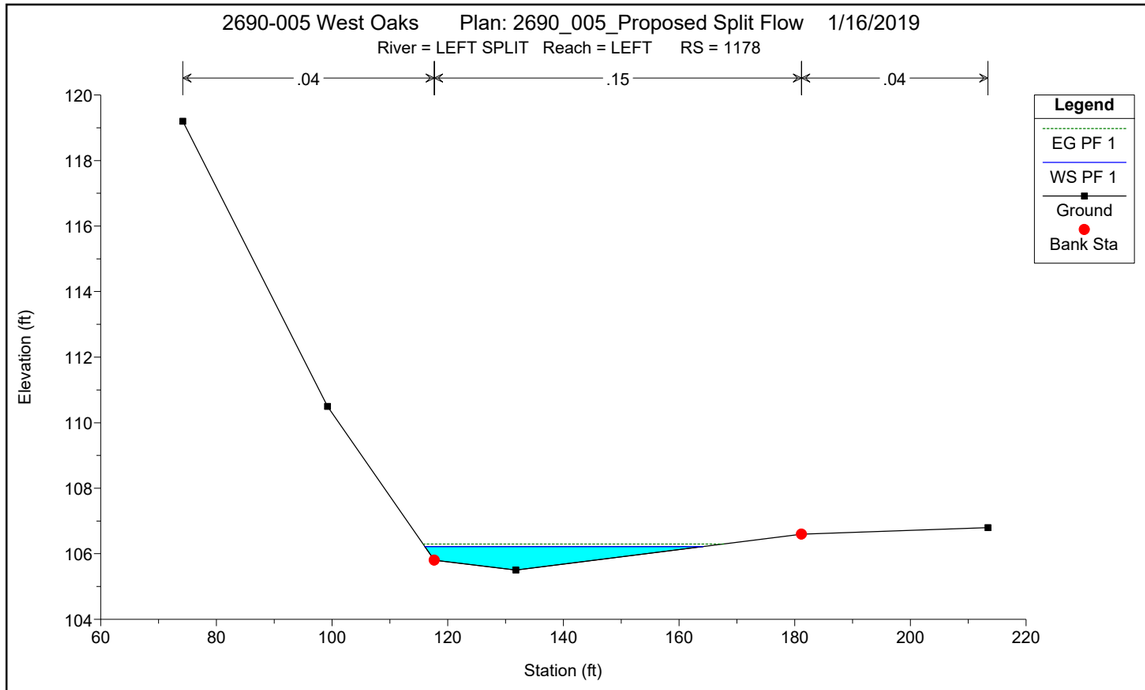


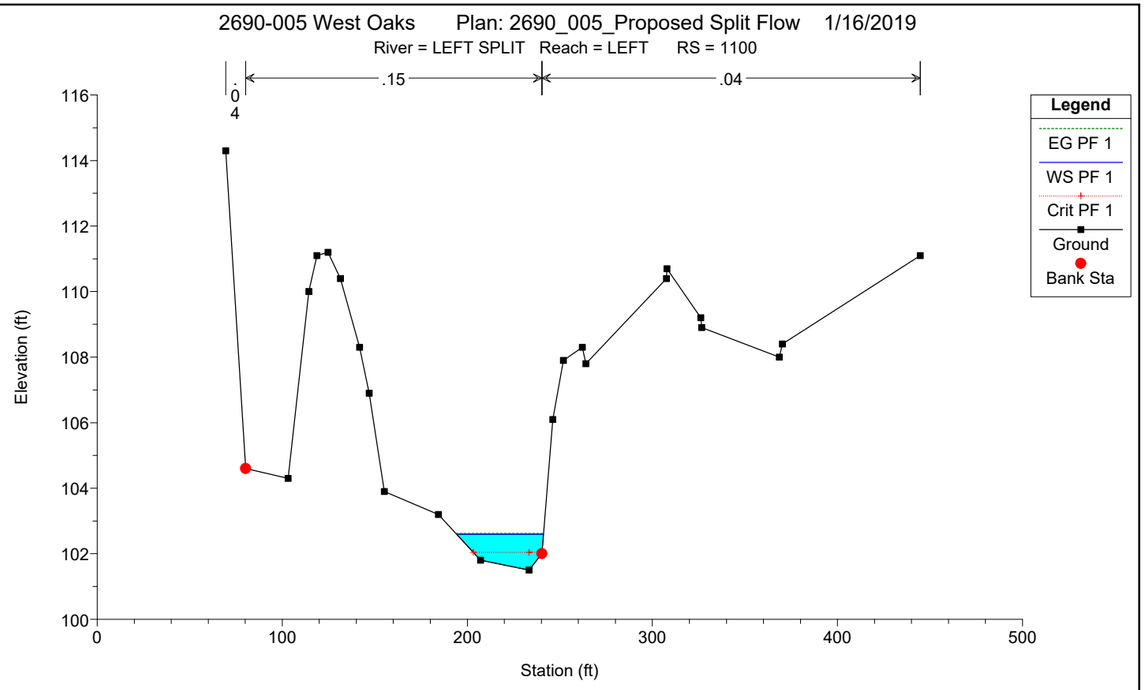

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1500
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1400
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1300 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1225 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.04
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1178
.04
.15
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
120
118
116
114
112
110
108
106
104
60
80
100
120
140
160
180
200
220

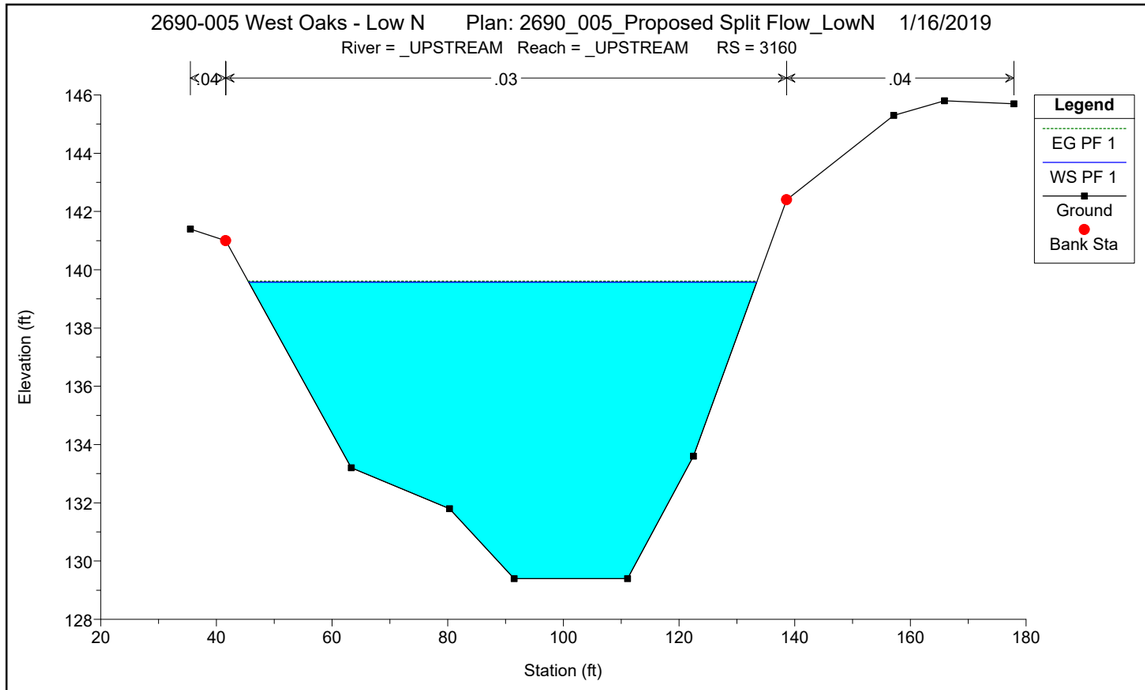

2690-005 West Oaks Plan: 2690_005_Proposed Split Flow 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1100
.04
.15
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
116
114
112
110
108
106
104
102
100
0
100
200
300
400
500

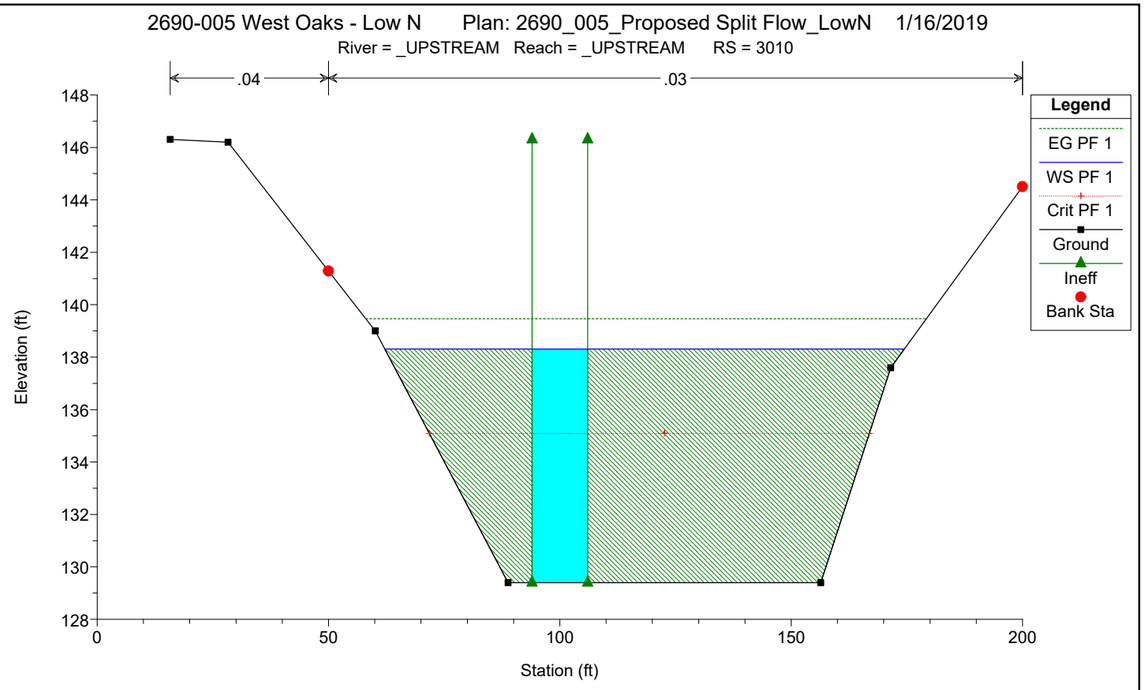
Low N Results

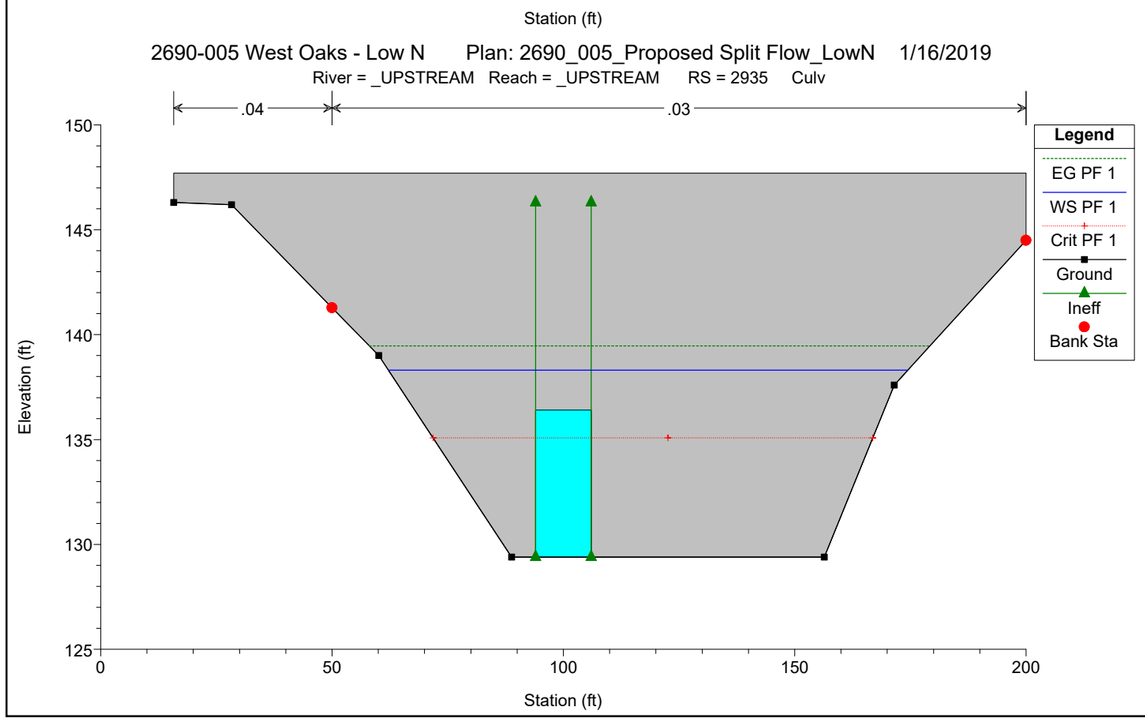
HEC-RAS Plan: Proposed_Split Flow_LowN Profile: PF 1

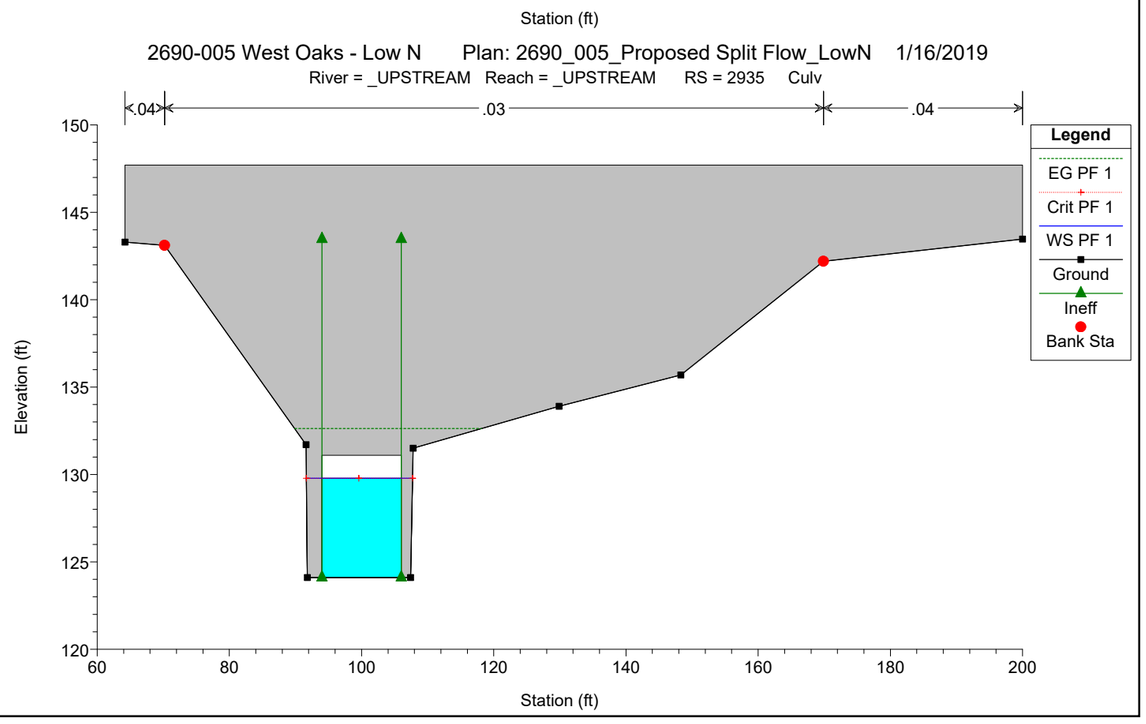
River	Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
				(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
_UPSTREAM	_UPSTREAM	3160	PF 1	922.00	129.40	139.57		139.61	0.000078	1.53	601.33	87.86	0.10
_UPSTREAM	_UPSTREAM	3010	PF 1	922.00	129.40	138.31	135.09	139.47	0.001640	8.62	106.94	112.28	0.51
_UPSTREAM	_UPSTREAM	2935		Culvert									
_UPSTREAM	_UPSTREAM	2860	PF 1	922.00	124.10	129.78	129.78	132.62	0.007376	13.54	68.11	16.06	1.00
_UPSTREAM	_UPSTREAM	2800	PF 1	922.00	118.60	125.85		126.44	0.002564	6.14	150.10	31.94	0.50
_UPSTREAM	_UPSTREAM	2710	PF 1	922.00	118.20	125.63		126.21	0.002422	6.13	150.43	30.32	0.49
_UPSTREAM	_UPSTREAM	2600	PF 1	922.00	118.20	125.59	122.35	125.97	0.001197	4.91	189.01	107.20	0.36
_UPSTREAM	_UPSTREAM	2510	PF 1	922.00	118.10	125.52		125.84	0.001223	4.56	202.25	178.29	0.36
_UPSTREAM	_UPSTREAM	2400	PF 1	922.00	115.50	125.54		125.71	0.000523	3.34	276.70	312.56	0.25
MAIN CHANNEL	MAIN	2360	PF 1	879.00	115.40	124.77	120.77	125.61	0.002515	7.34	120.98	331.64	0.47
MAIN CHANNEL	MAIN	2248.50		Culvert									
MAIN CHANNEL	MAIN	2140	PF 1	879.00	115.56	121.04	121.04	123.69	0.016550	13.07	67.26	241.05	1.00
MAIN CHANNEL	MAIN	2080	PF 1	879.00	113.40	118.92	118.92	121.66	0.017557	13.28	66.17	222.22	1.00
MAIN CHANNEL	MAIN	2020	PF 1	879.00	110.30	114.81	114.81	116.52	0.010876	10.48	83.85	44.43	1.00
MAIN CHANNEL	MAIN	1900	PF 1	879.00	109.90	114.85		115.31	0.002767	5.72	186.87	157.62	0.55
MAIN CHANNEL	MAIN	1800	PF 1	879.00	109.60	113.98	113.98	114.86	0.006700	7.77	132.41	148.40	0.83
MAIN CHANNEL	MAIN	1700	PF 1	879.00	108.30	113.13	113.13	114.04	0.006570	7.96	131.18	209.11	0.82
MAIN CHANNEL	MAIN	1600	PF 1	879.00	107.30	112.45		113.10	0.005132	6.91	154.78	149.58	0.73
MAIN CHANNEL	MAIN	1500	PF 1	879.00	106.40	112.24	111.52	112.65	0.002875	5.61	198.64	224.89	0.55
MAIN CHANNEL	MAIN	1400	PF 1	879.00	105.90	111.40	110.64	112.24	0.004898	7.37	121.26	313.73	0.72
MAIN CHANNEL	MAIN	1300	PF 1	879.00	105.60	110.39	110.39	111.58	0.008394	8.76	104.39	282.31	0.93
MAIN CHANNEL	MAIN	1228	PF 1	879.00	105.40	109.64	109.17	109.93	0.002318	4.89	269.92	278.95	0.50
MAIN CHANNEL	MAIN	1203		Bridge									
MAIN CHANNEL	MAIN	1178	PF 1	879.00	104.80	107.20	107.20	107.68	0.011875	6.74	178.87	173.33	1.00
MAIN CHANNEL	MAIN	1100	PF 1	879.00	101.50	104.01	104.01	104.74	0.011713	6.84	128.43	88.30	1.00
LEFT SPLIT	LEFT	2360	PF 1	43.00	120.70	121.26	121.26	121.45	0.006535	3.44	12.50	34.89	1.01
LEFT SPLIT	LEFT	2140	PF 1	43.00	116.80	117.54	117.54	117.71	0.006522	3.23	13.32	197.56	1.00
LEFT SPLIT	LEFT	2080	PF 1	43.00	116.00	116.57	116.57	116.73	0.006387	3.28	13.19	126.35	0.99
LEFT SPLIT	LEFT	2020	PF 1	43.00	114.60	115.16	115.16	115.28	0.005738	2.95	21.67	108.29	0.93
LEFT SPLIT	LEFT	1900	PF 1	43.00	112.00	112.30	112.30	112.44	0.006821	3.05	14.10	49.09	1.00
LEFT SPLIT	LEFT	1800	PF 1	43.00	111.00	111.92		111.95	0.000410	1.30	33.09	50.07	0.28
LEFT SPLIT	LEFT	1700	PF 1	43.00	111.00	111.71	111.71	111.89	0.006251	3.38	12.81	108.09	1.00
LEFT SPLIT	LEFT	1600	PF 1	43.00	110.50	110.85		110.93	0.002818	2.25	19.49	57.61	0.67
LEFT SPLIT	LEFT	1500	PF 1	43.00	110.00	110.44	110.44	110.57	0.006529	2.97	15.33	58.42	0.98
LEFT SPLIT	LEFT	1400	PF 1	43.00	109.00	109.64	109.62	109.77	0.005319	2.90	14.82	73.43	0.90
LEFT SPLIT	LEFT	1300	PF 1	43.00	109.00	109.18	109.18	109.27	0.007503	2.36	18.22	113.58	0.98
LEFT SPLIT	LEFT	1225	PF 1	43.00	106.80	107.31	107.31	107.49	0.018317	3.44	12.51	34.01	1.00
LEFT SPLIT	LEFT	1178	PF 1	43.00	105.50	106.07	106.07	106.23	0.019180	3.28	13.20	40.57	1.01
LEFT SPLIT	LEFT	1100	PF 1	43.00	101.50	102.04	102.04	102.22	0.018961	3.35	12.82	37.19	1.01

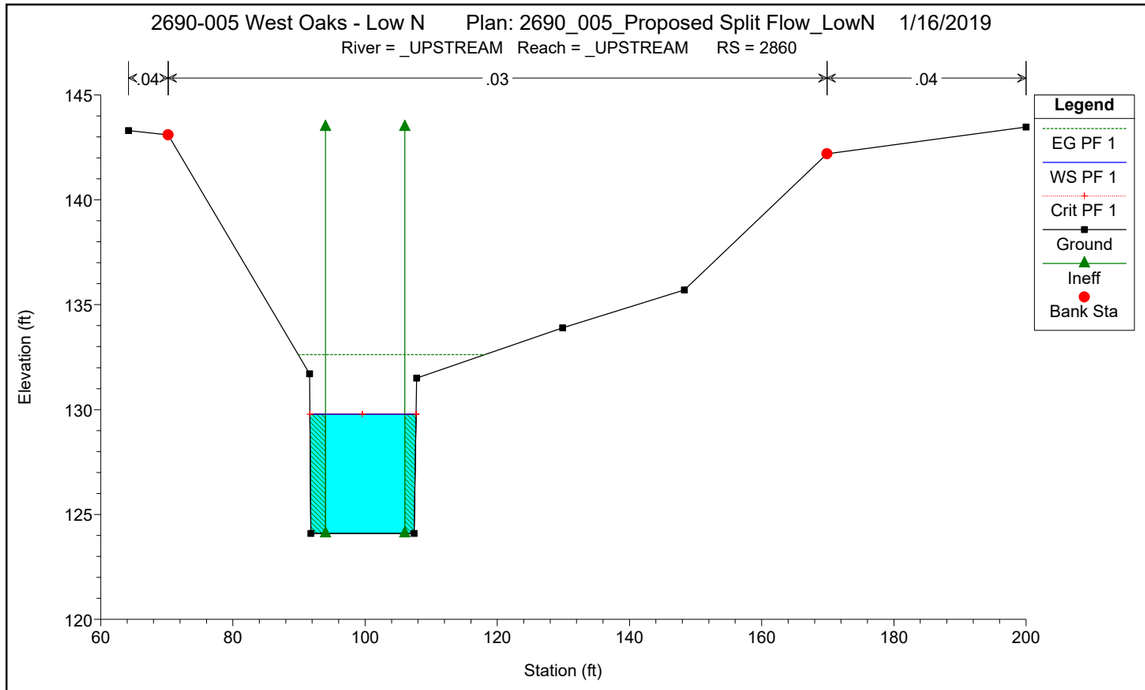
Proposed Sections - Low N

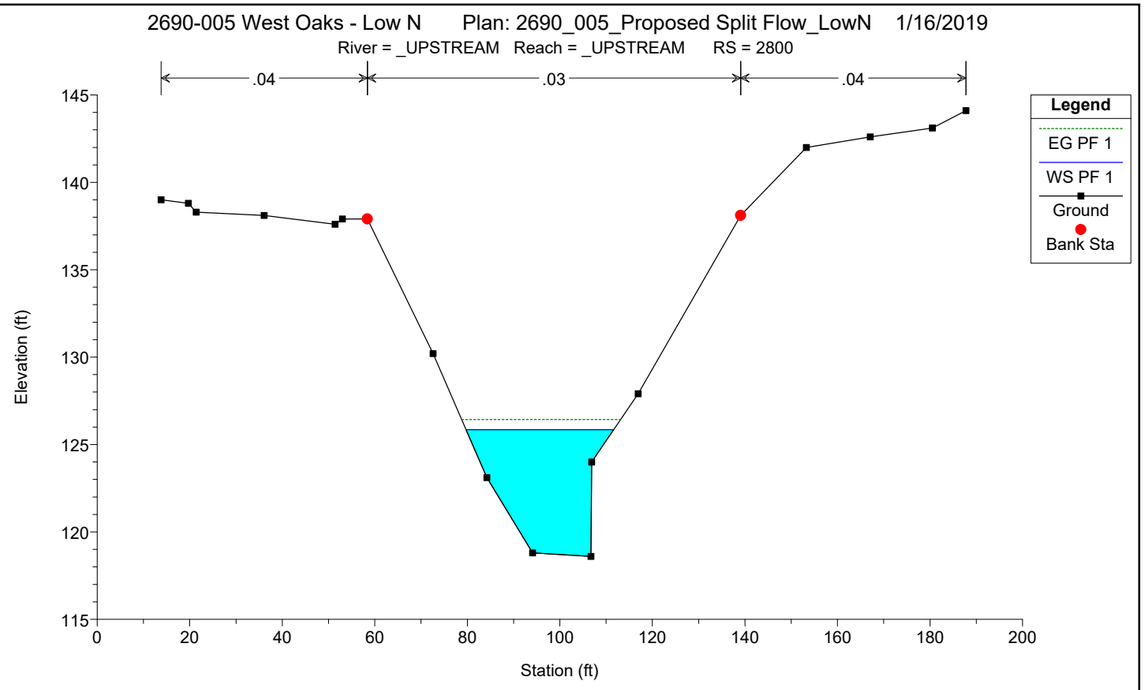


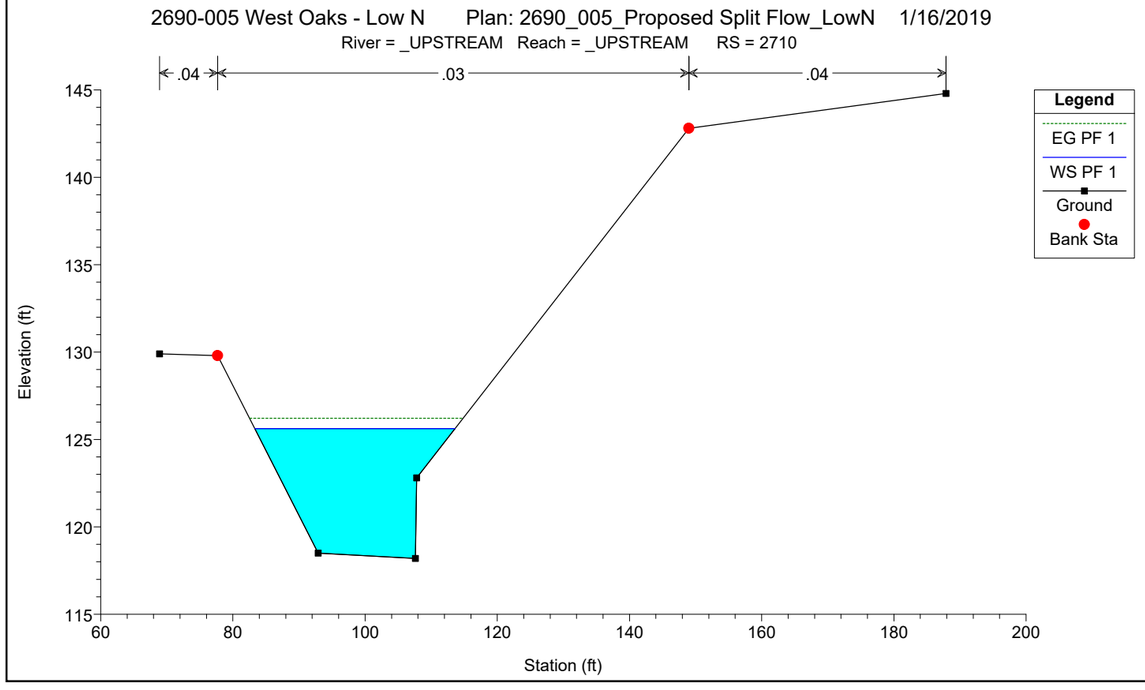


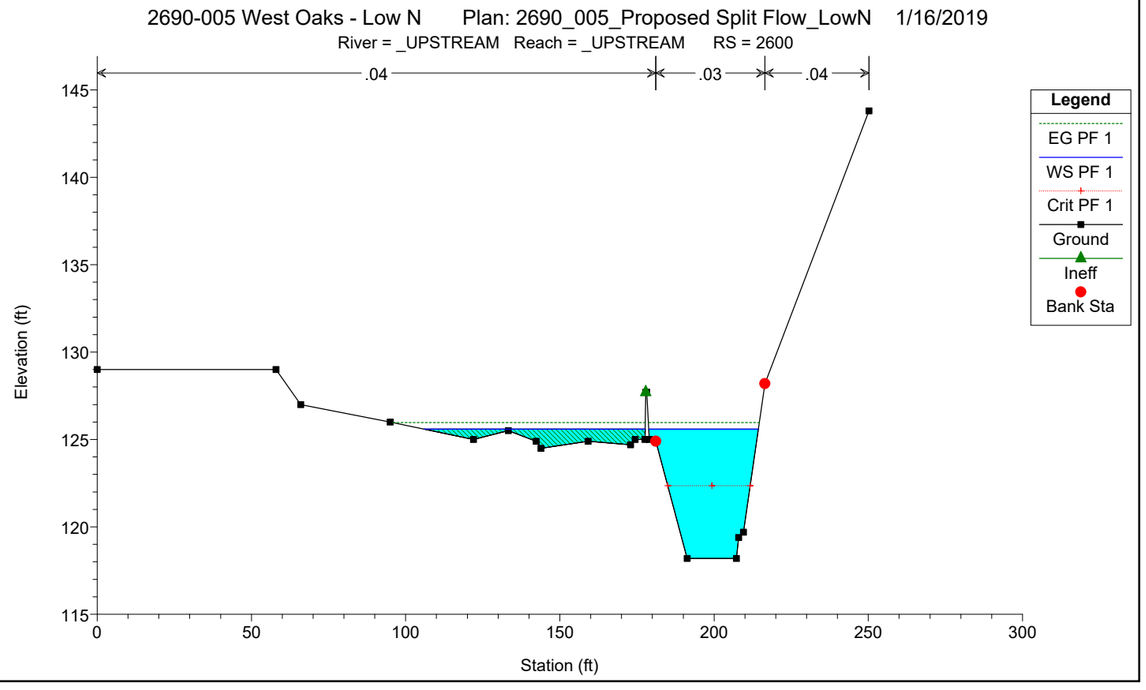


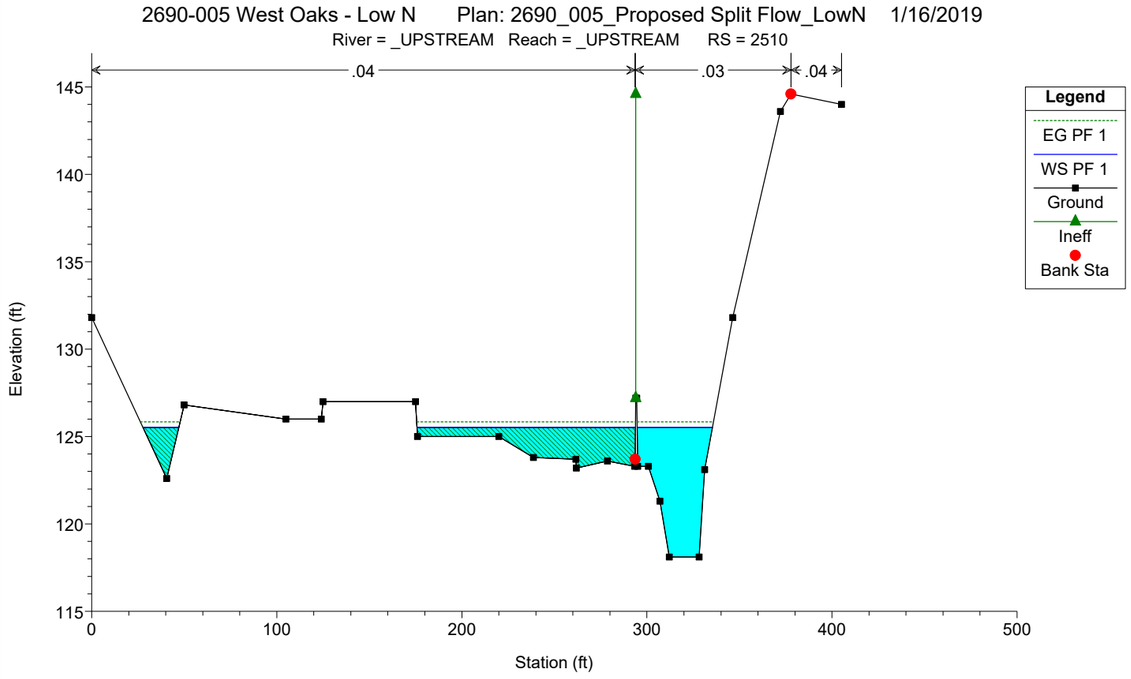


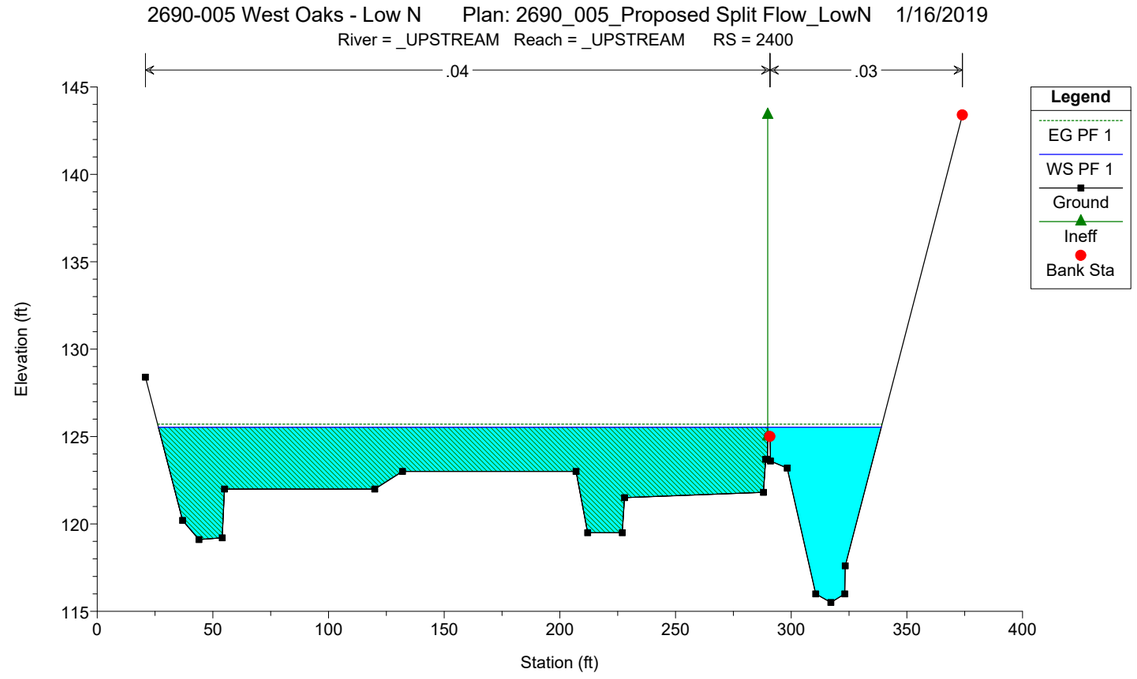

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2860
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

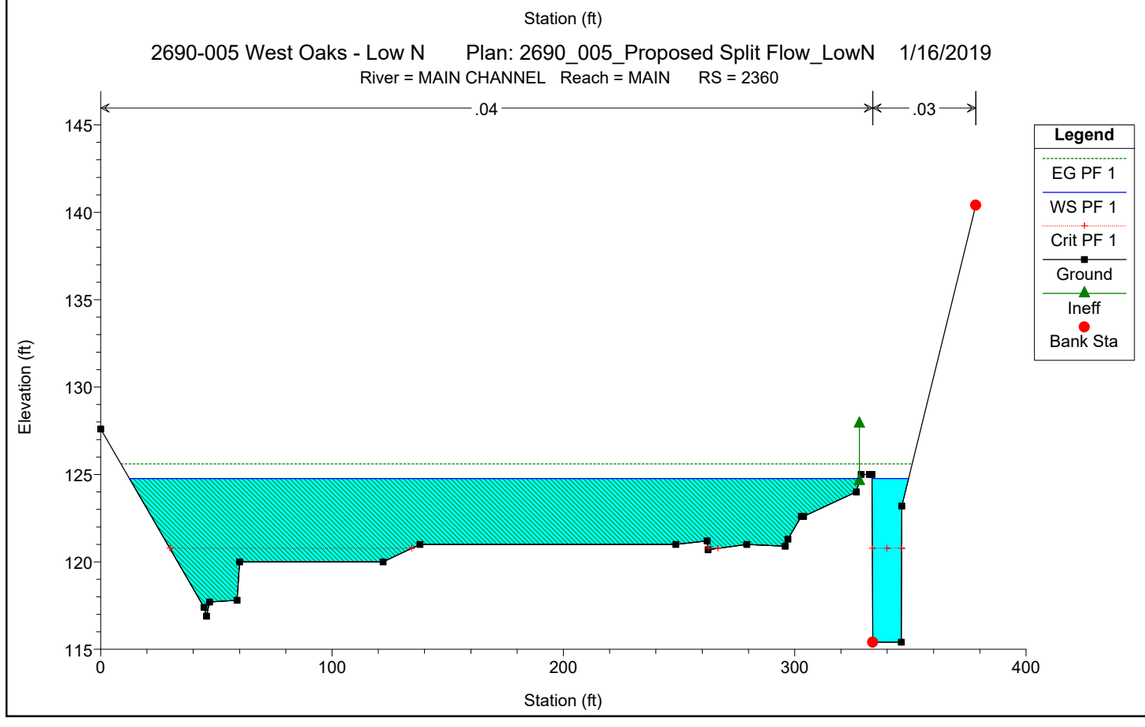

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2800
.04
.03
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

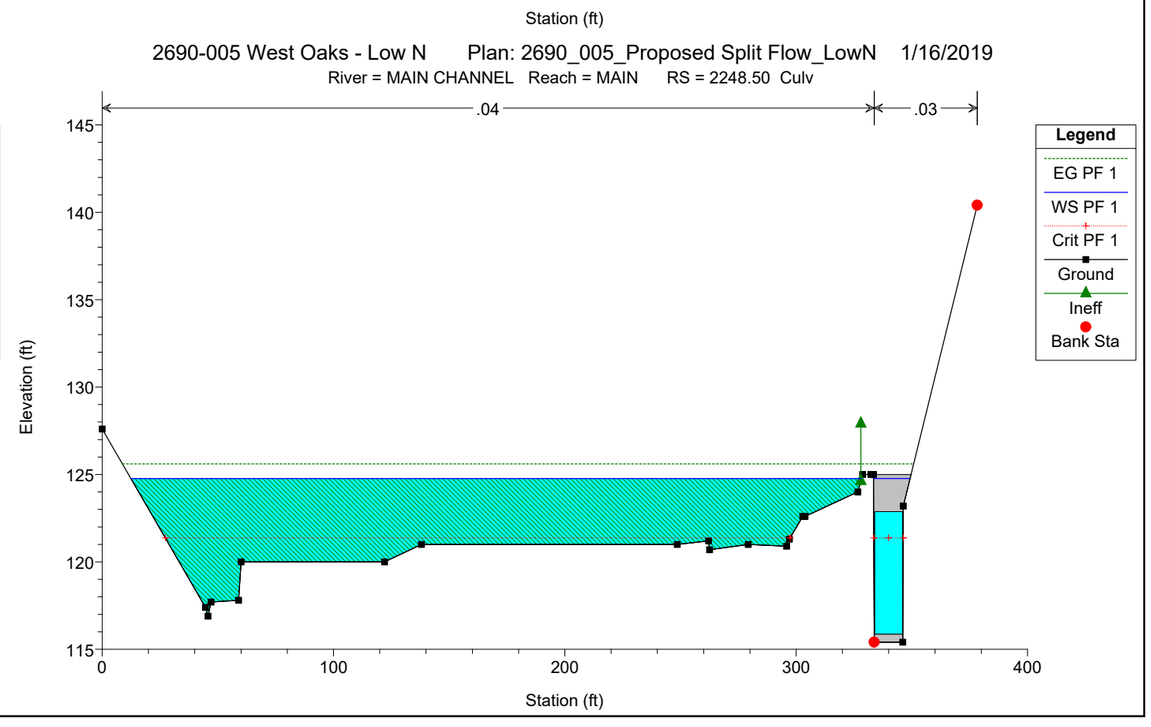

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2710
.04
.03
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2600
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2510
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta

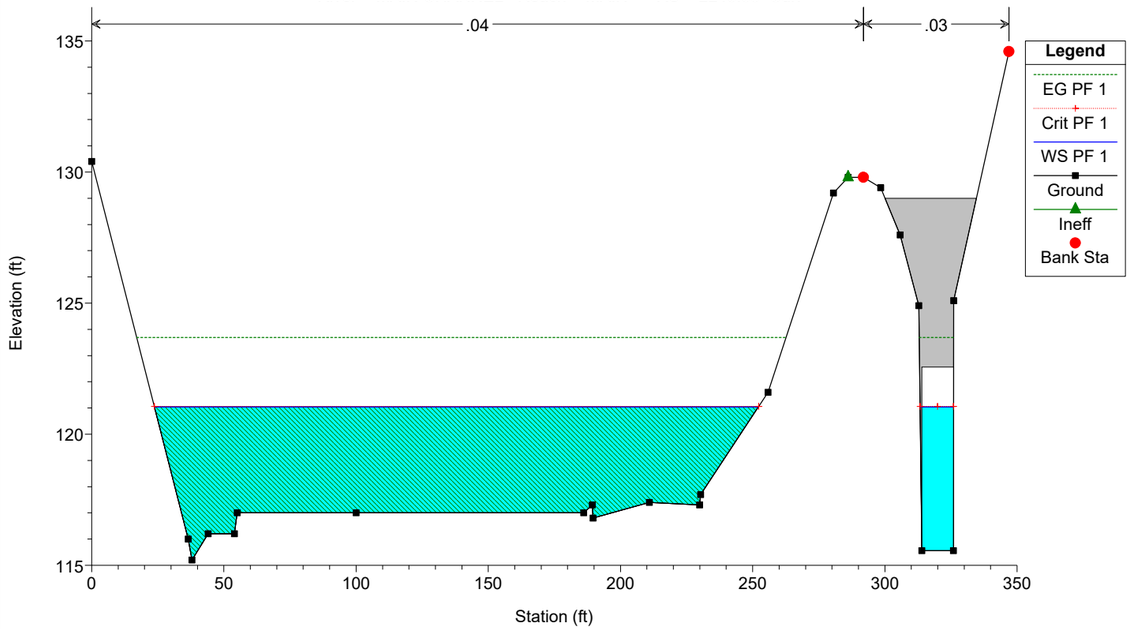

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = _UPSTREAM Reach = _UPSTREAM RS = 2400
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2360
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv
.04
.03
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

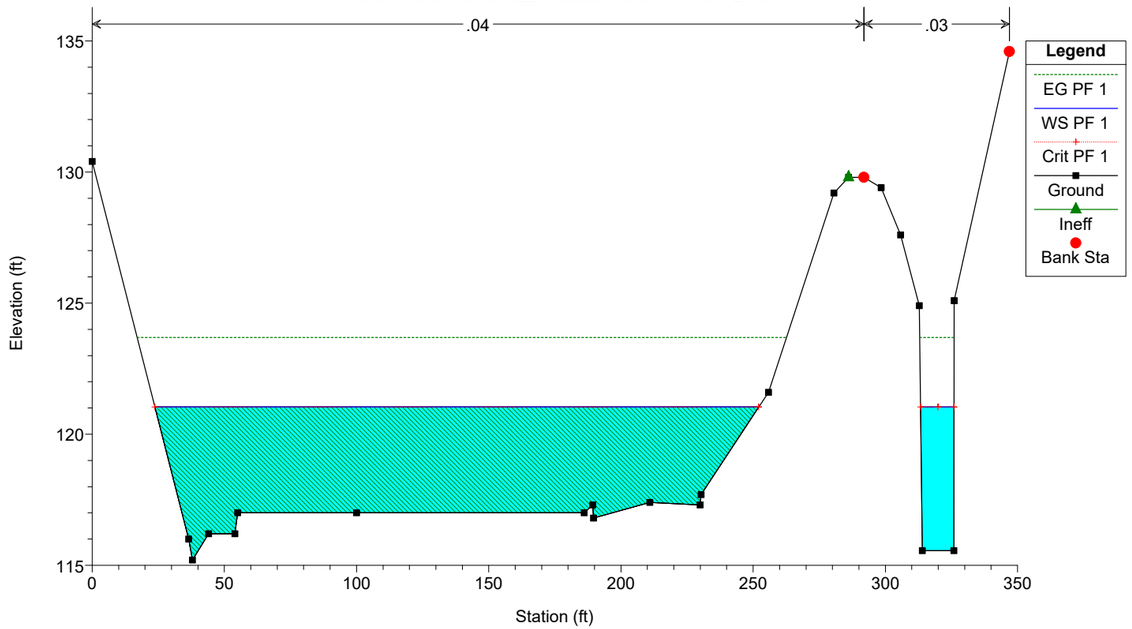
2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2248.50 Culv



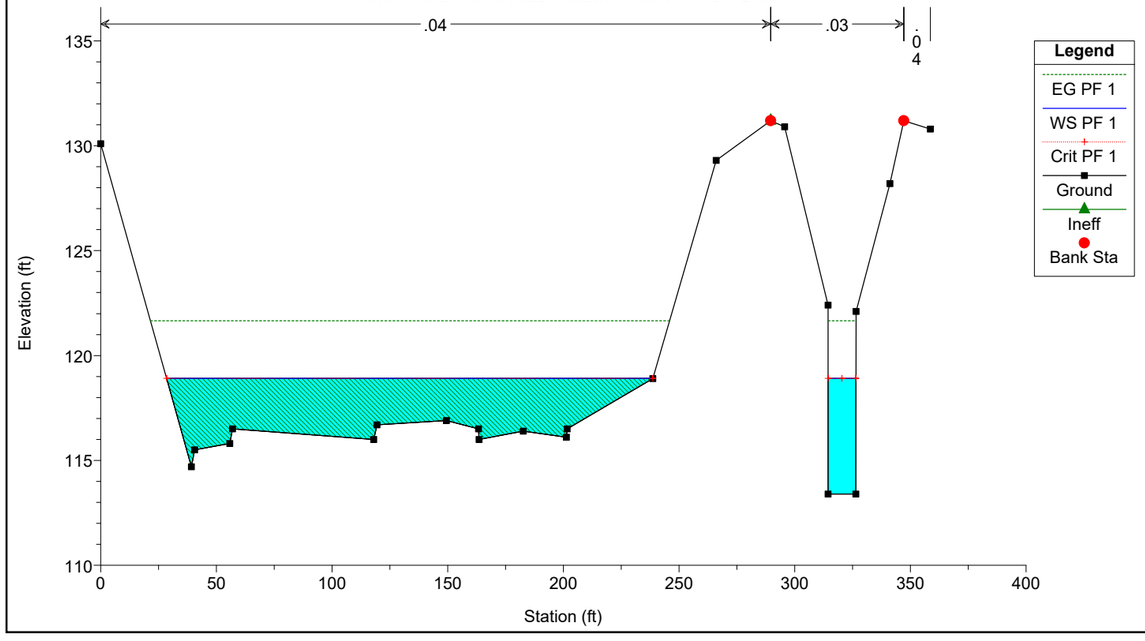
2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019

River = MAIN CHANNEL Reach = MAIN RS = 2140



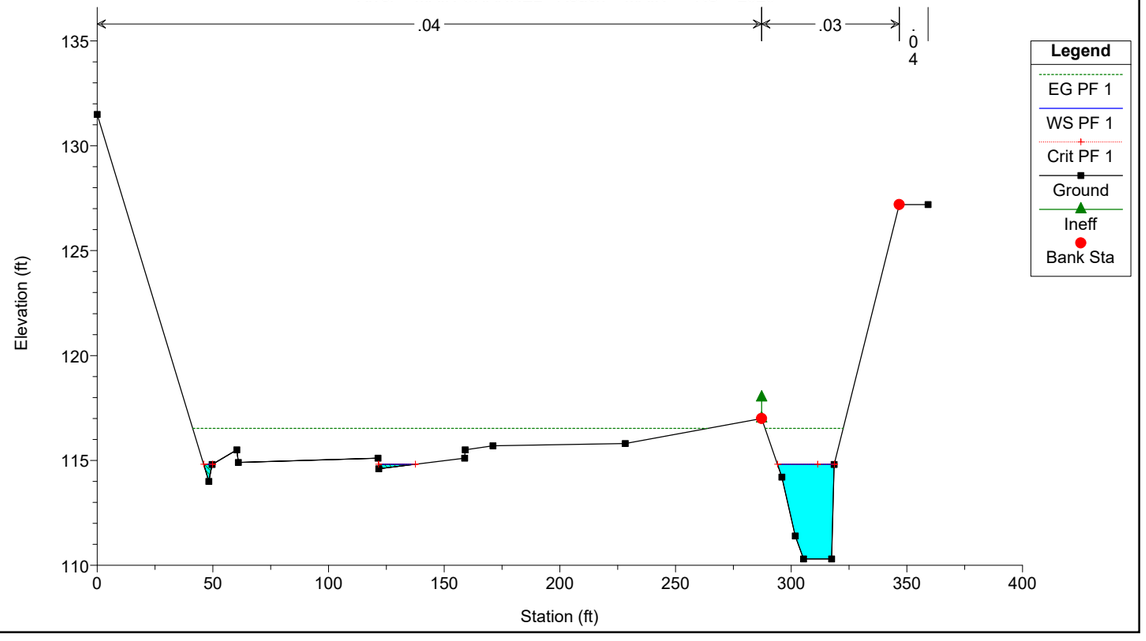
2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019

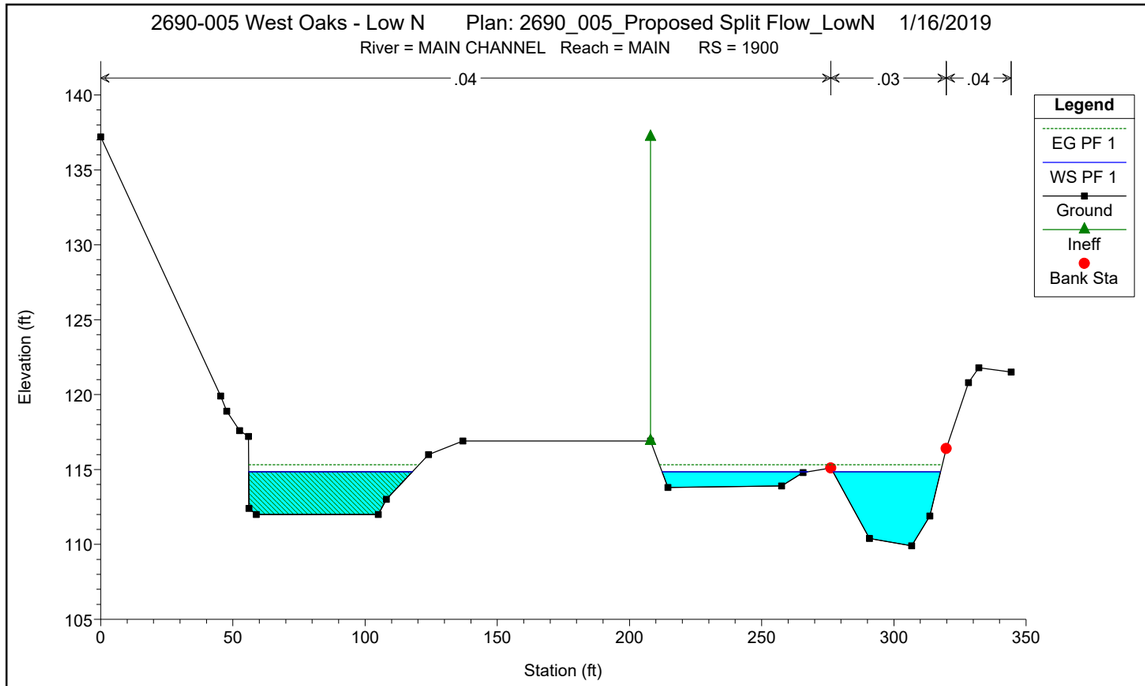
River = MAIN CHANNEL Reach = MAIN RS = 2080

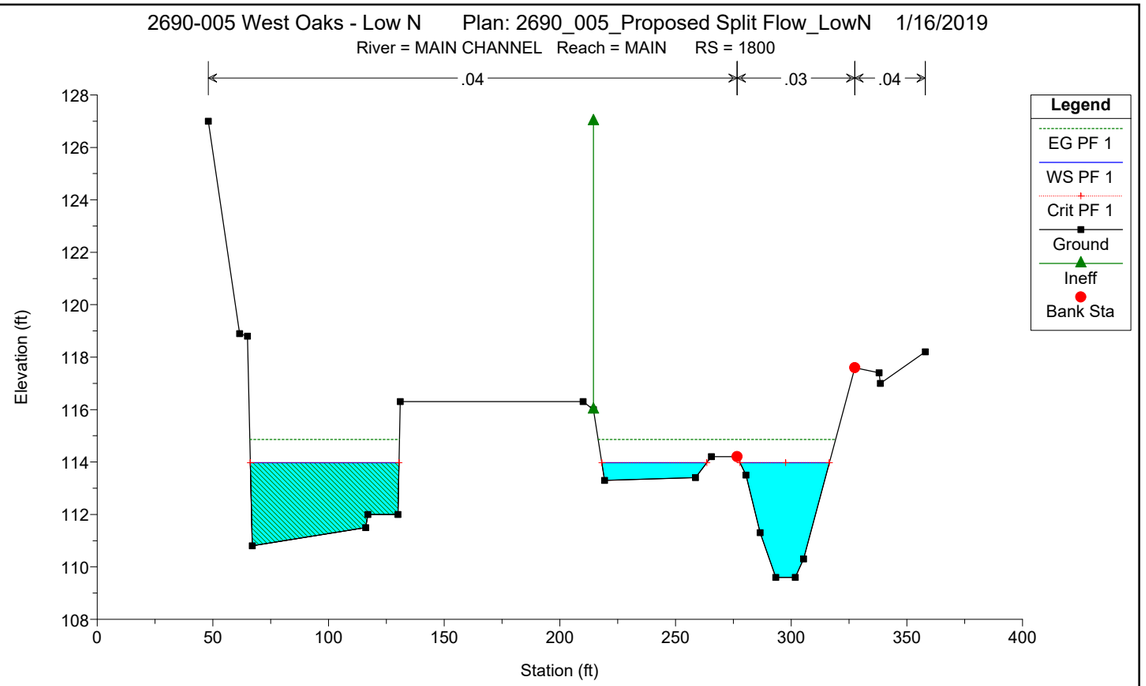


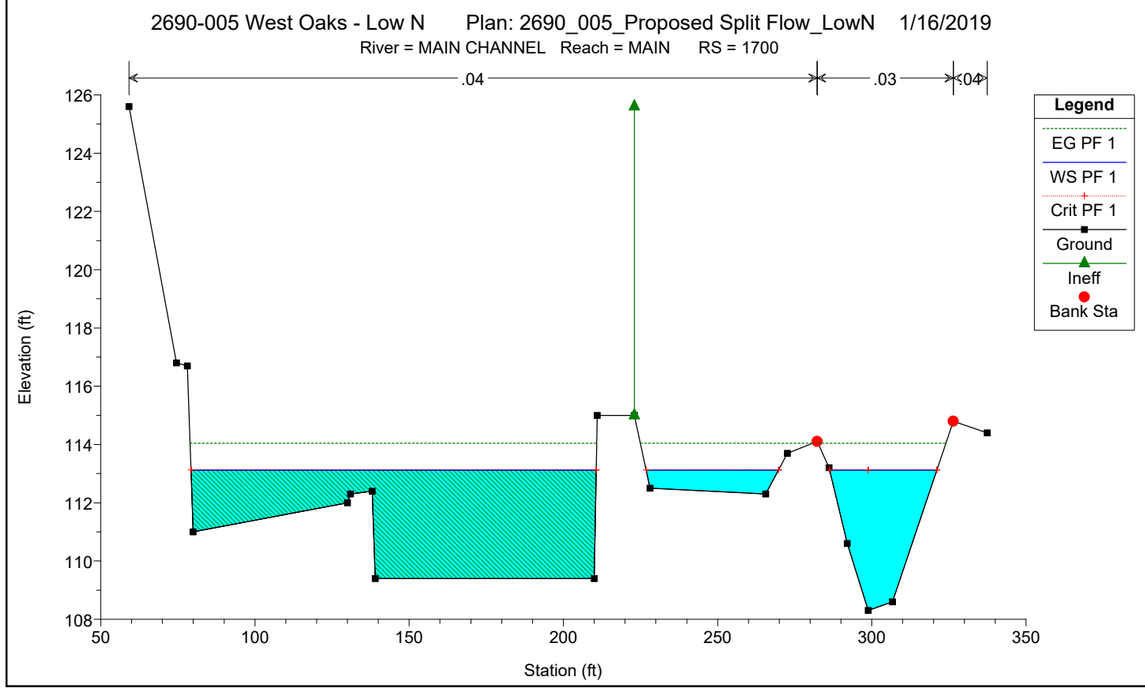
2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019

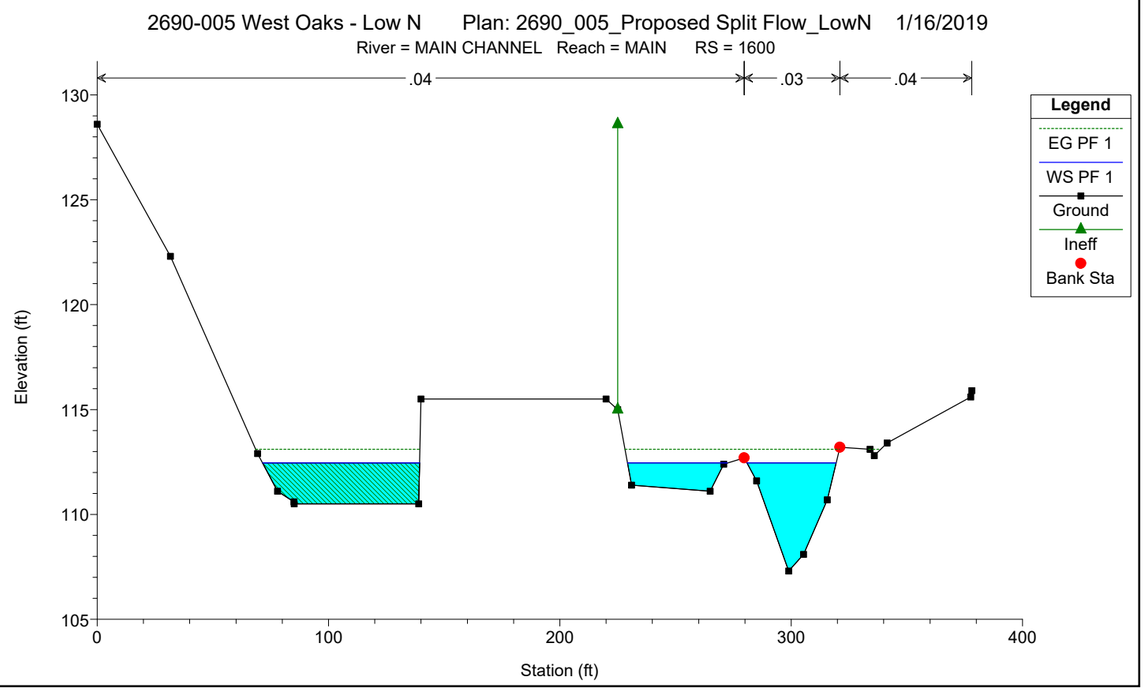
River = MAIN CHANNEL Reach = MAIN RS = 2020

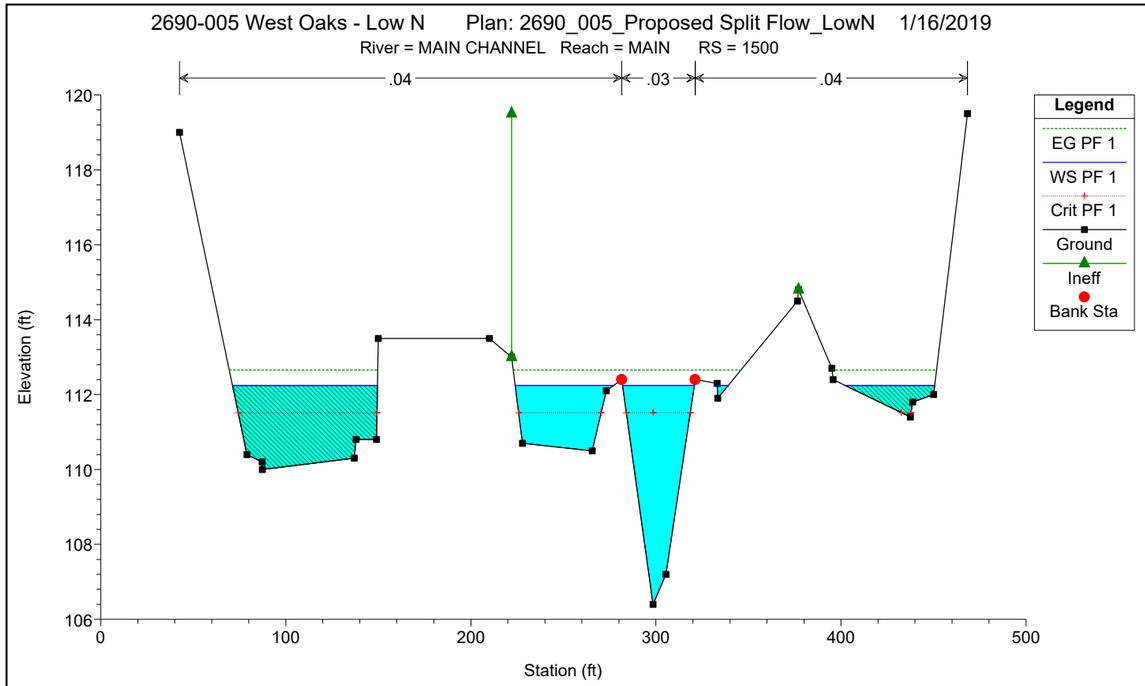


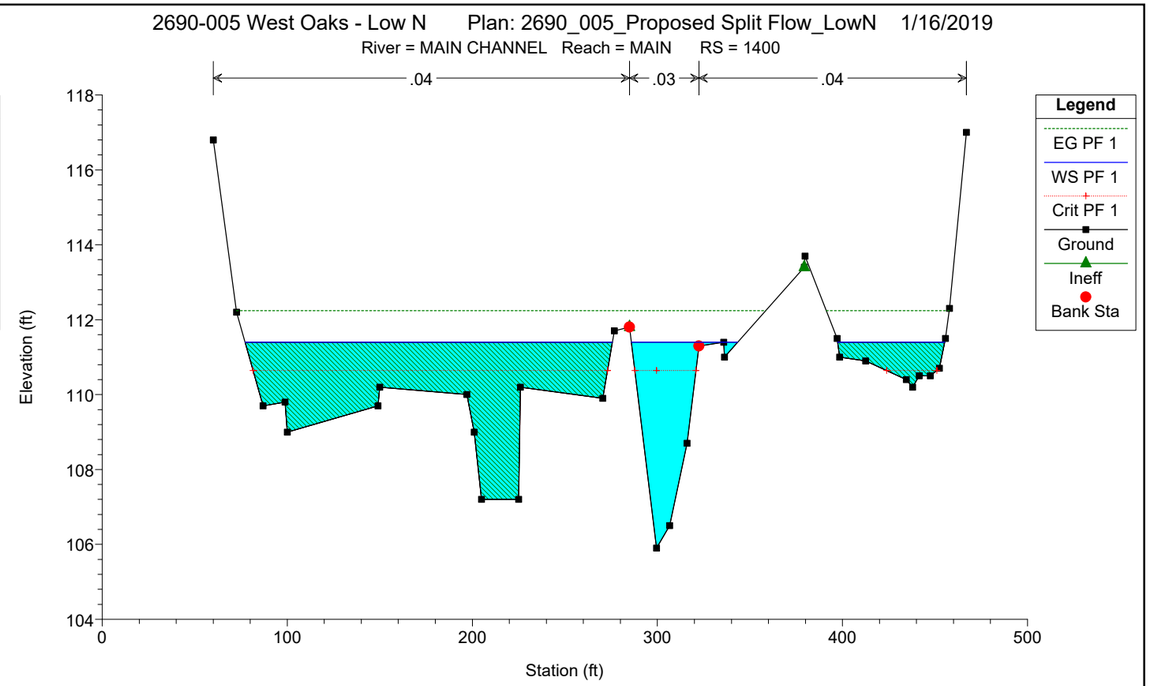

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1900
.04
.03
.04
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

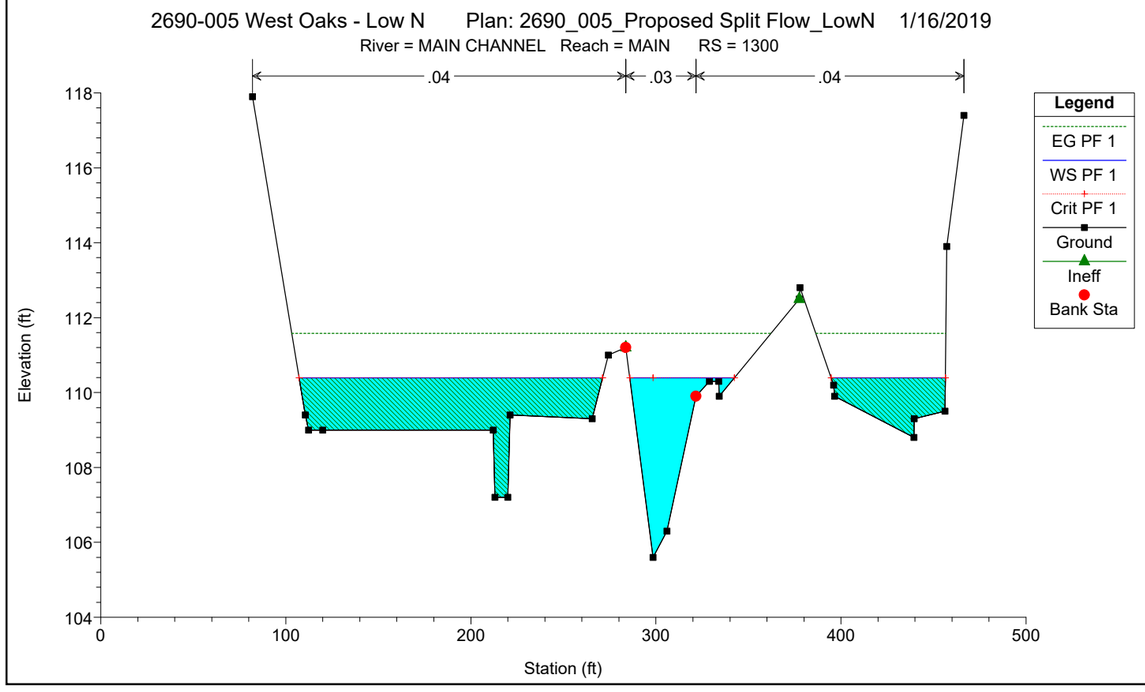

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1800
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

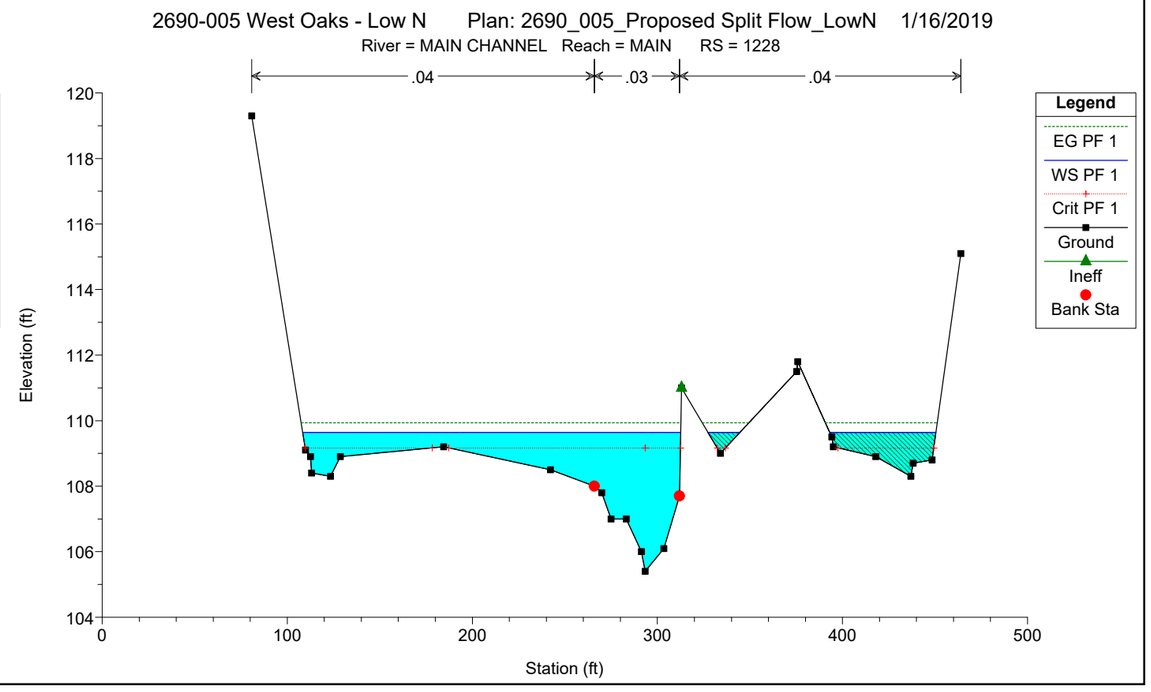

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1700
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

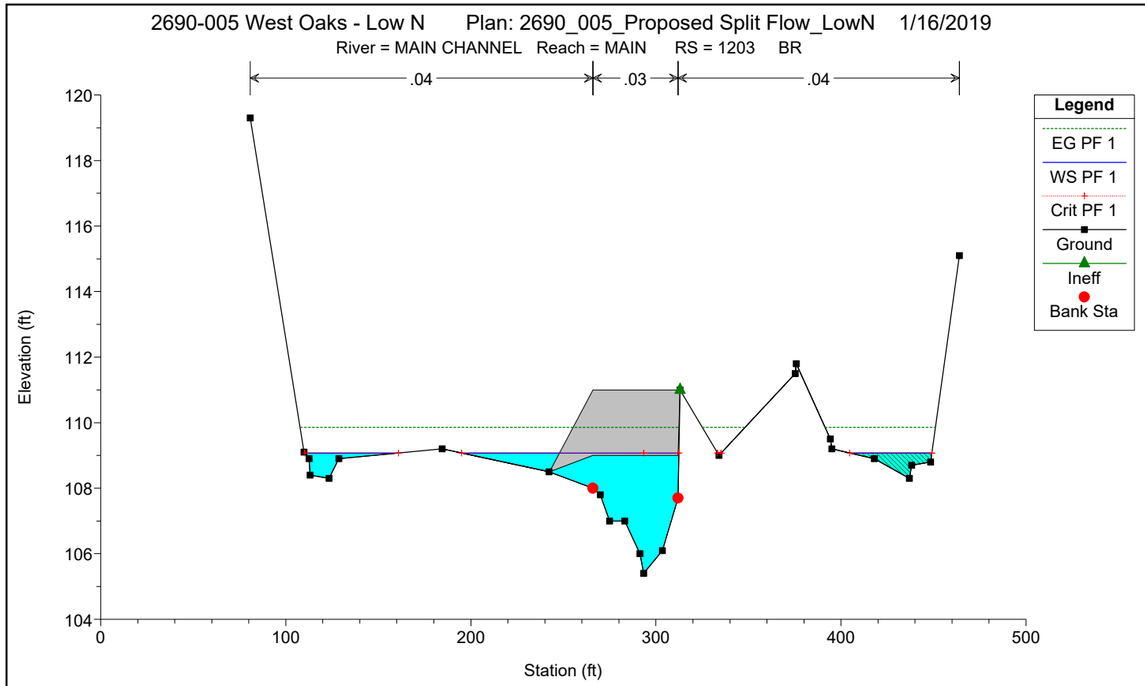

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1600
.04
.03
.04
Legend
EG PF 1
WS PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

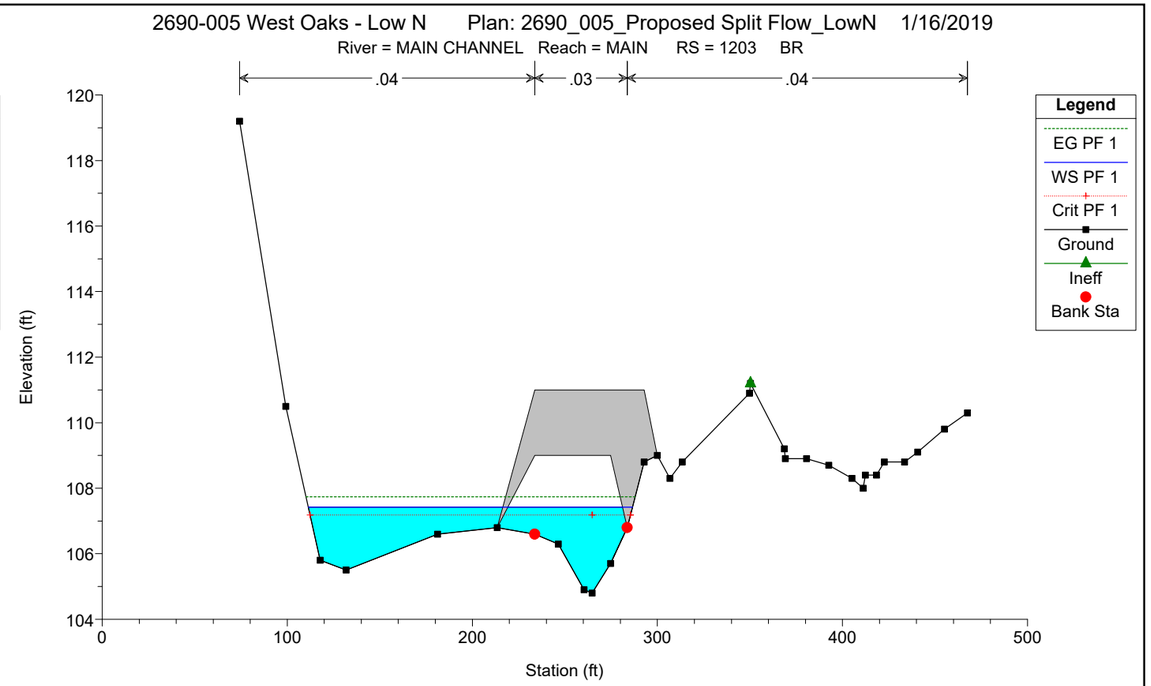

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1500
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

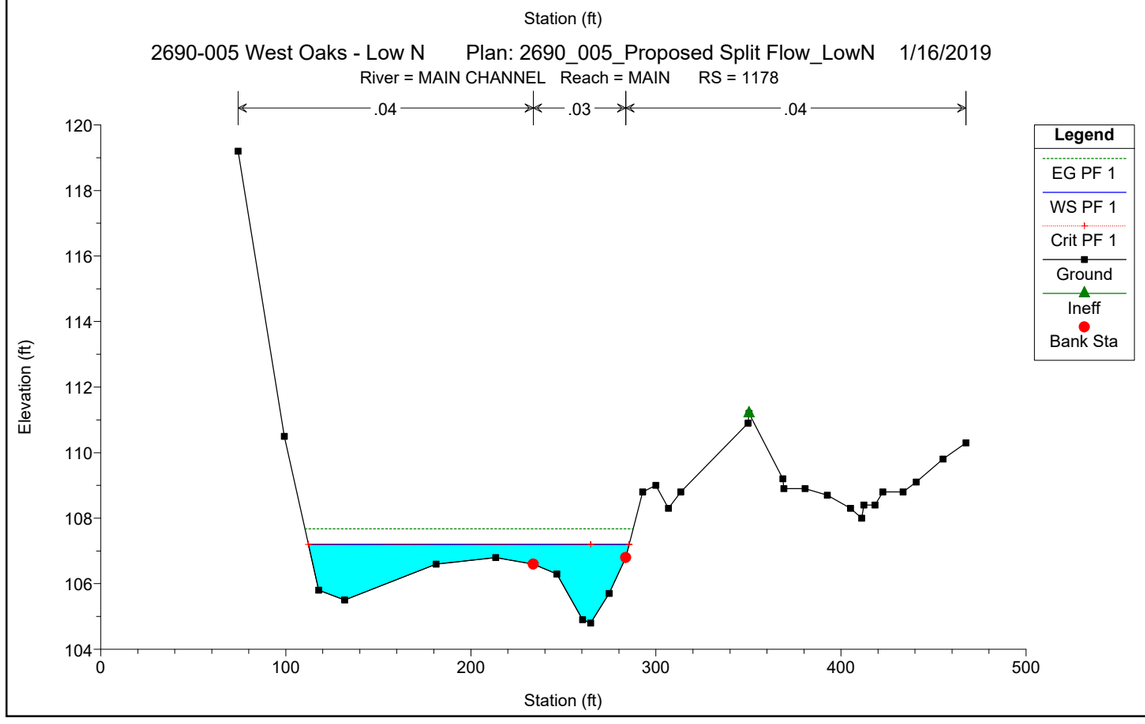

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1400
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

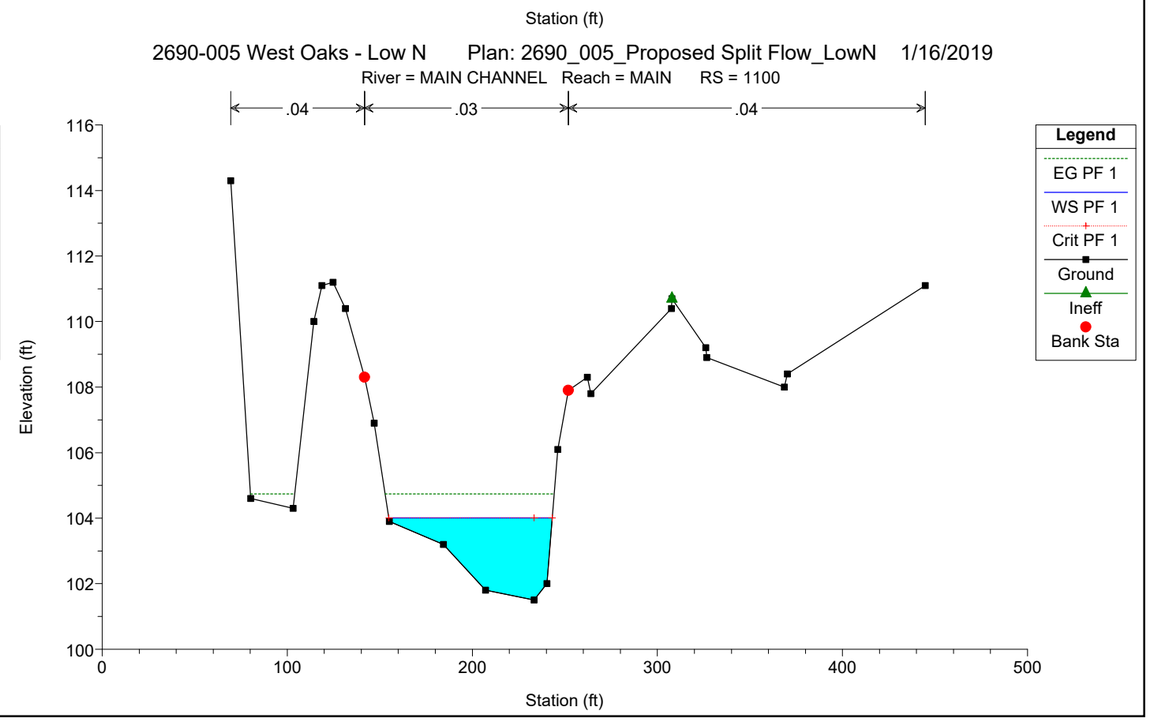

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1300
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

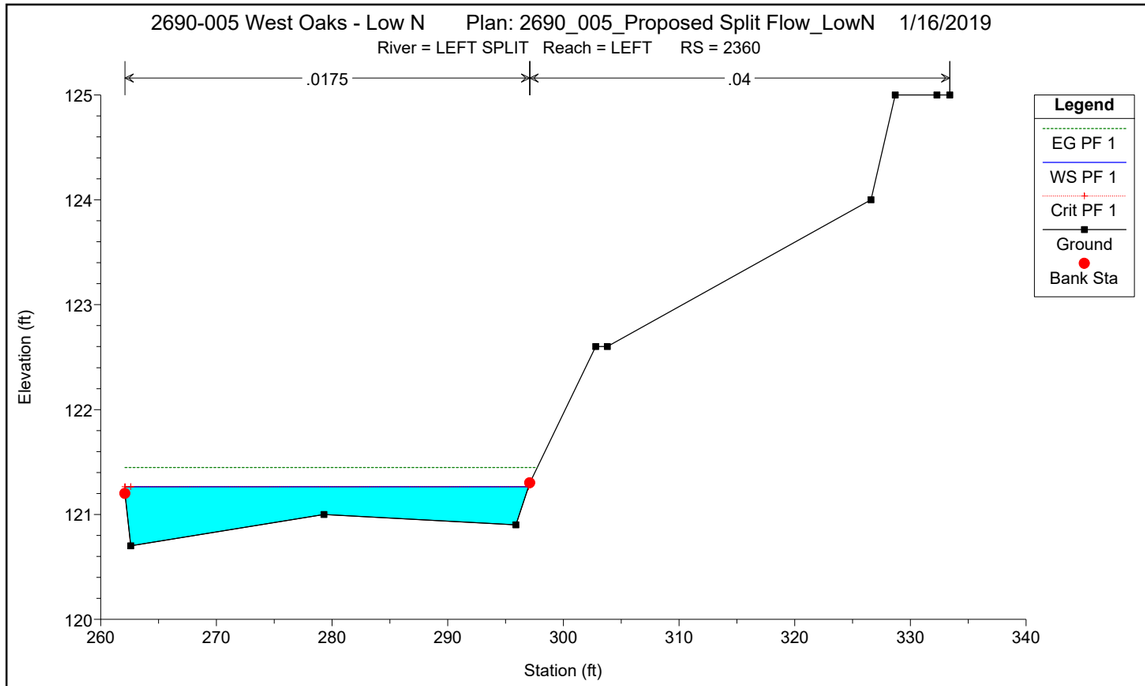

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1228
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

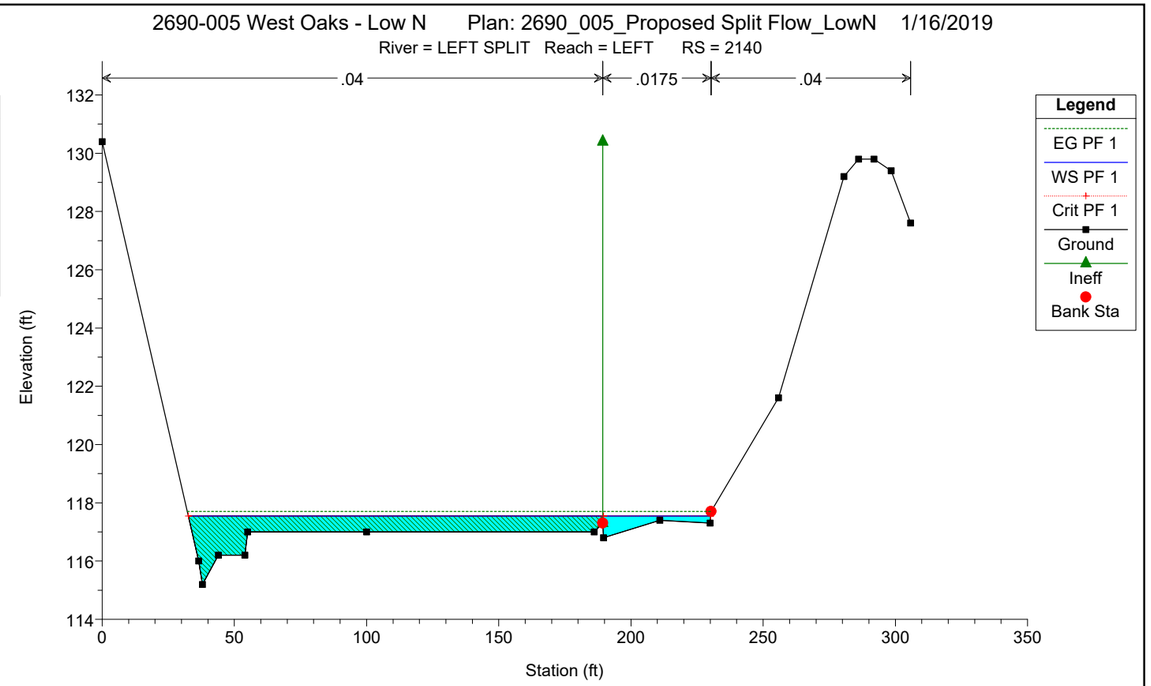

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1203 BR
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

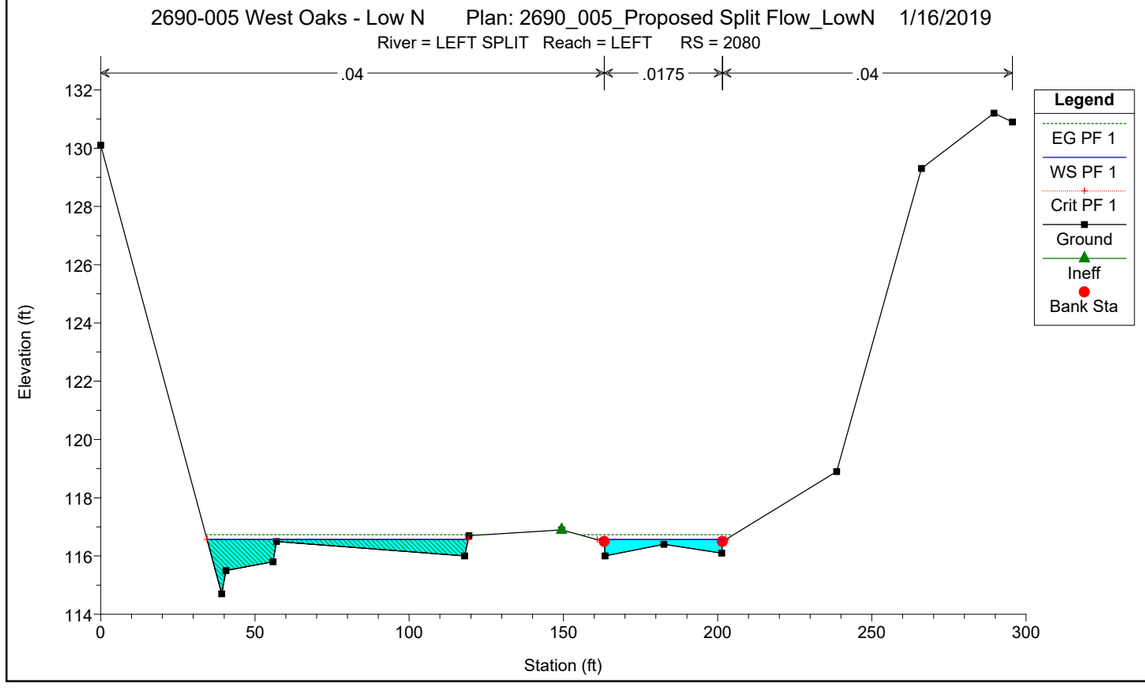

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1203 BR
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

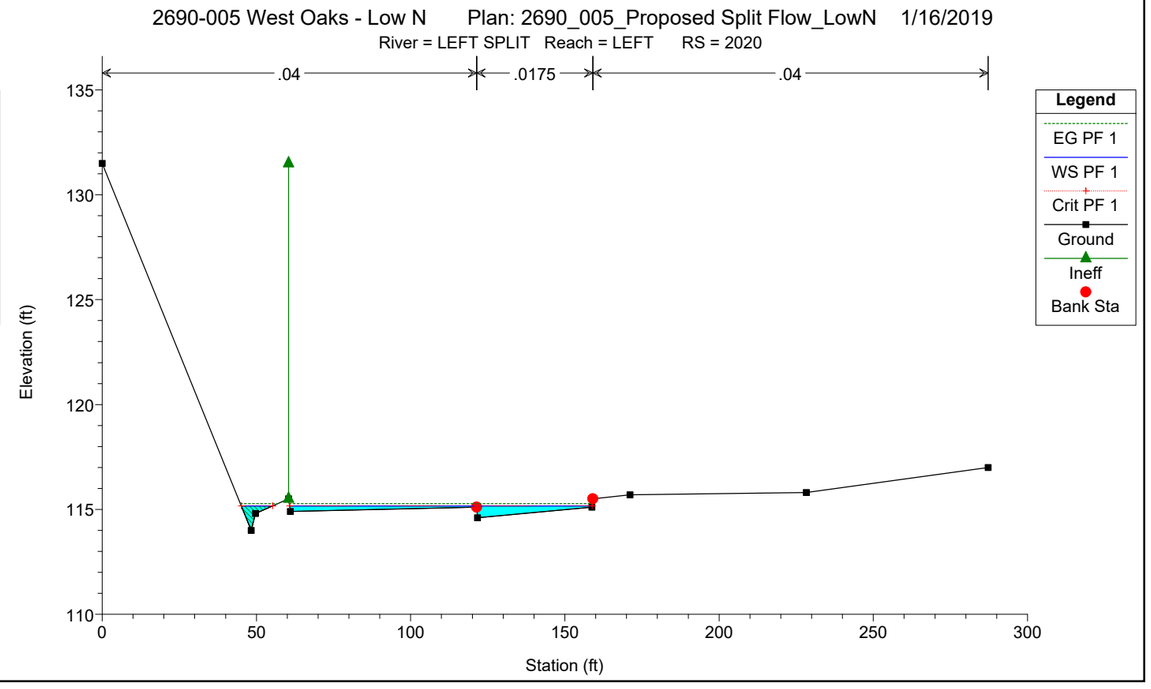

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1178
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

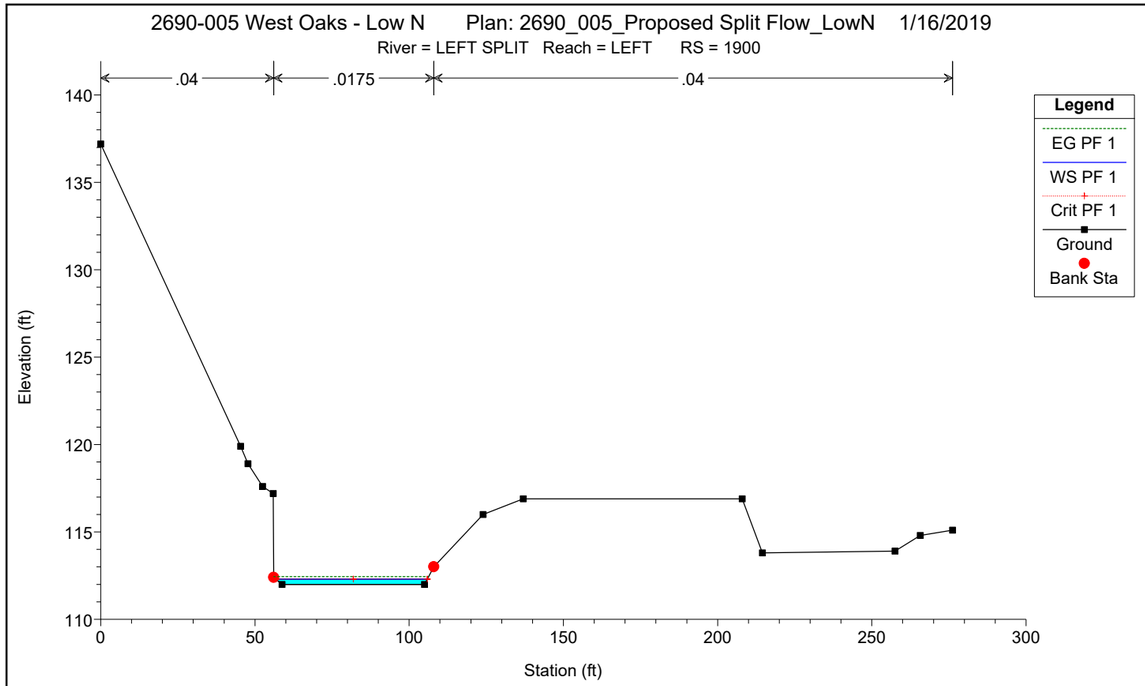

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = MAIN CHANNEL Reach = MAIN RS = 1100
.04
.03
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

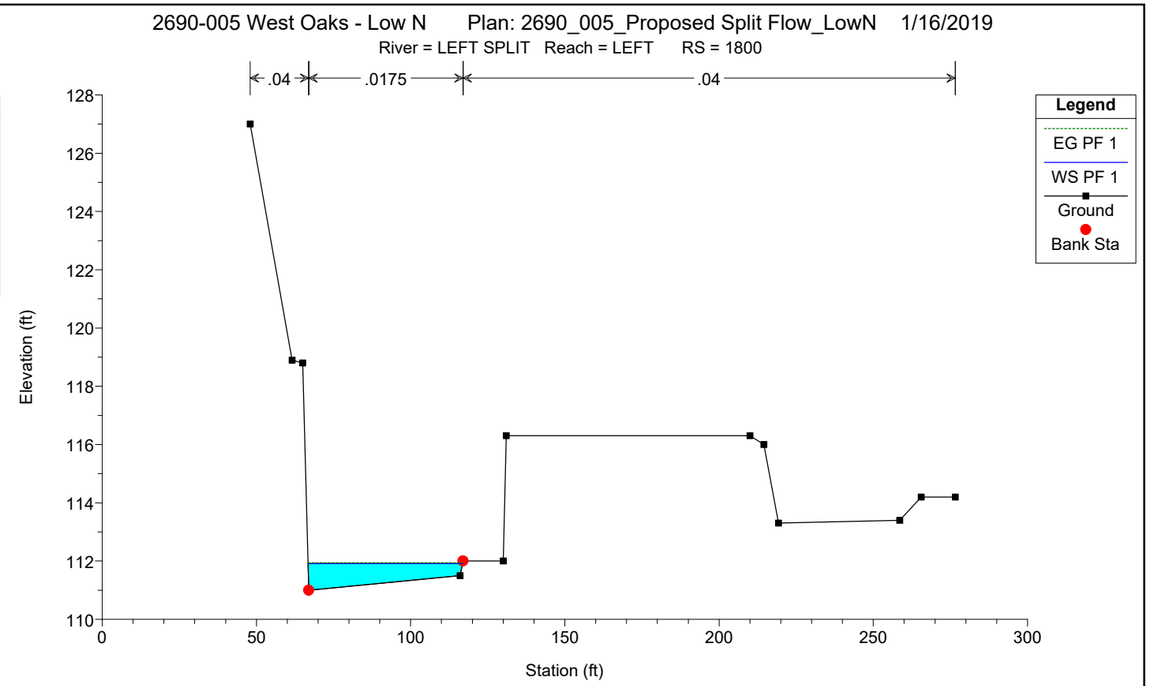

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 2360
.0175
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta

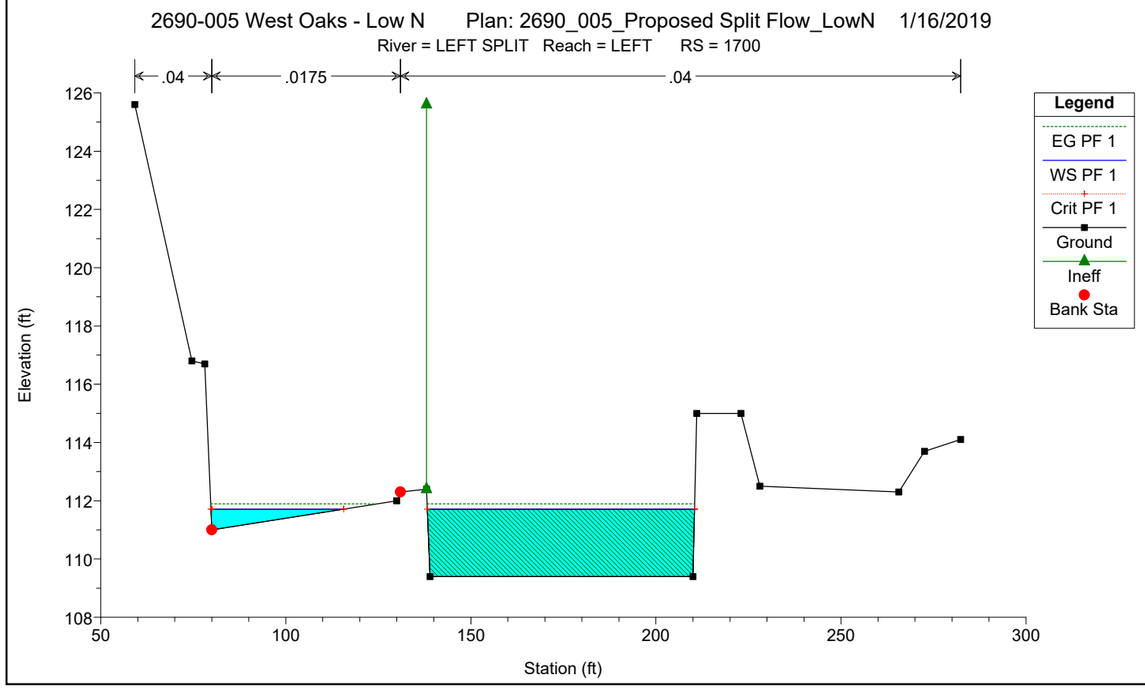

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 2140
.04
.0175
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

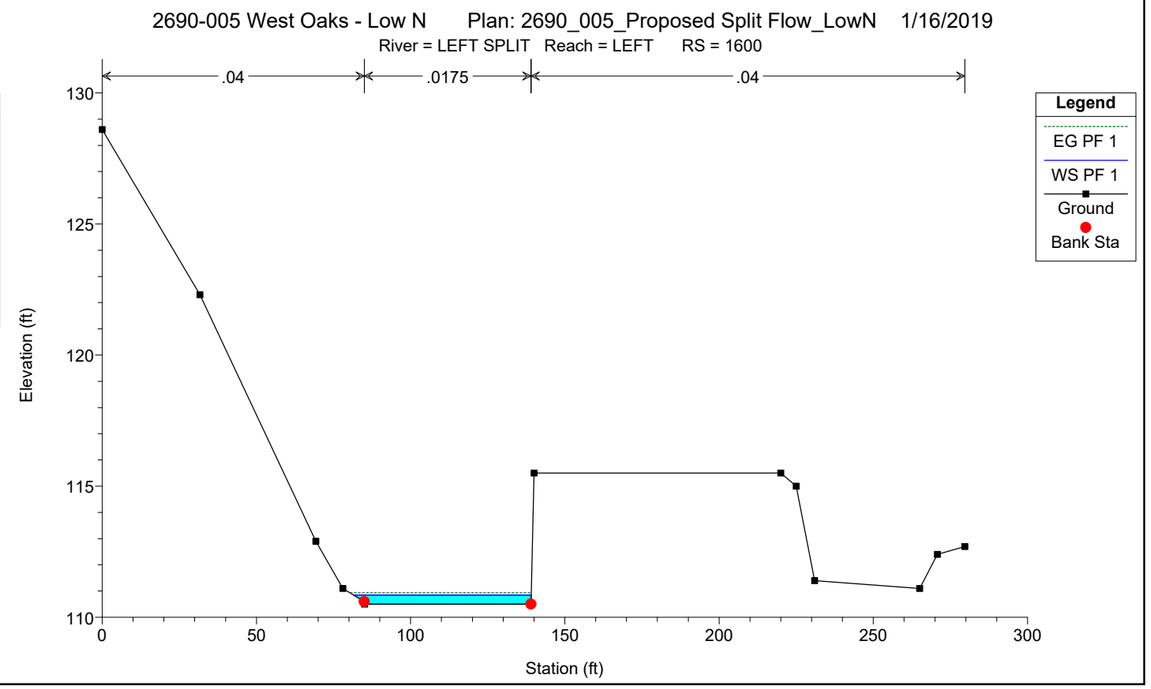

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 2080
.04
.0175
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

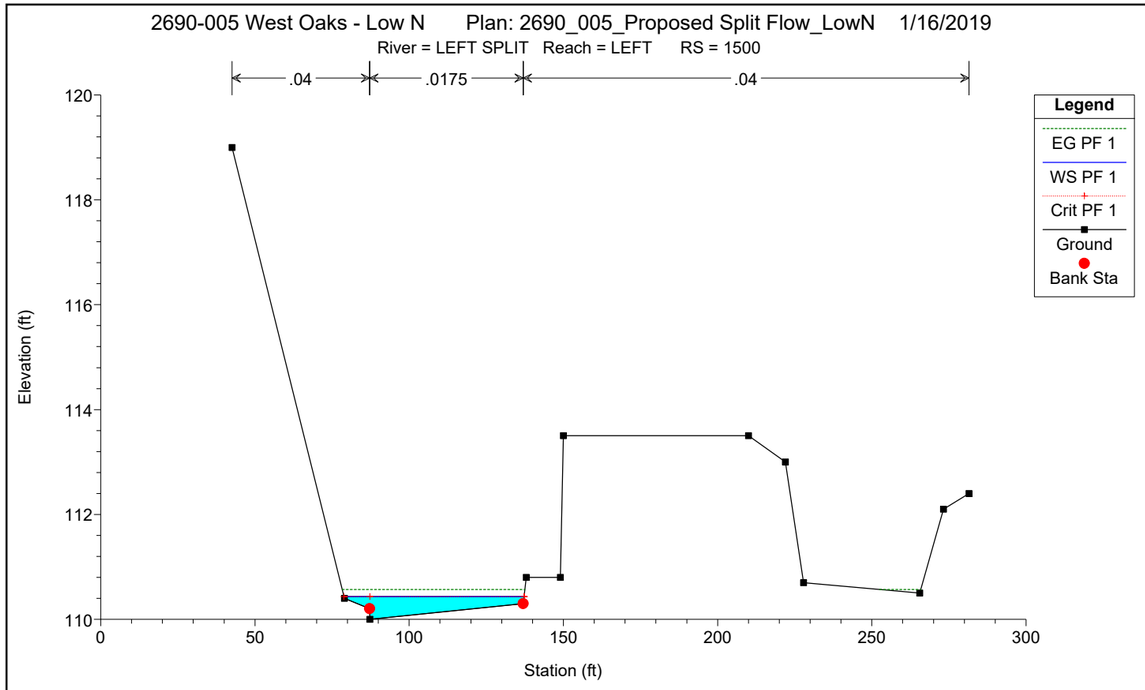

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 2020
.04
.0175
.04
Elevation (ft)
Station (ft)
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta

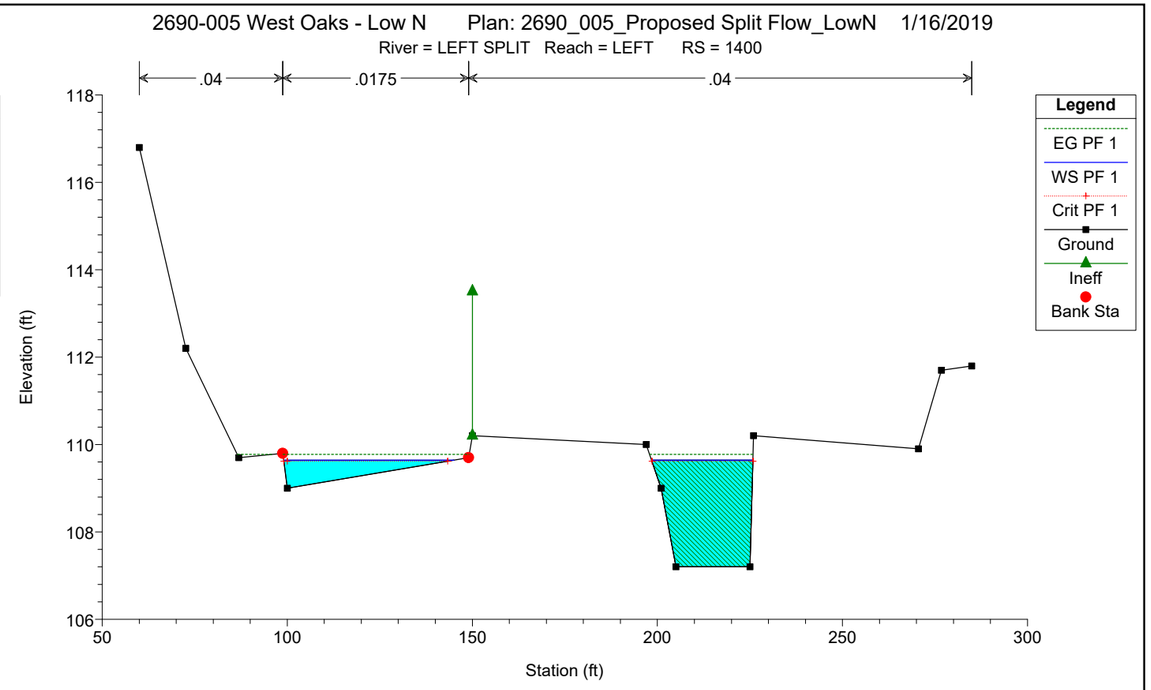

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1900
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

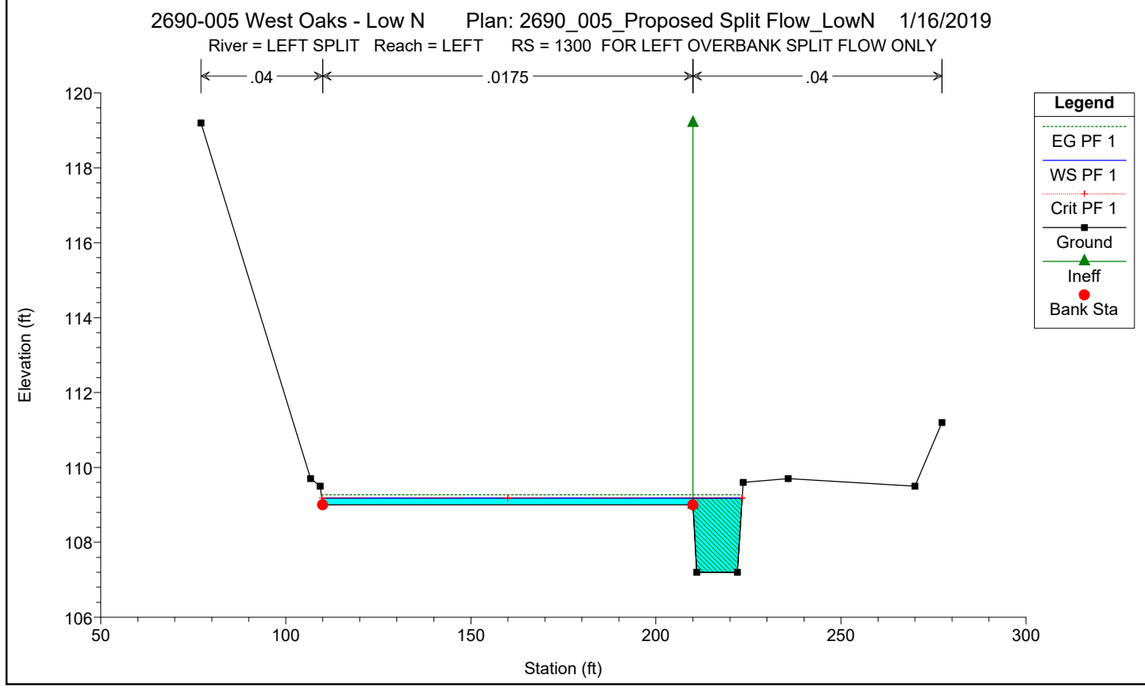

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1800
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

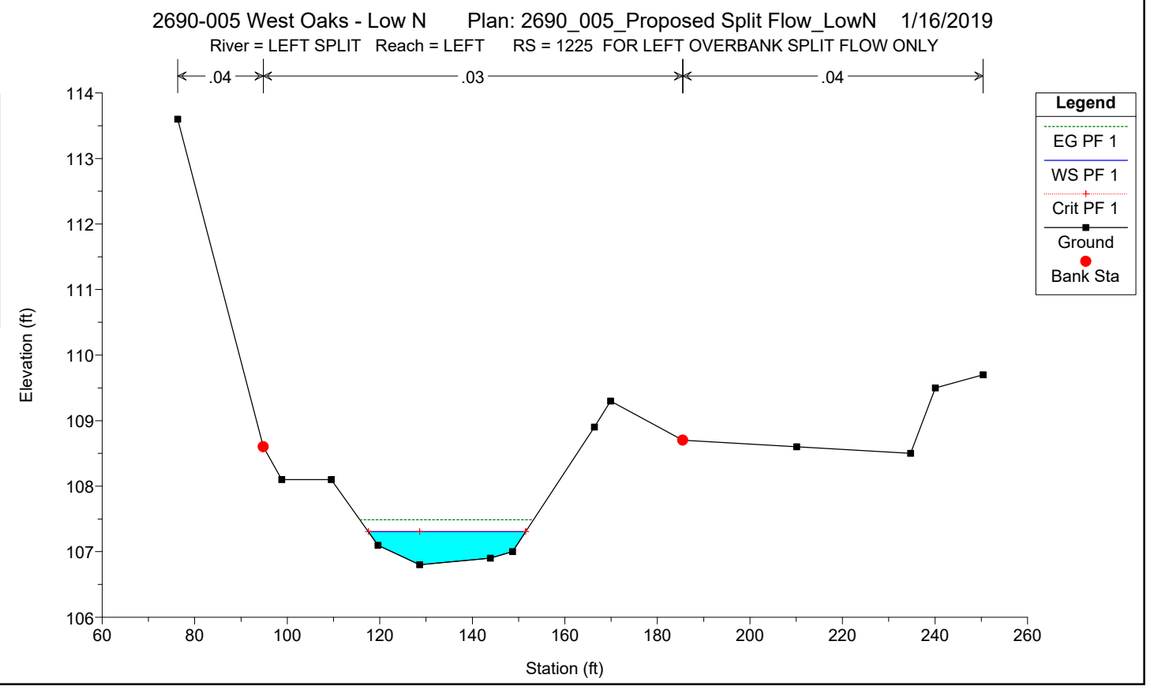

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1700
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

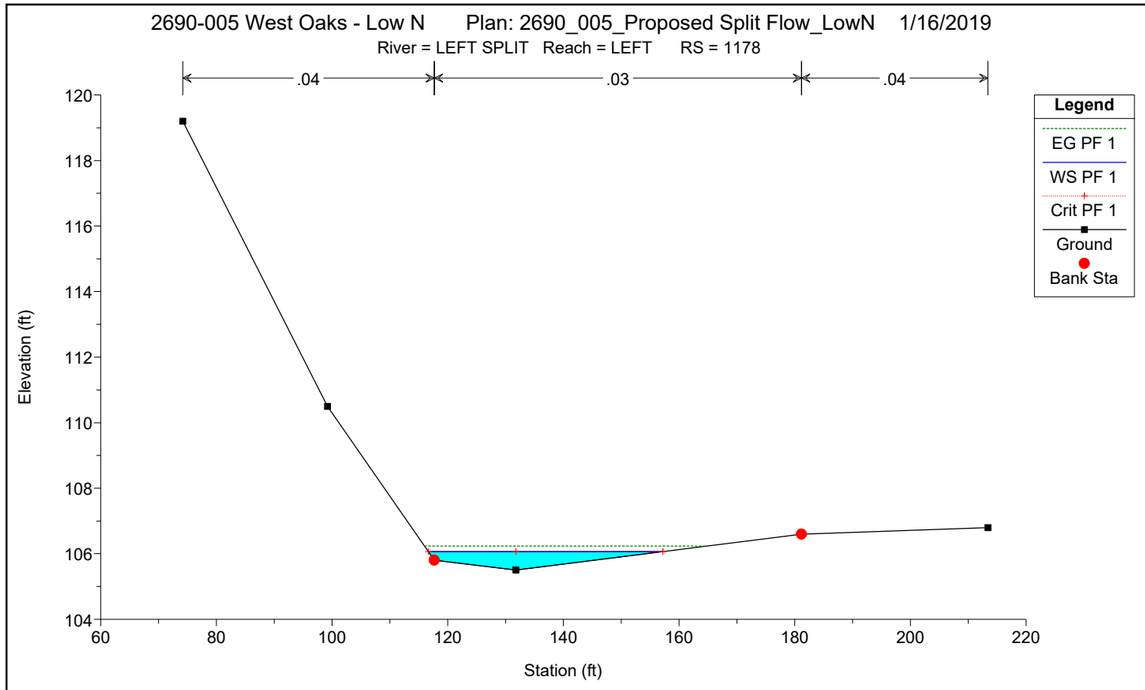

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1600
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)

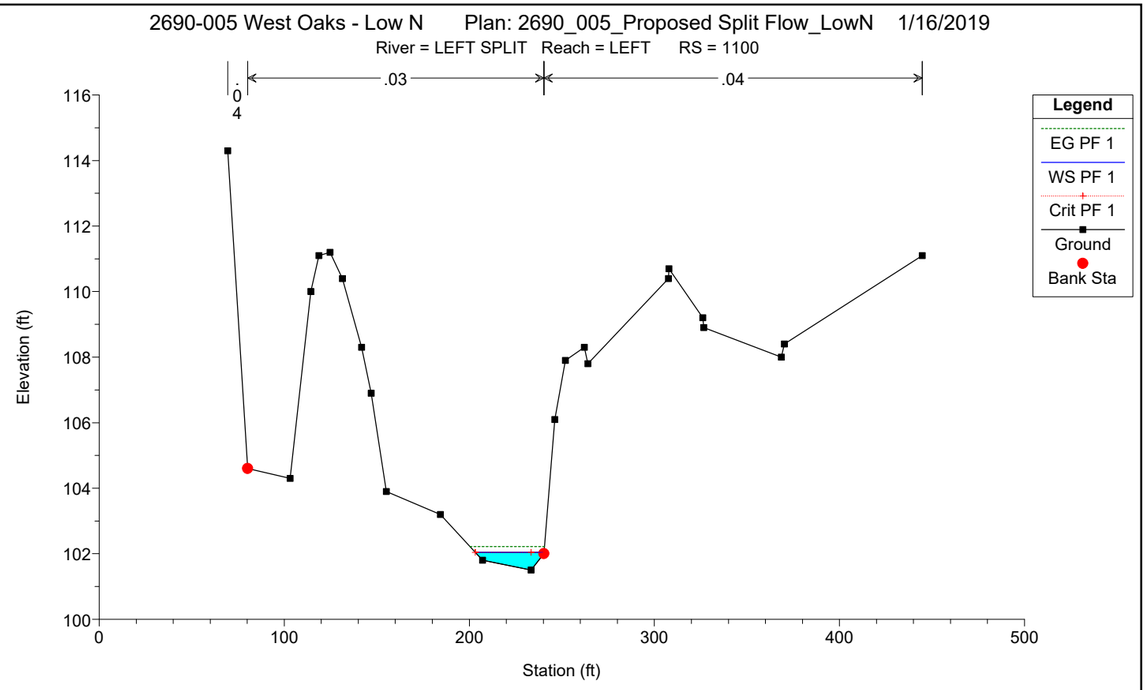

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1500
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1400
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)

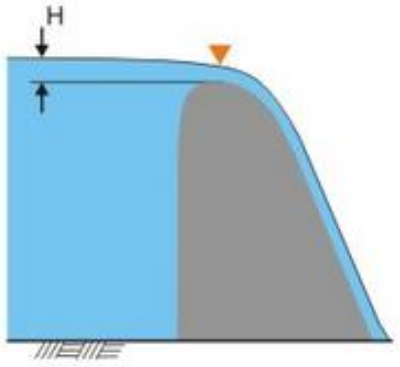

2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1300 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.0175
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1225 FOR LEFT OVERBANK SPLIT FLOW ONLY
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1178
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
120
118
116
114
112
110
108
106
104
60
80
100
120
140
160
180
200
220


2690-005 West Oaks - Low N Plan: 2690_005_Proposed Split Flow_LowN 1/16/2019
River = LEFT SPLIT Reach = LEFT RS = 1100
.04
.03
.04
Legend
EG PF 1
WS PF 1
Crit PF 1
Ground
Bank Sta
Elevation (ft)
Station (ft)
116
114
112
110
108
106
104
102
100
0
100
200
300
400
500

onlinechannel14.php: Discharge over a broad-crested weir



The broad-crested weir

Formulas:

$$C = \frac{(2/3)^{3/2}(g)^{1/2}}{}$$

$$Q = CLH^{3/2}$$

INPUT DATA:

Select:
SI units (metric)
U.S. Customary units

Hydraulic head H:
0.4 ft

Weir length L:
55 ft

INTERMEDIATE CALCS:

Units selected: U.S. Customary

Gravitational acceleration
g: 32.17 ft s^{-2}

Discharge coefficient C:
3.087 $ft^{1/2}$ s^{-1}

OUTPUT:

Discharge Q:
42.95 cfs

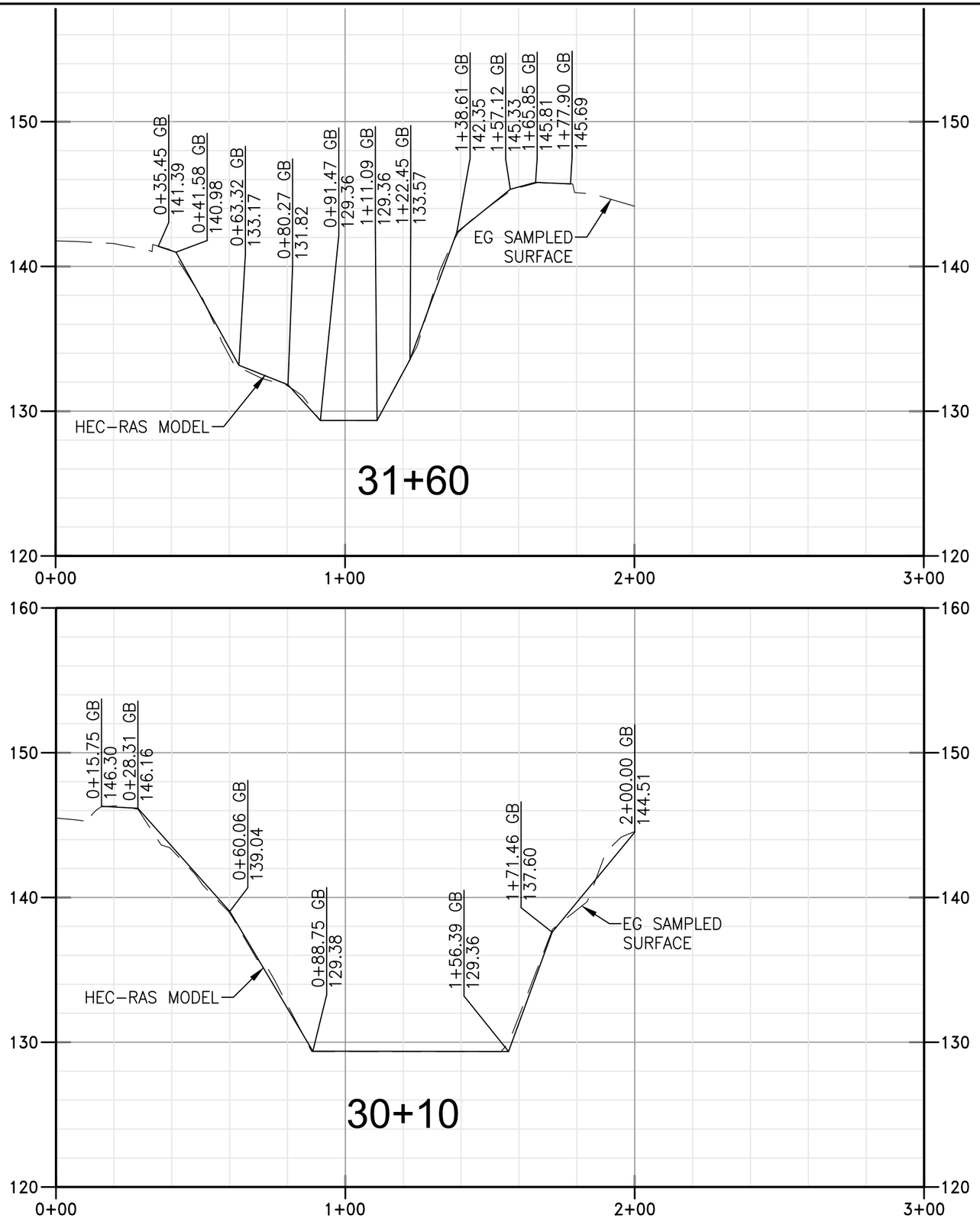
Calculate Reset

Your request was processed at 03:58:17 pm on August 27th, 2018 [180827 15:58:17].

Thank you for running onlinechannel14.php. Please call again. [140618]

online calc

Existing Conditions



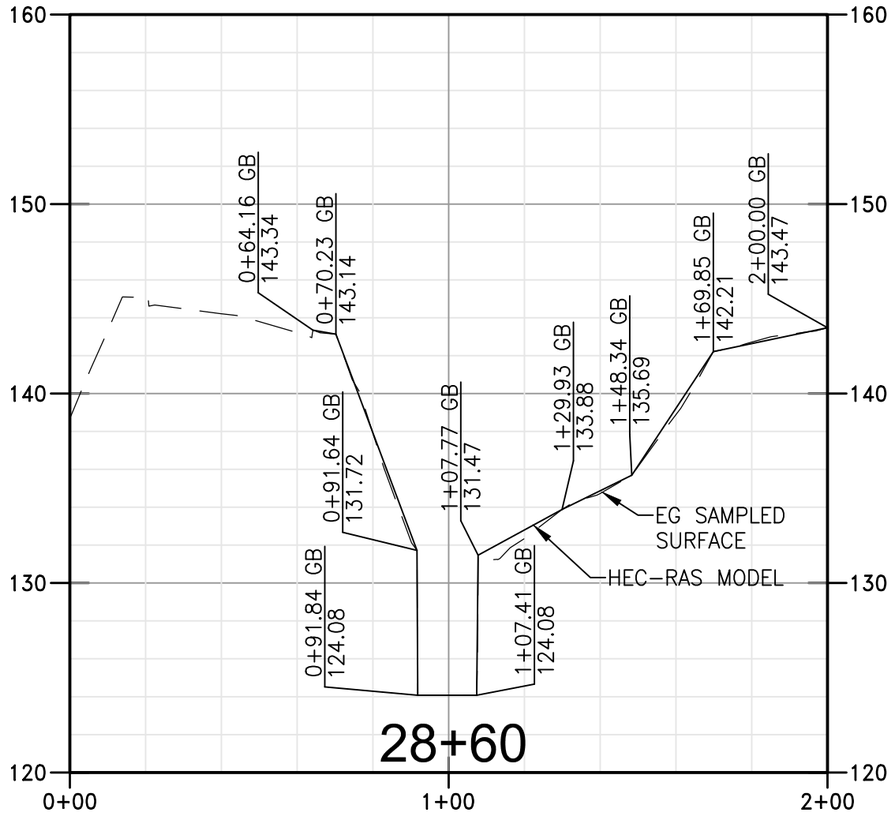
FUSCOE ENGINEERING

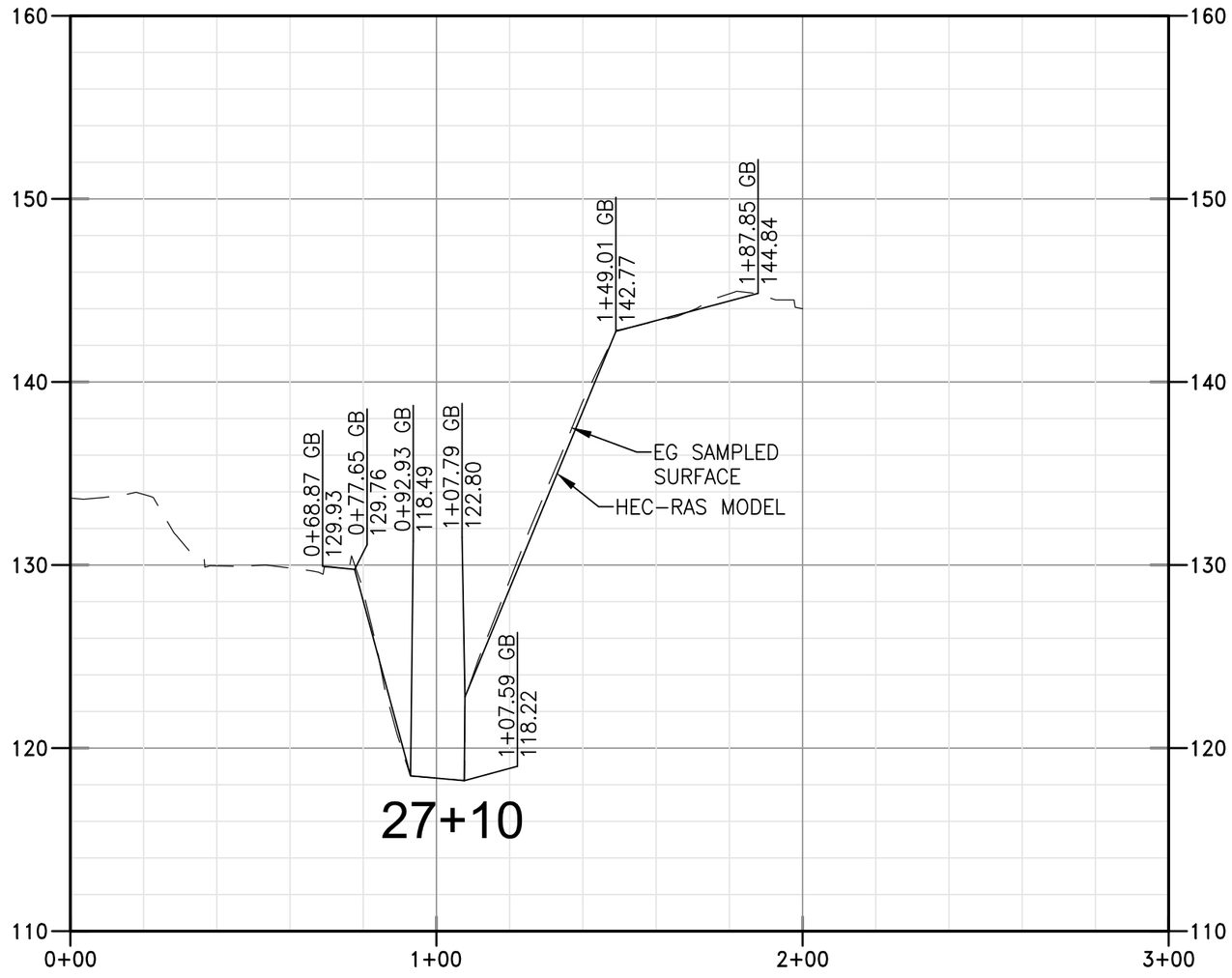
HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
1 of 23

DATE:
08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:38PM) Plotted by: rroberts





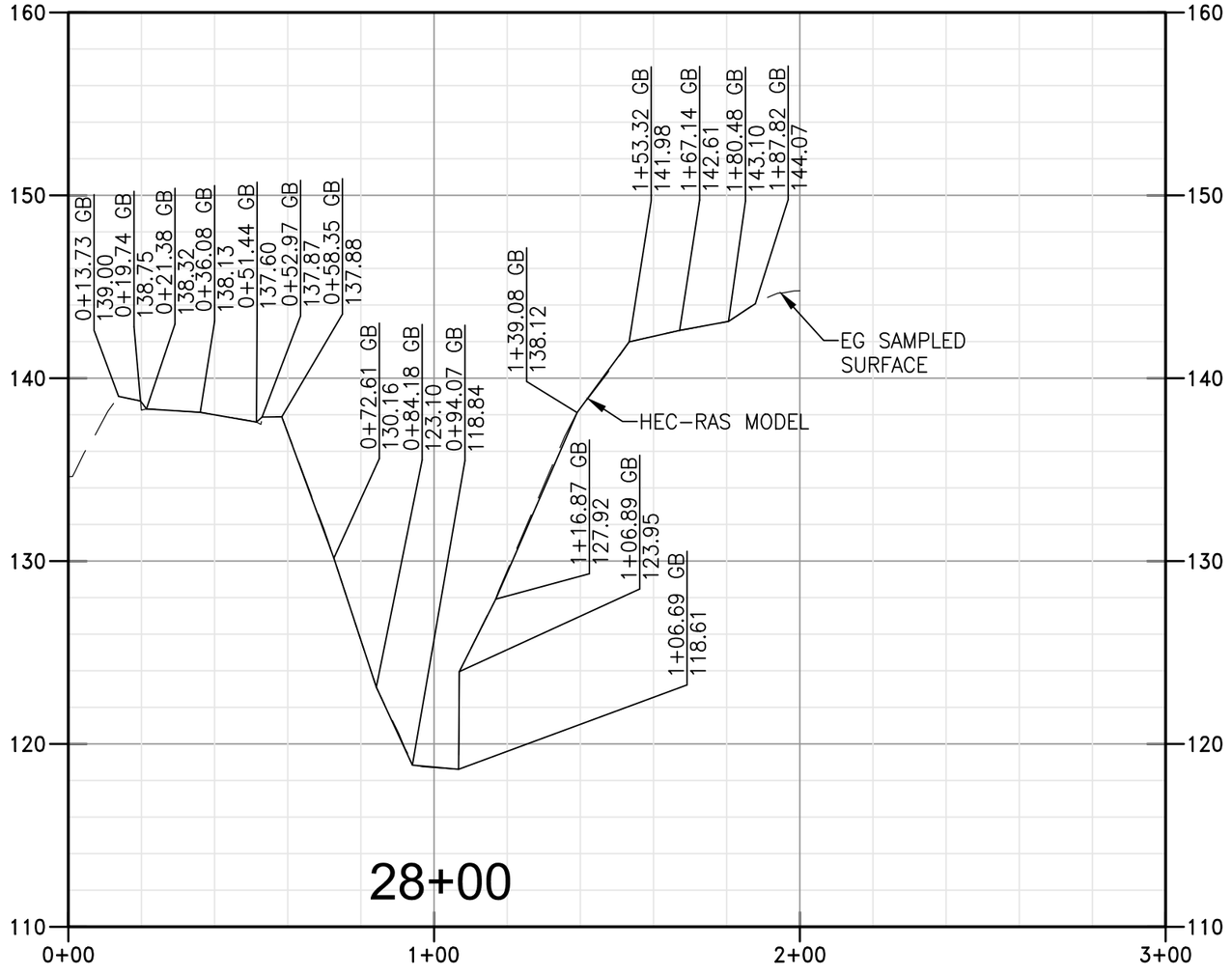
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 2 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:39PM) Plotted by: rroberts



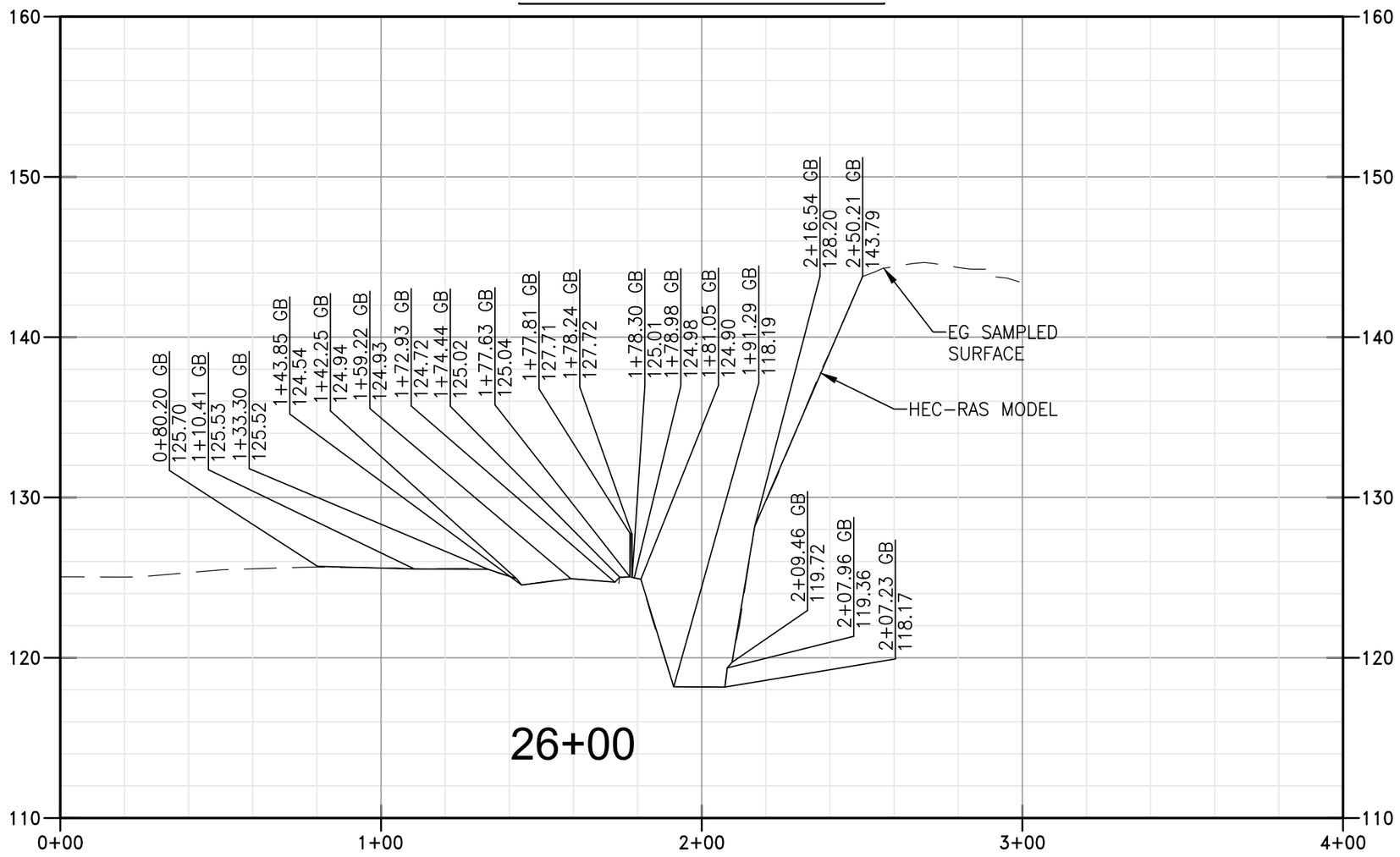
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 3 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:42PM) Plotted by: rroberts



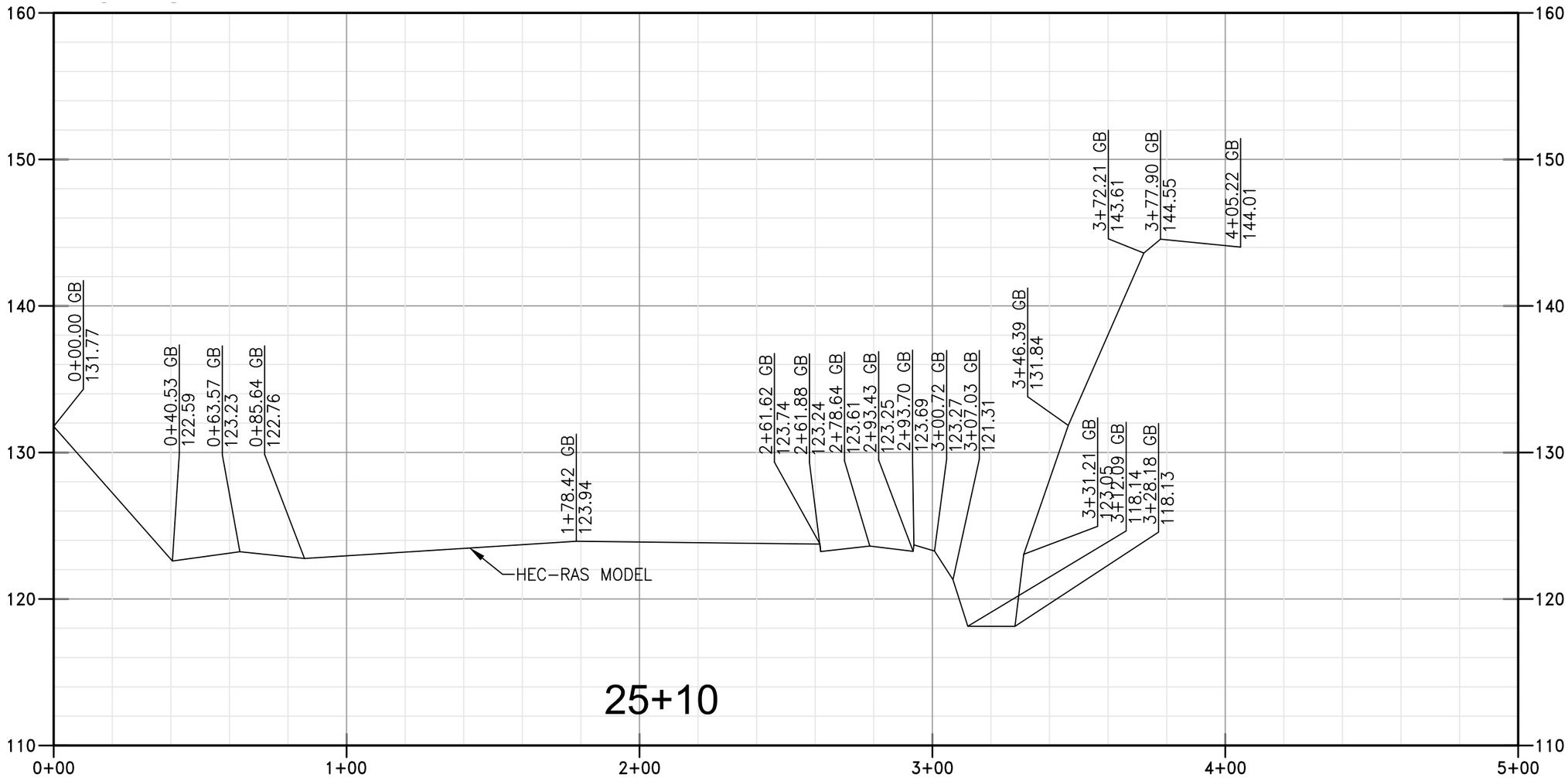
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 4 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:43PM) Plotted by: rroberts



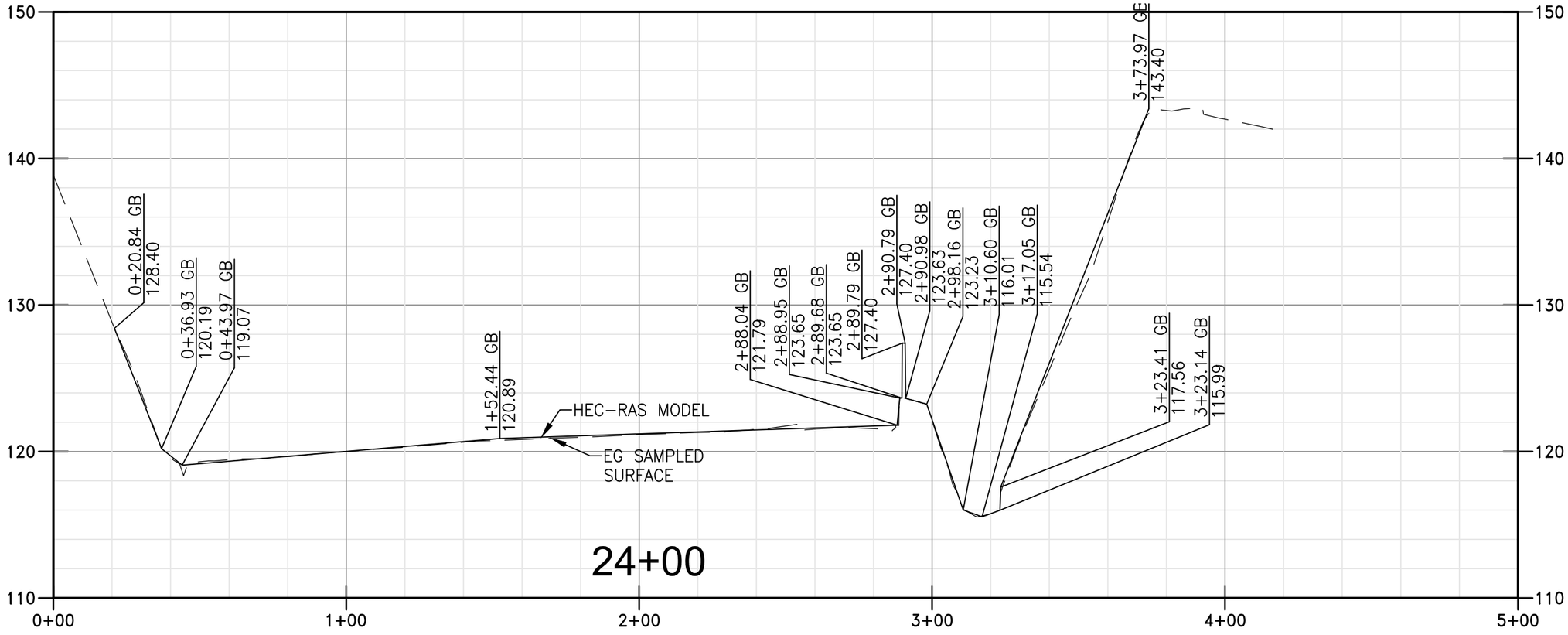
FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
5 of 23

DATE:
08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:45PM) Plotted by: rroberts

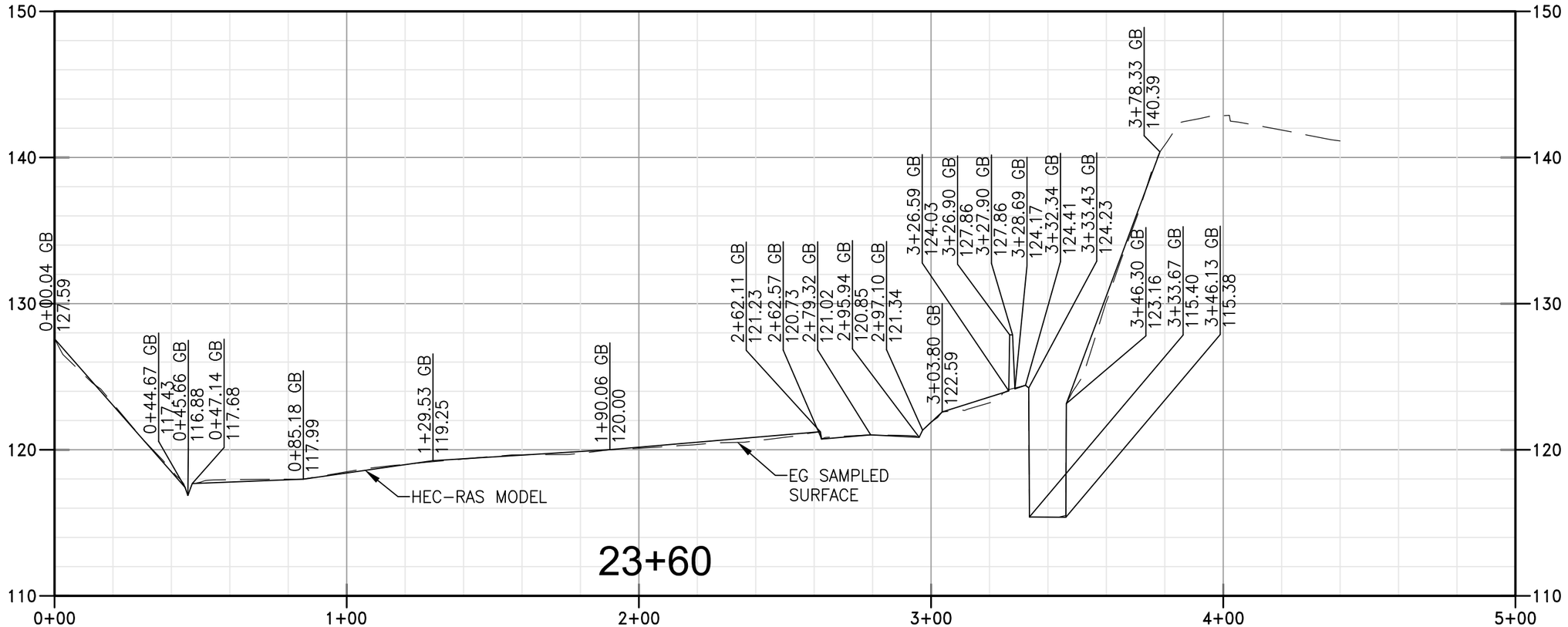


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 6 of 23

DATE: 08/22/2018

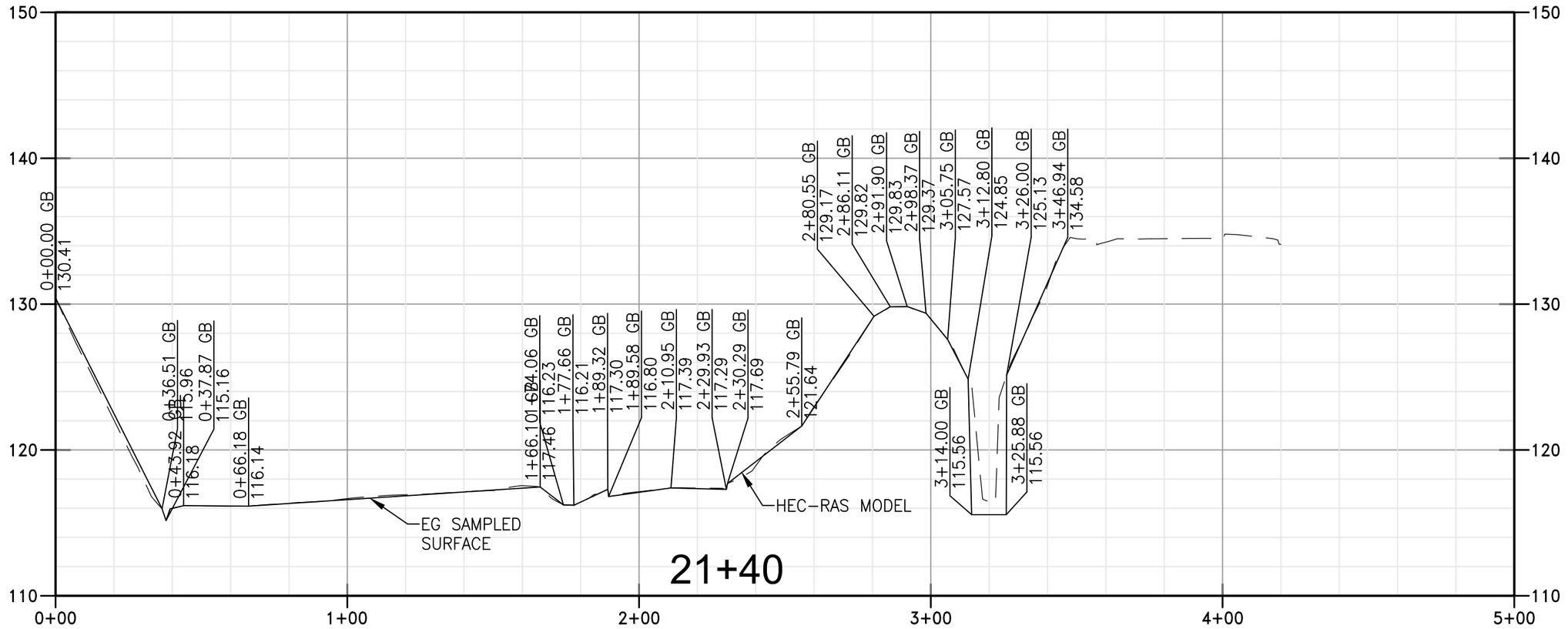


FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
7 of 23

DATE:
08/22/2018

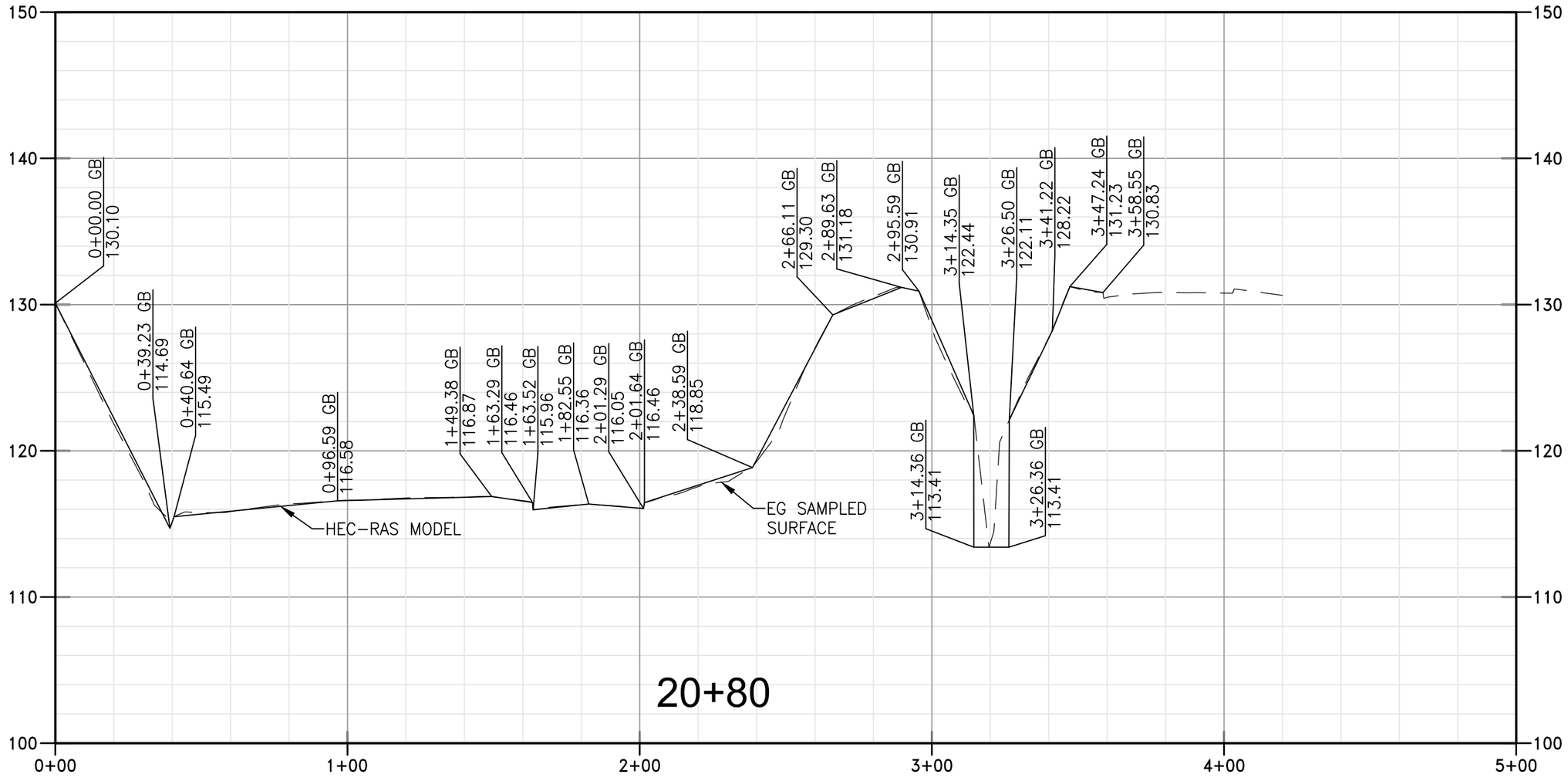


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 8 of 23

DATE: 08/22/2018

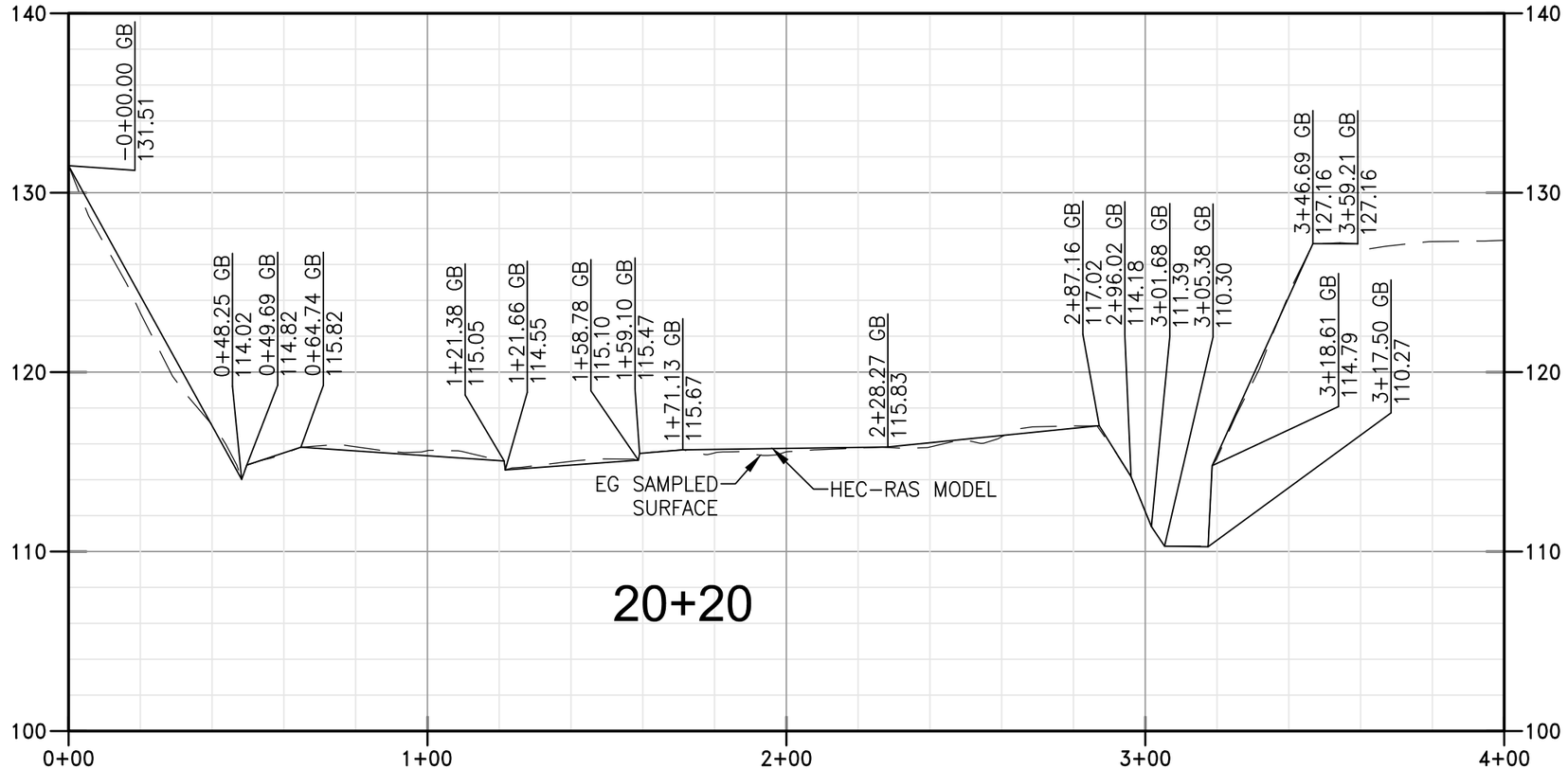


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 9 of 23

DATE: 08/22/2018



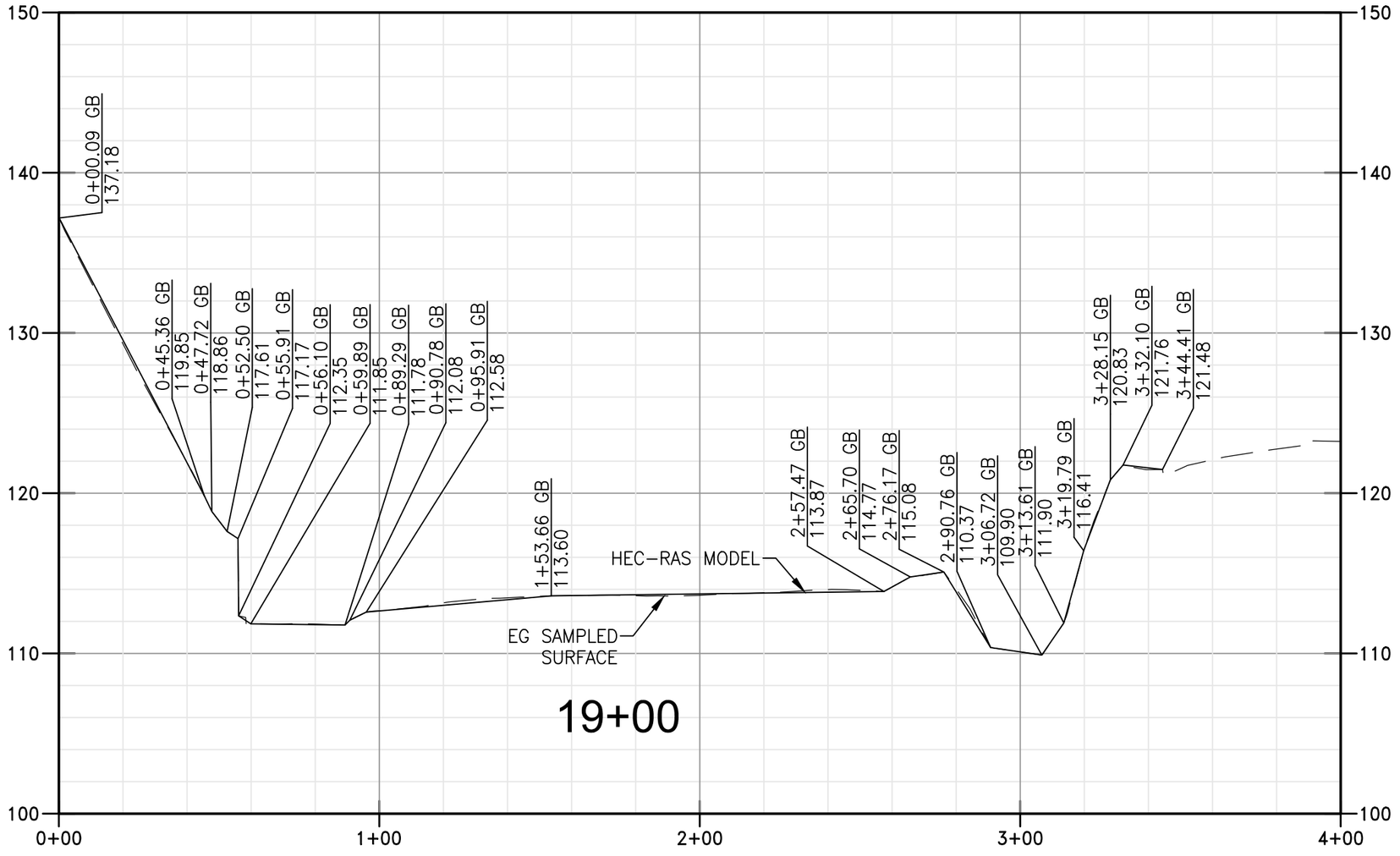
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 10 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:54PM) Plotted by: rroberts



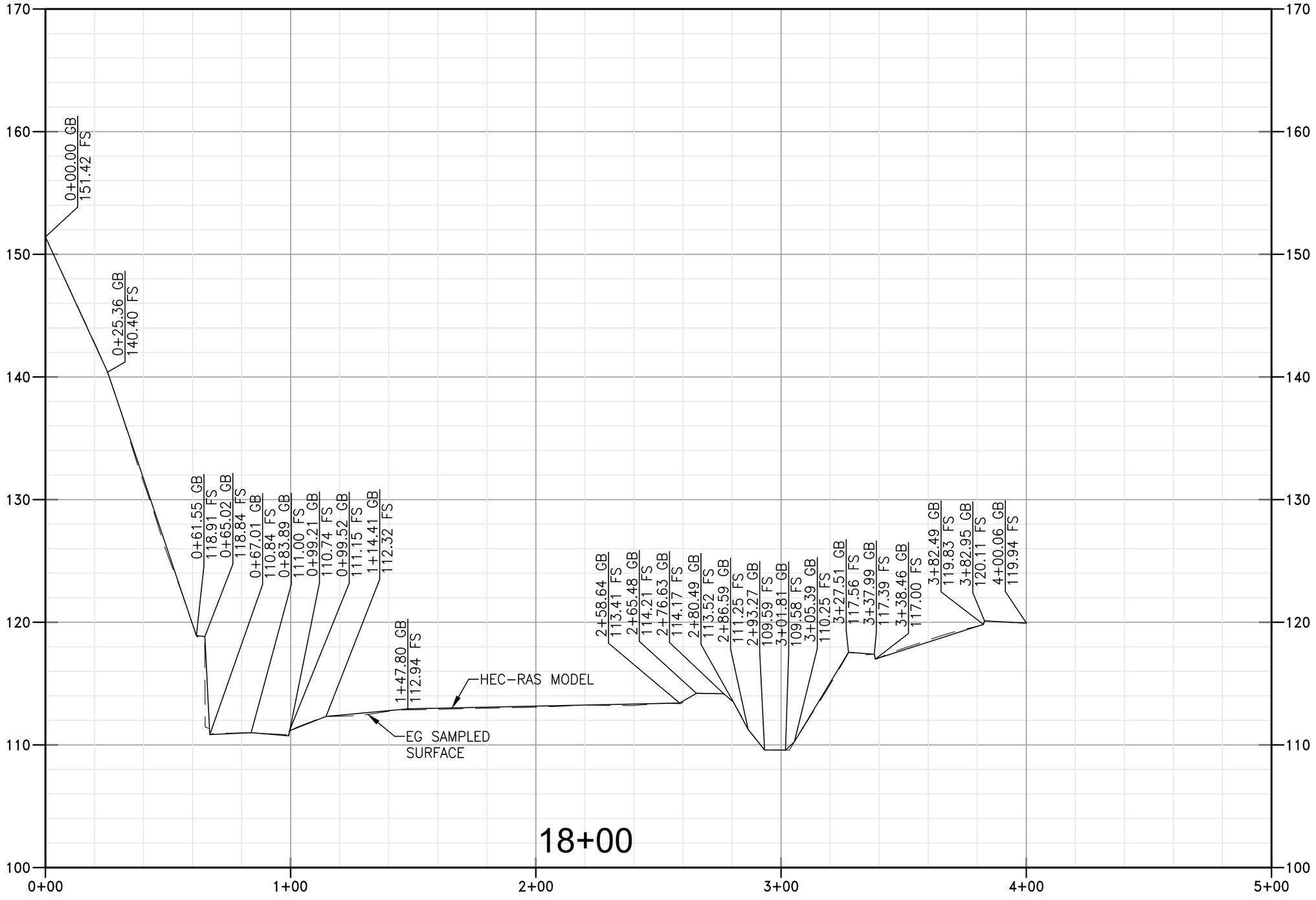
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 11 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:54PM) Plotted by: rroberts



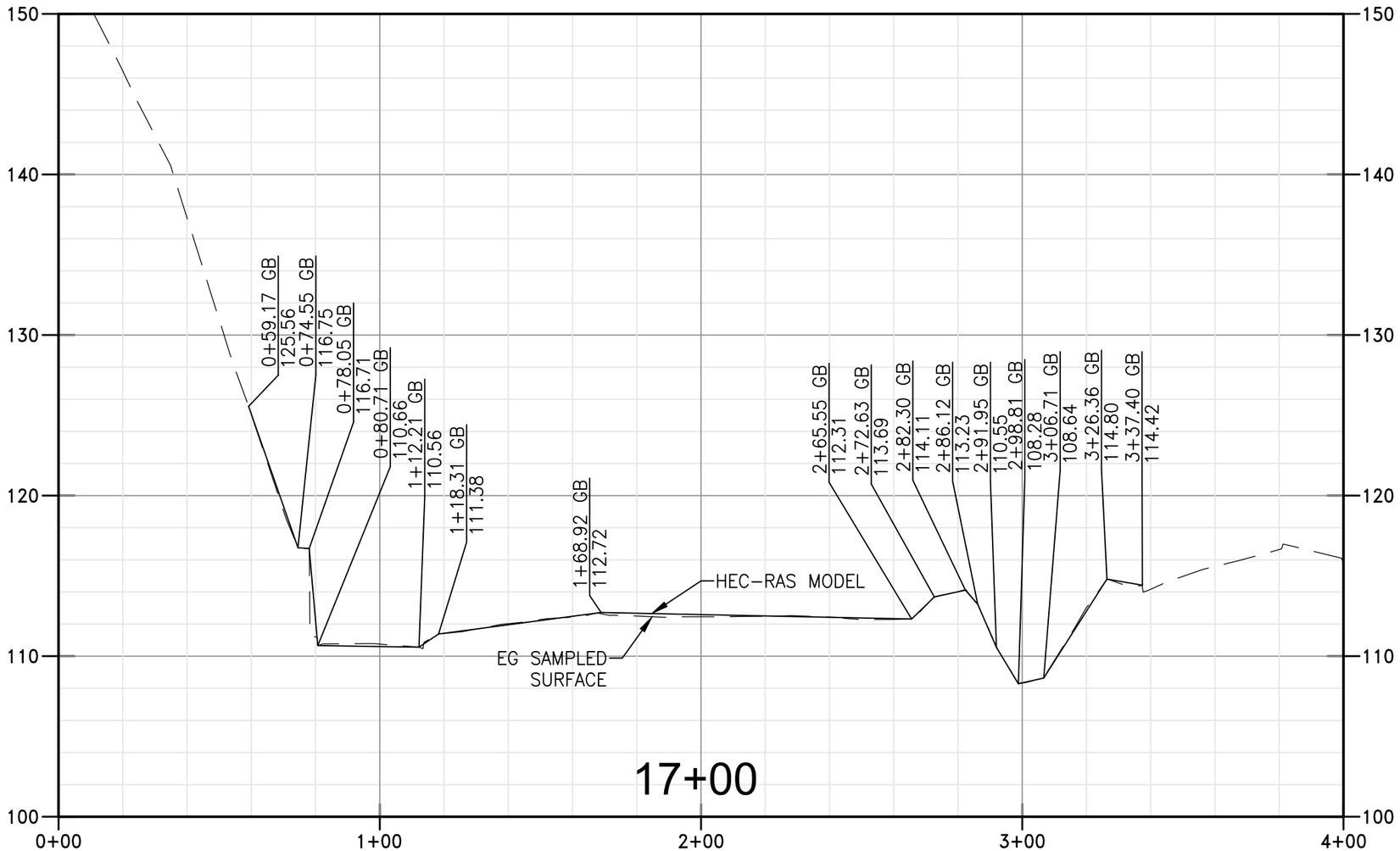
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 12 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:56PM) Plotted by: rroberts



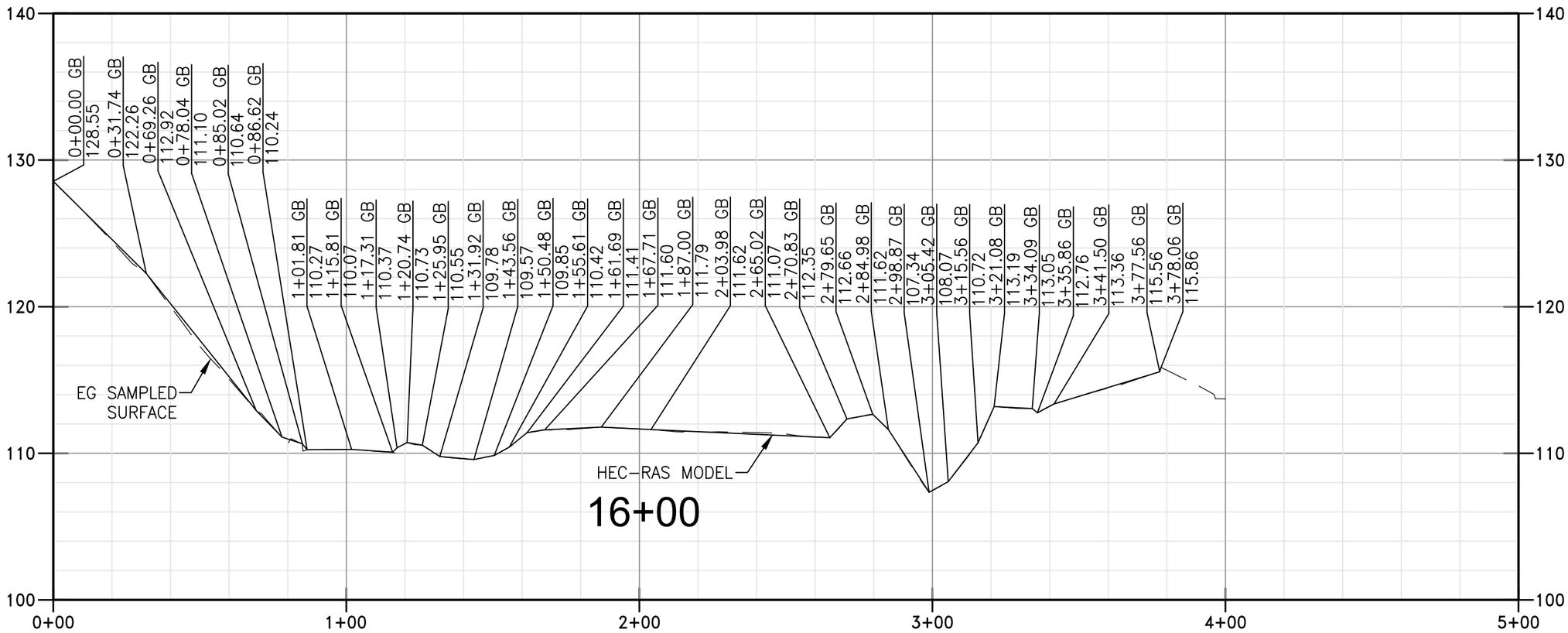
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 13 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 3:59:58PM) Plotted by: rroberts

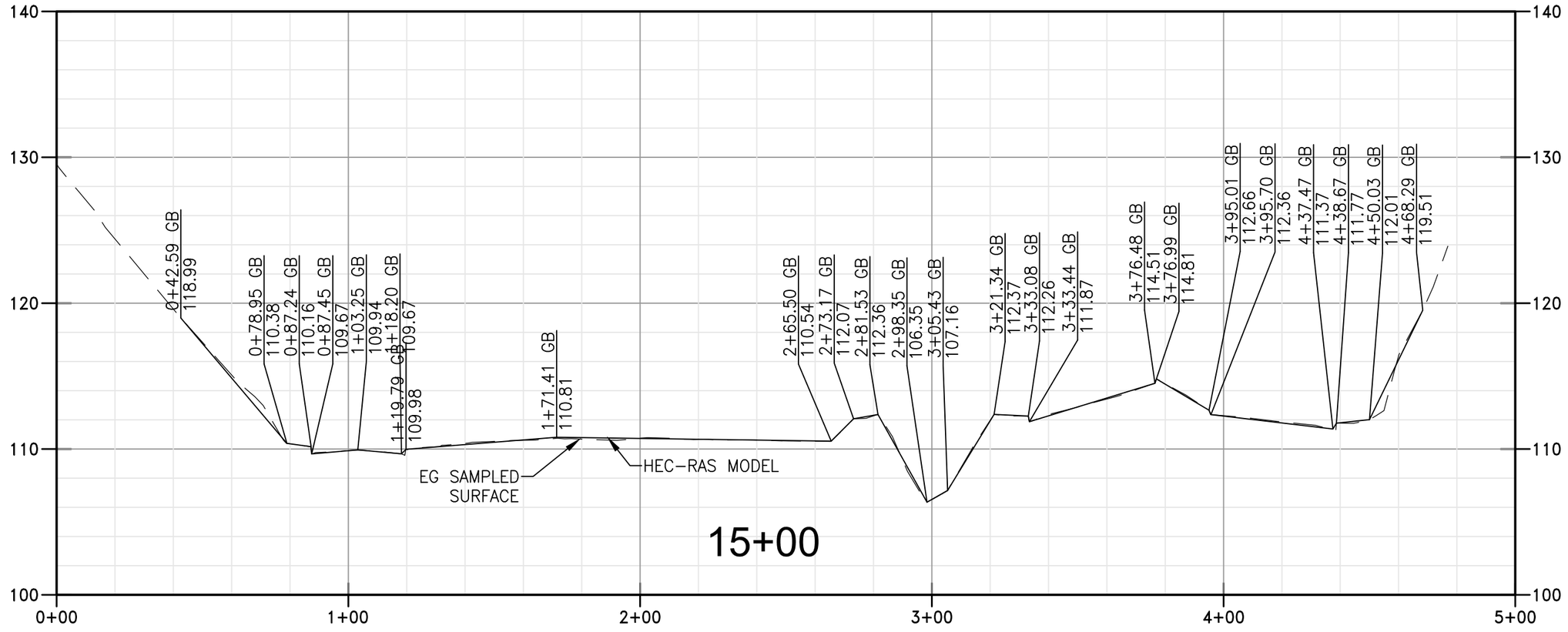


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 14 of 23

DATE: 08/22/2018



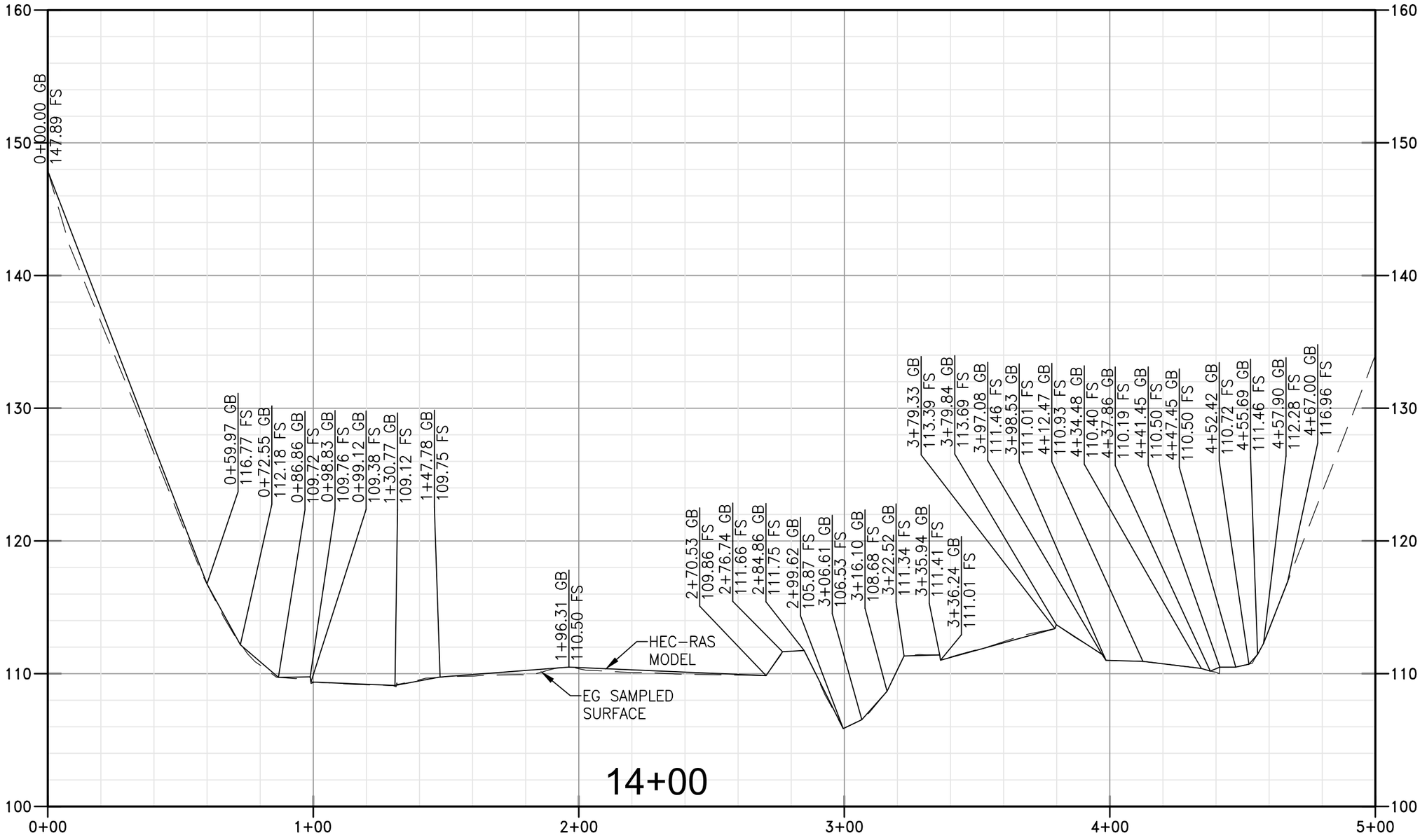
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 15 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 4:00:00PM) Plotted by: rroberts



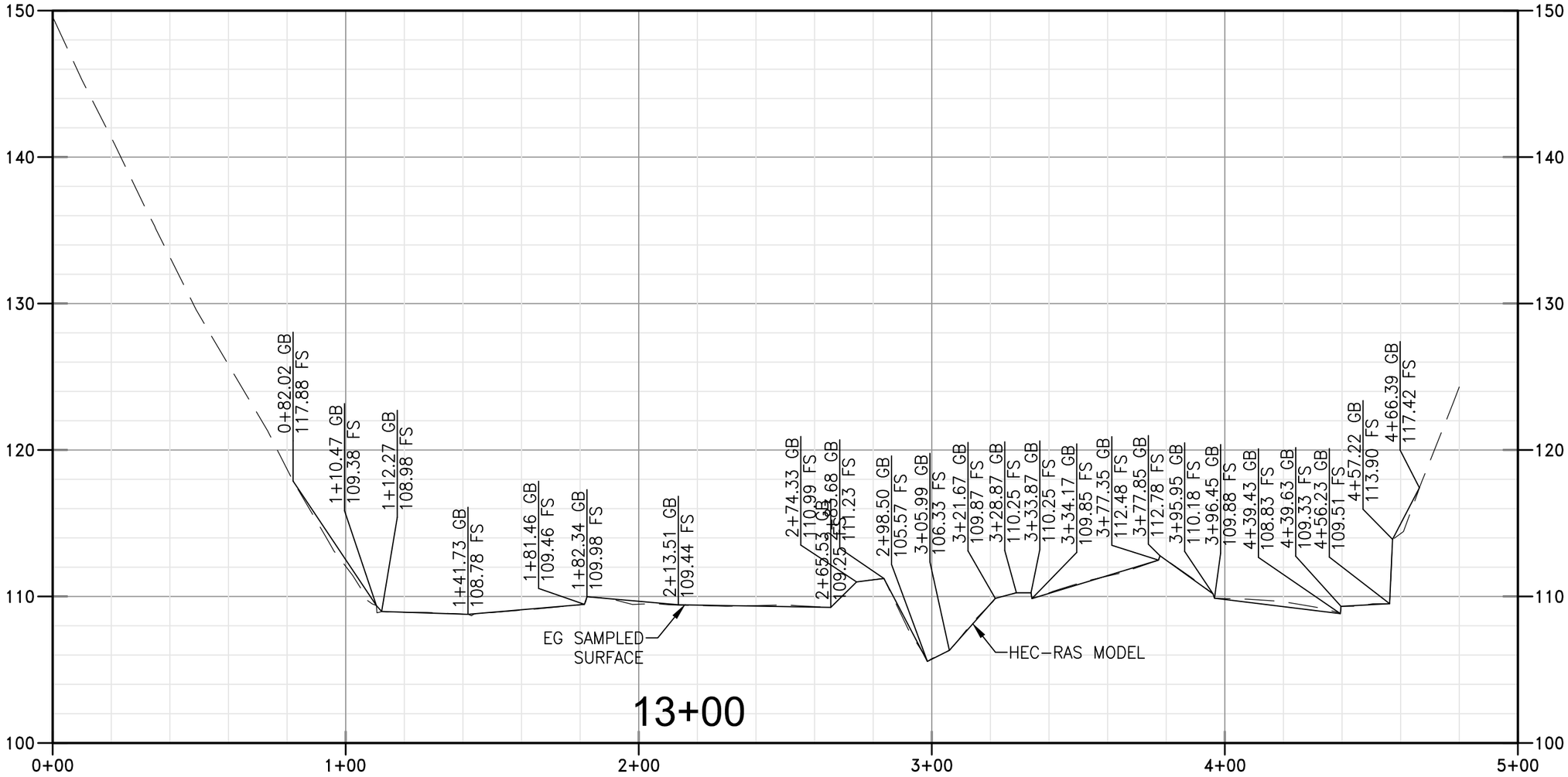
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 16 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 4:00:00PM) Plotted by: rroberts

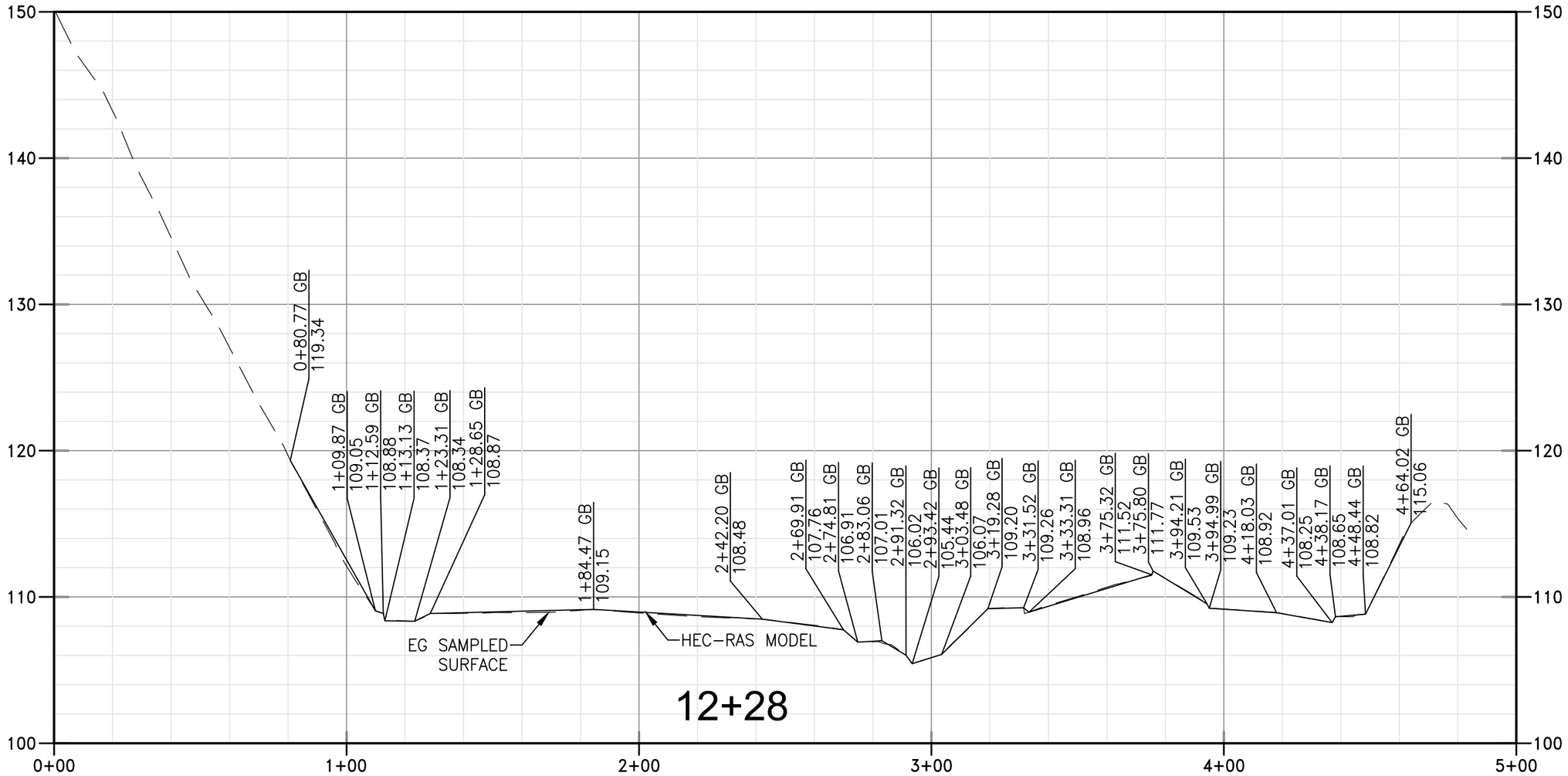


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 17 of 23

DATE: 08/22/2018



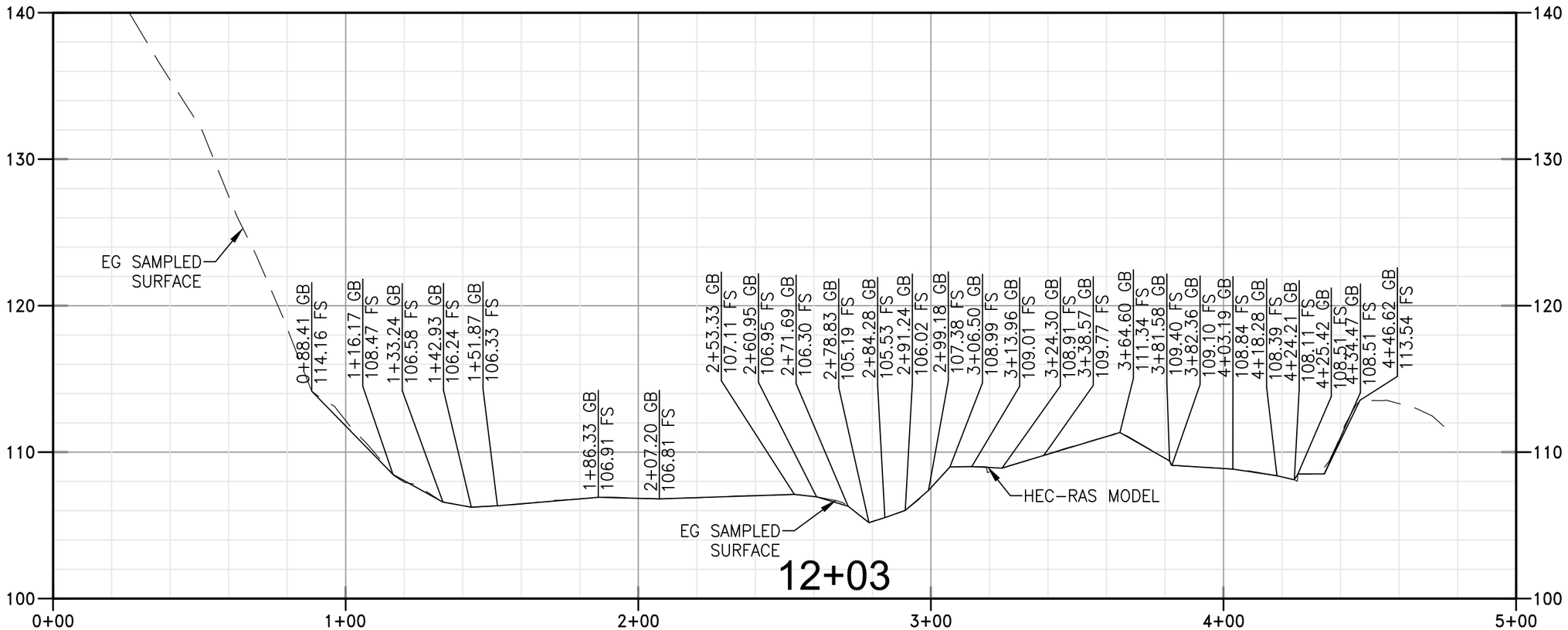
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 18 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 4:00:03PM) Plotted by: rroberts



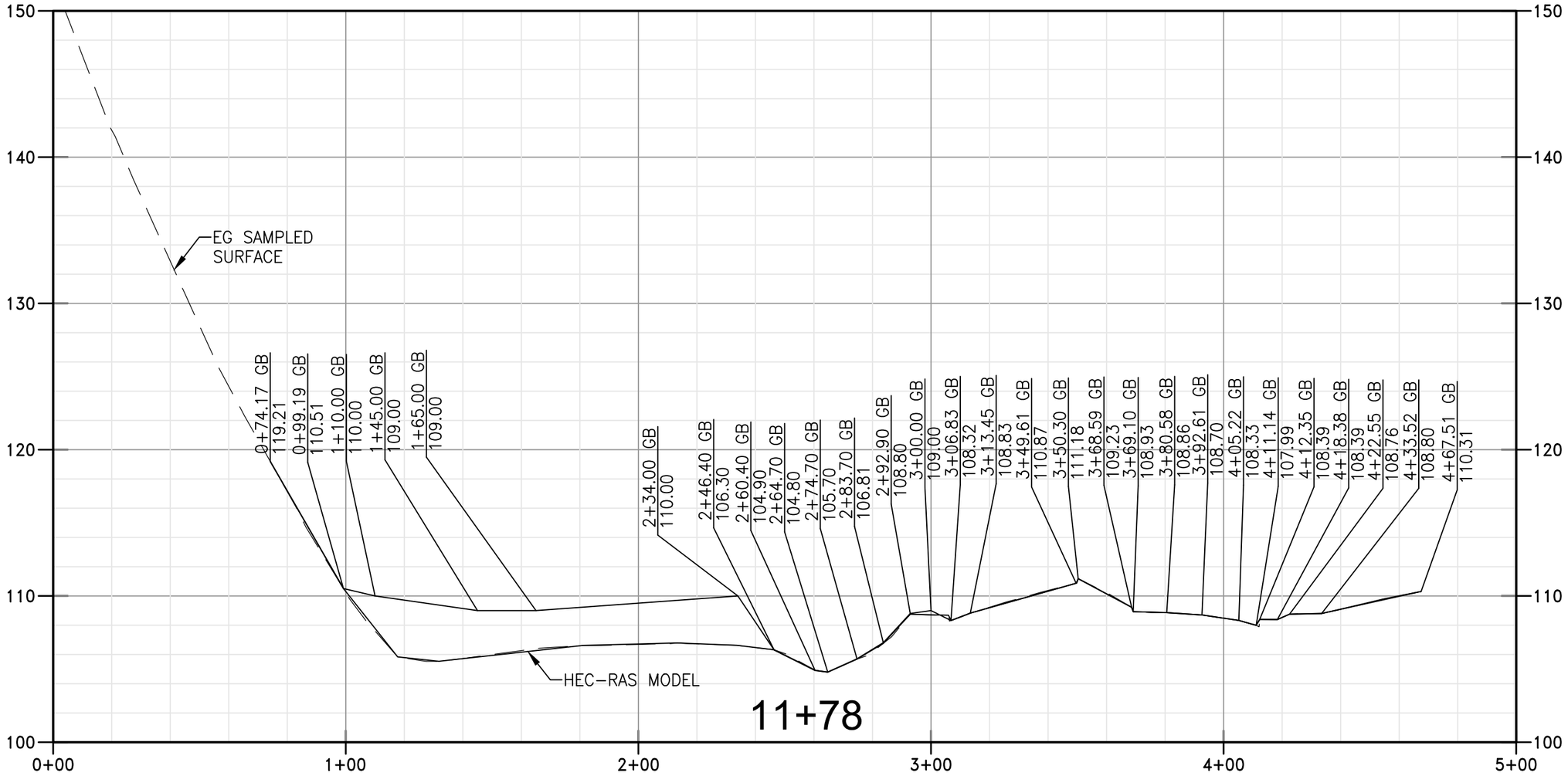
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 19 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 4:00:04PM) Plotted by: rroberts

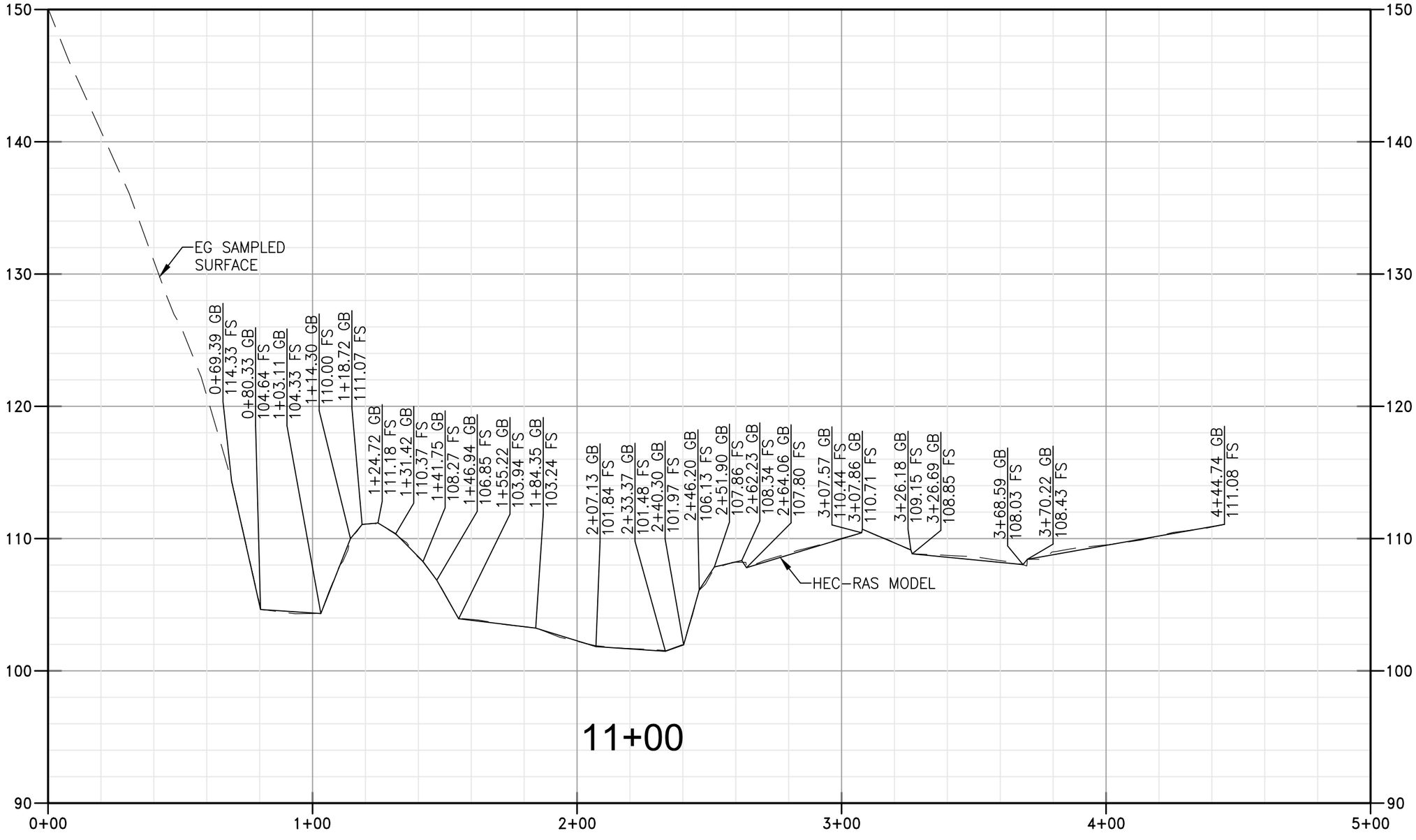


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 20 of 23

DATE: 08/22/2018

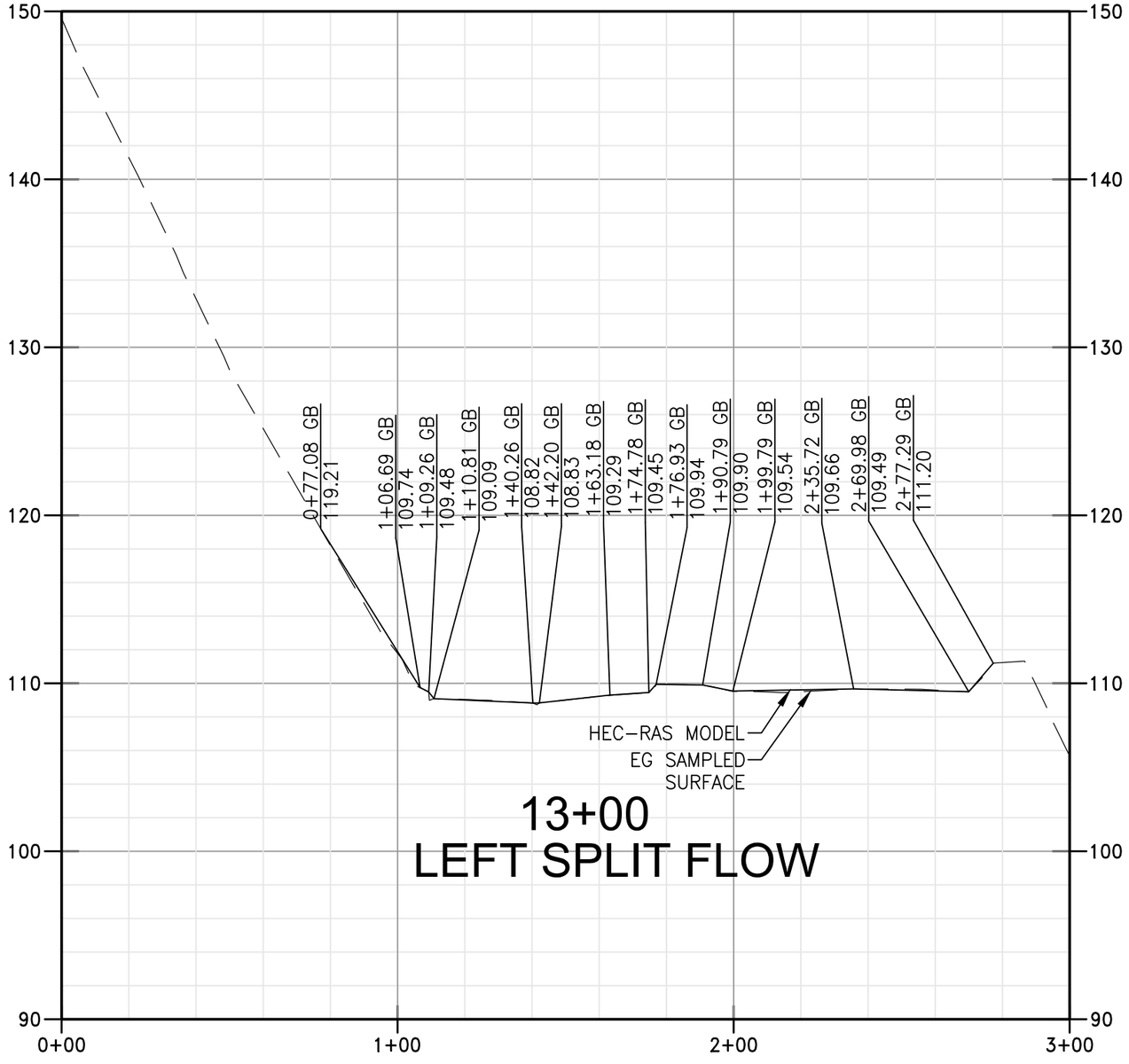


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 21 of 23

DATE: 08/22/2018



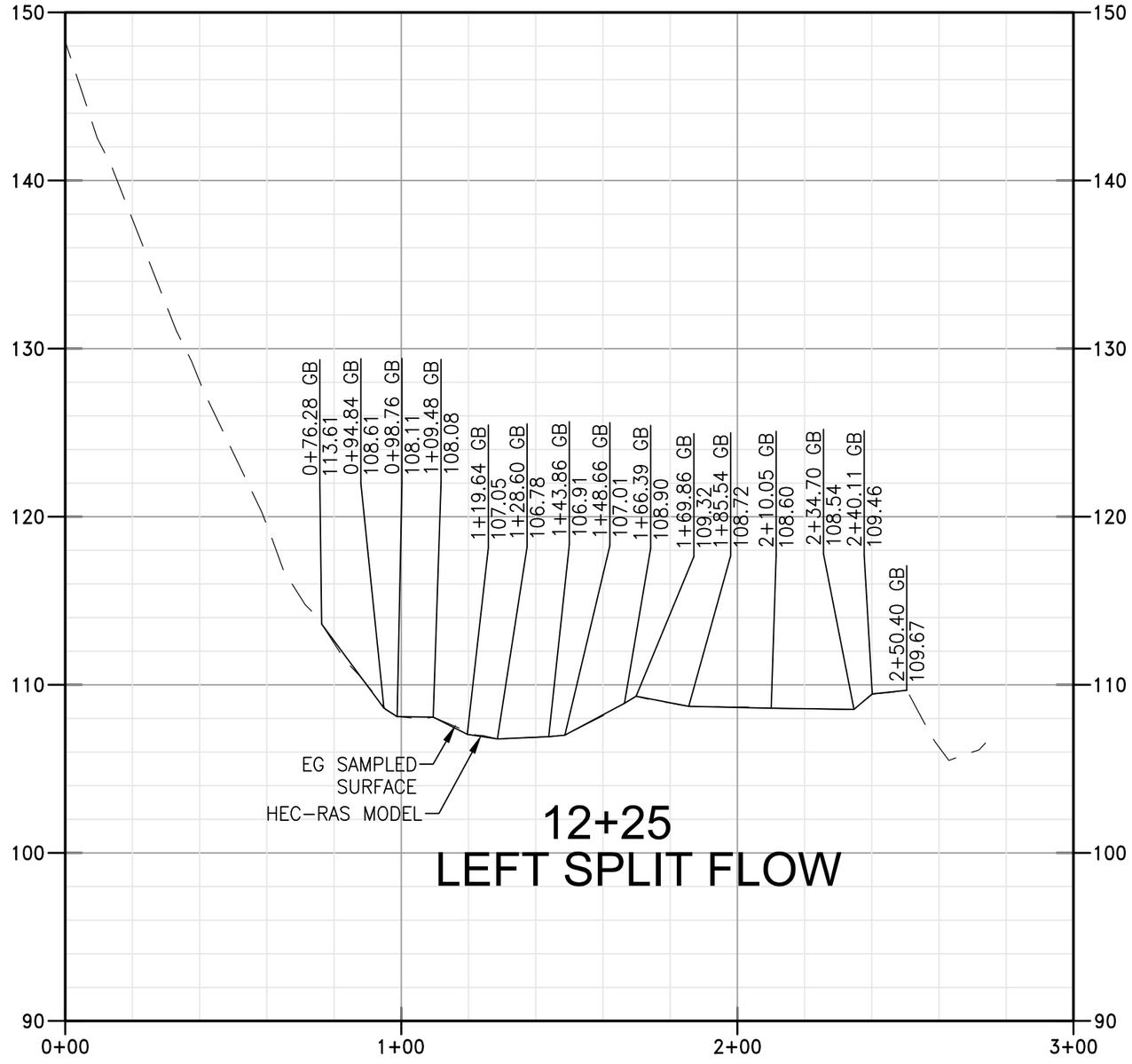
13+00
LEFT SPLIT FLOW

FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 22 of 23

DATE: 08/22/2018



FUSCOE ENGINEERING

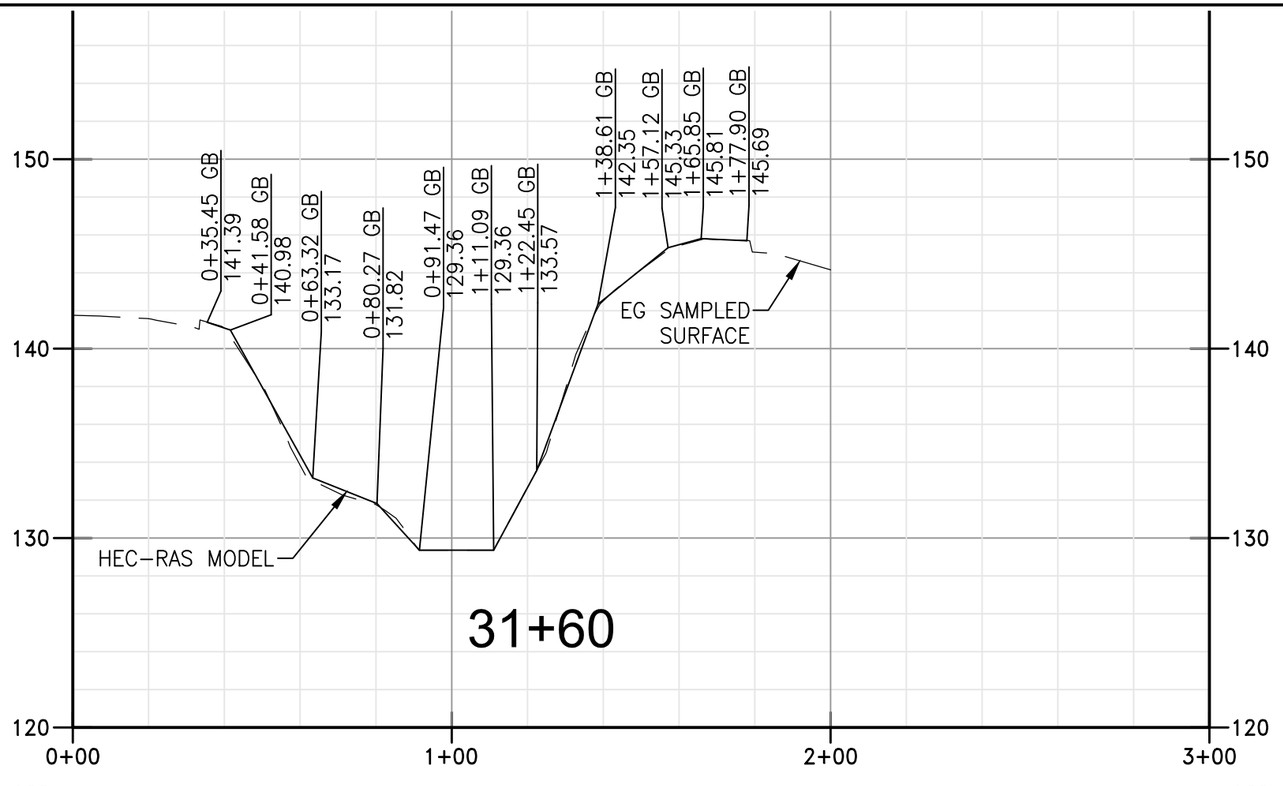
HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

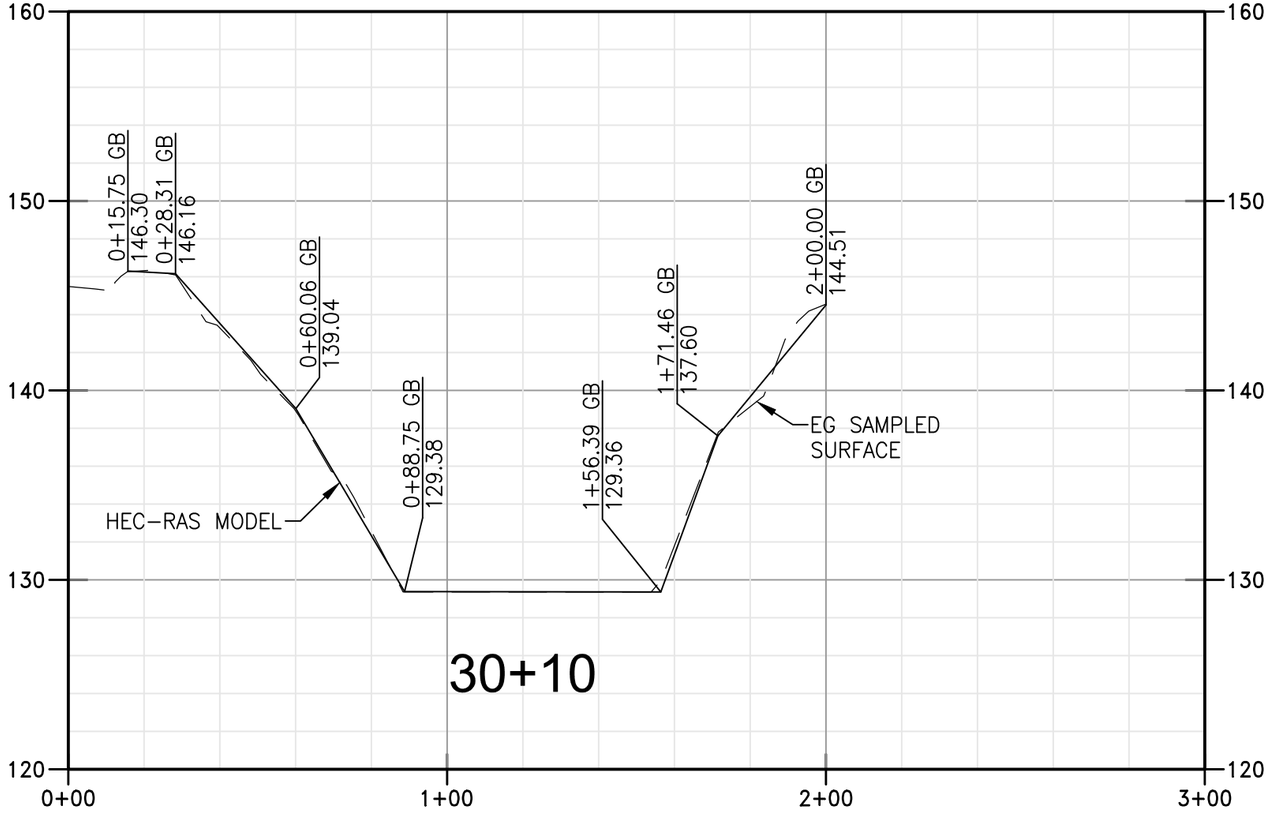
SHEET 23 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-EXISTING.DWG (01-16-2019 4:00:10PM) Plotted by: rroberts

Proposed Sections





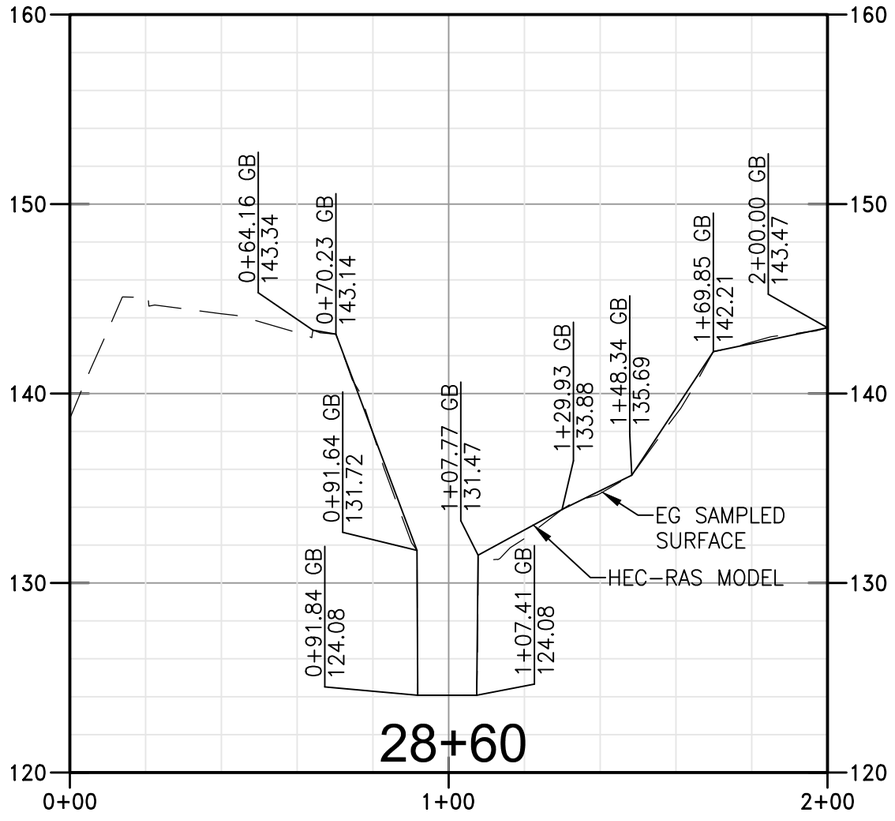
FUSCOE ENGINEERING

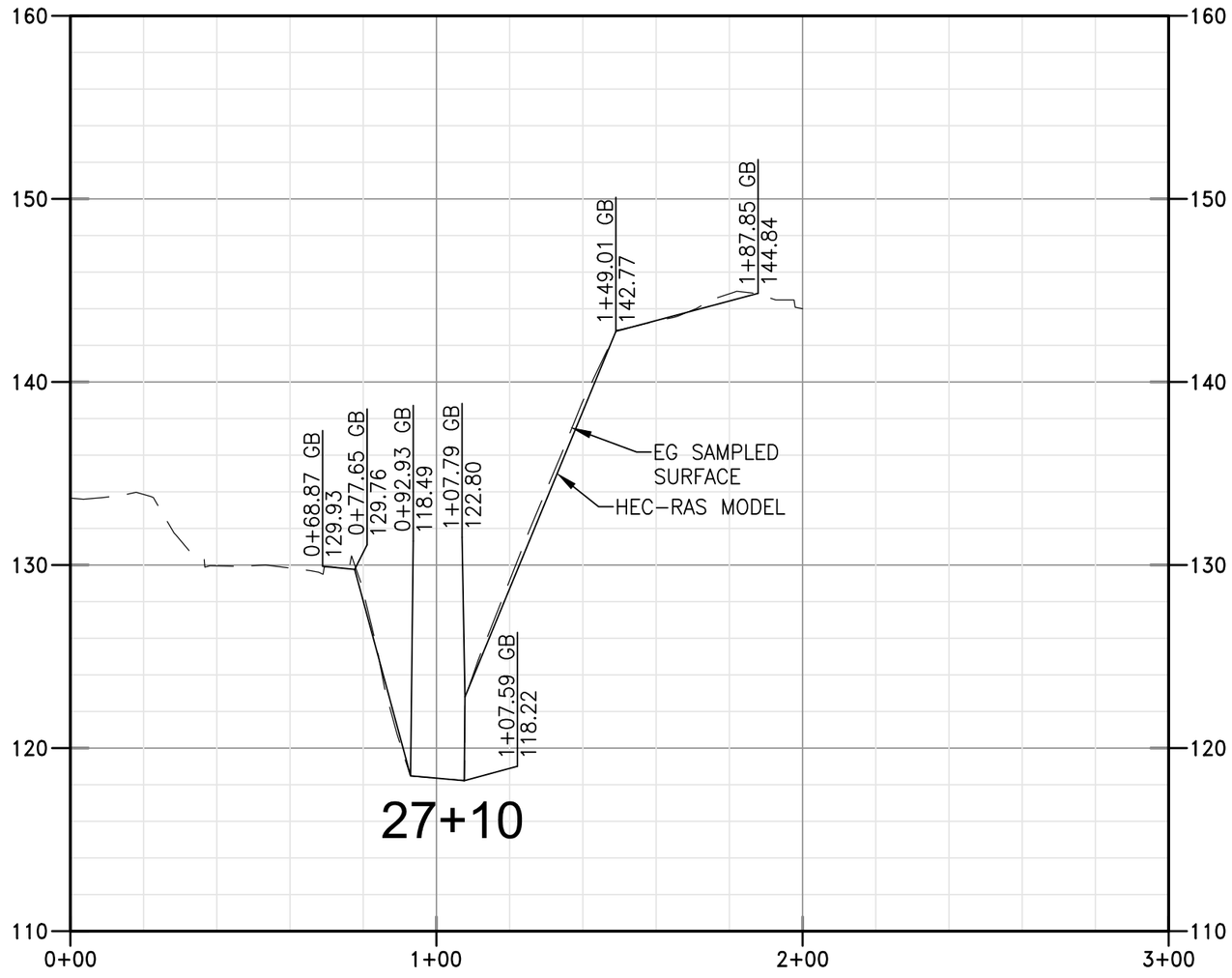
HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 1 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:54:47PM) Plotted by: rroberts





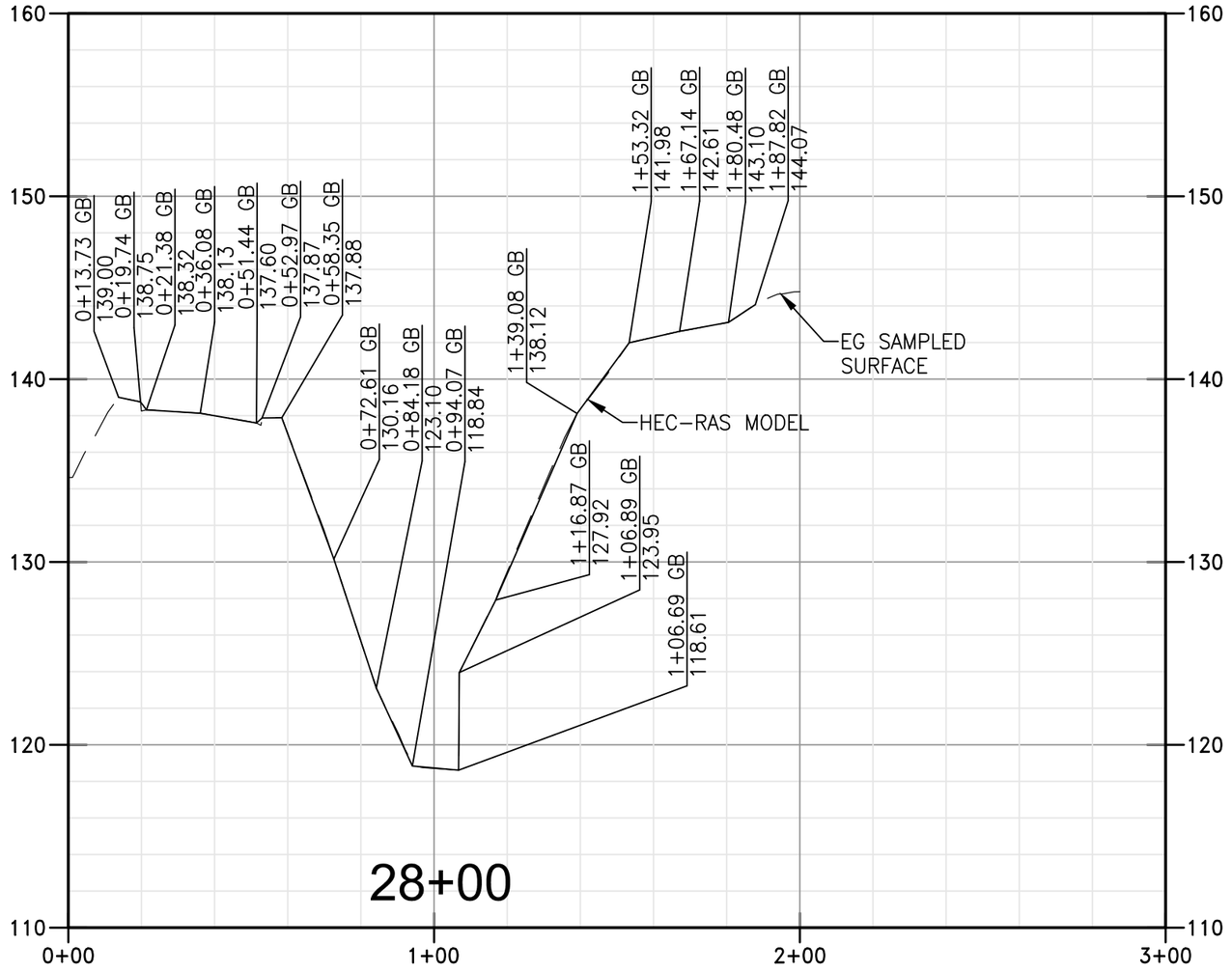
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 2 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:54:47PM) Plotted by: rroberts



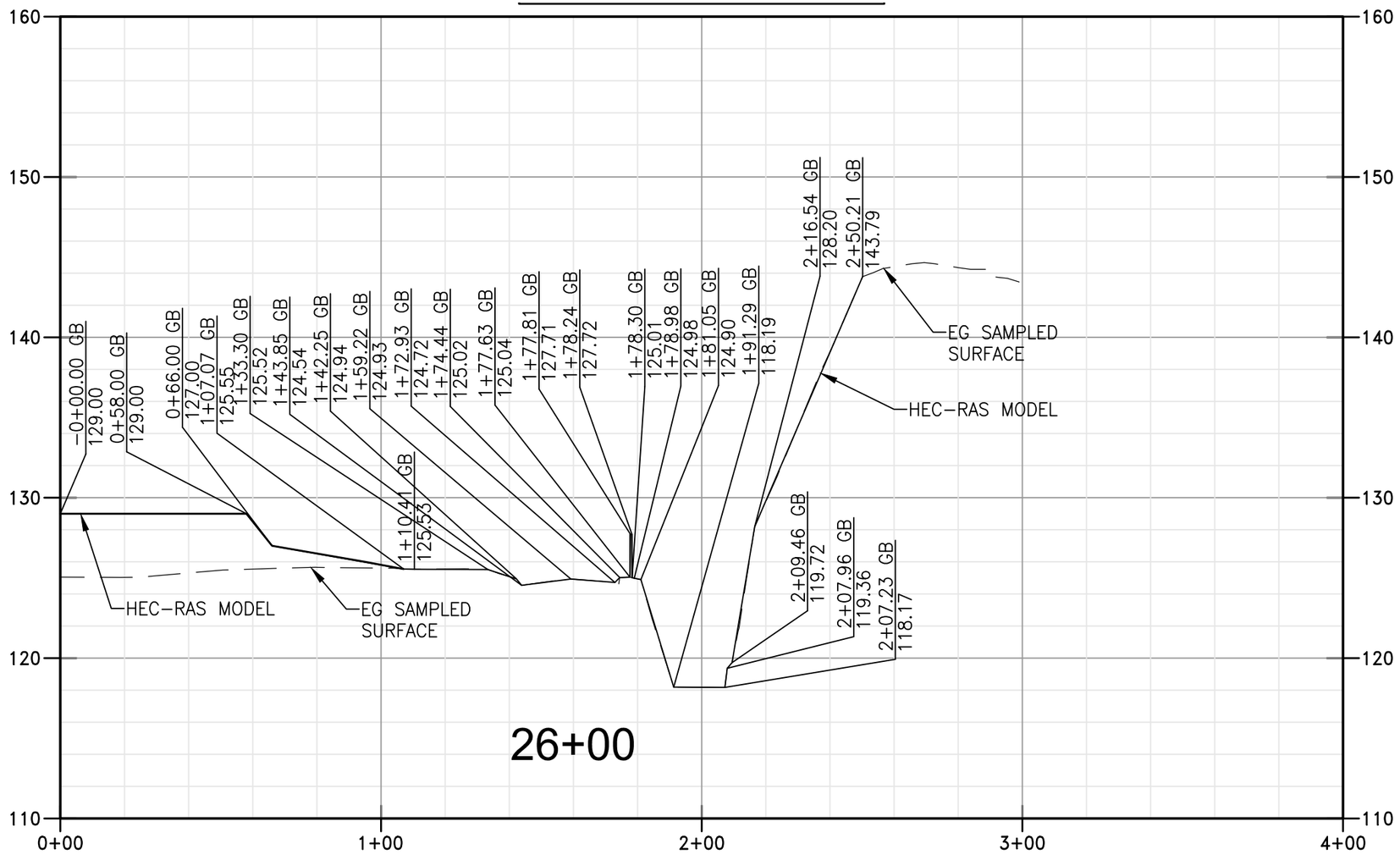
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 3 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:54:51PM) Plotted by: rroberts

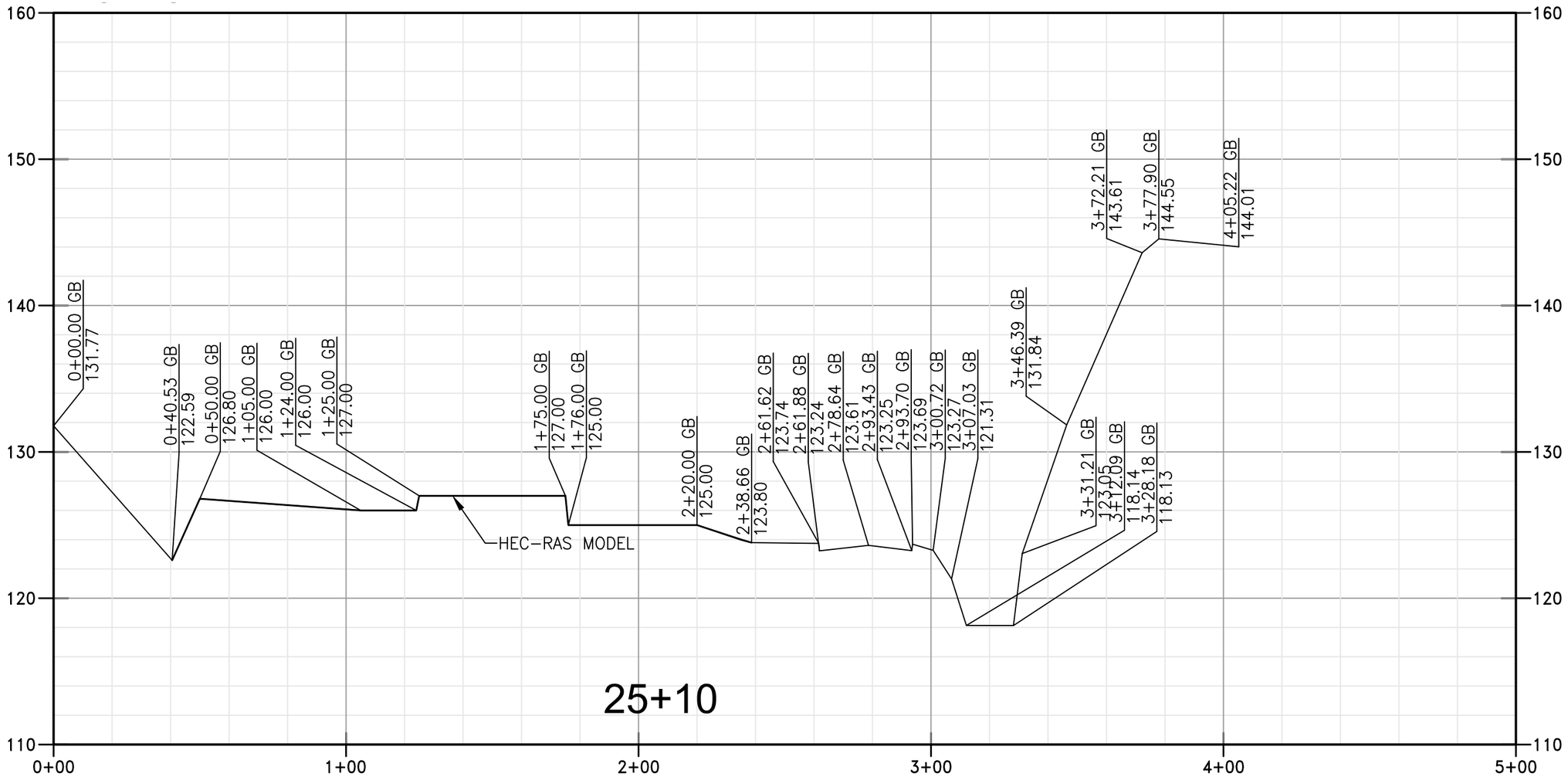


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 4 of 23

DATE: 08/22/2018

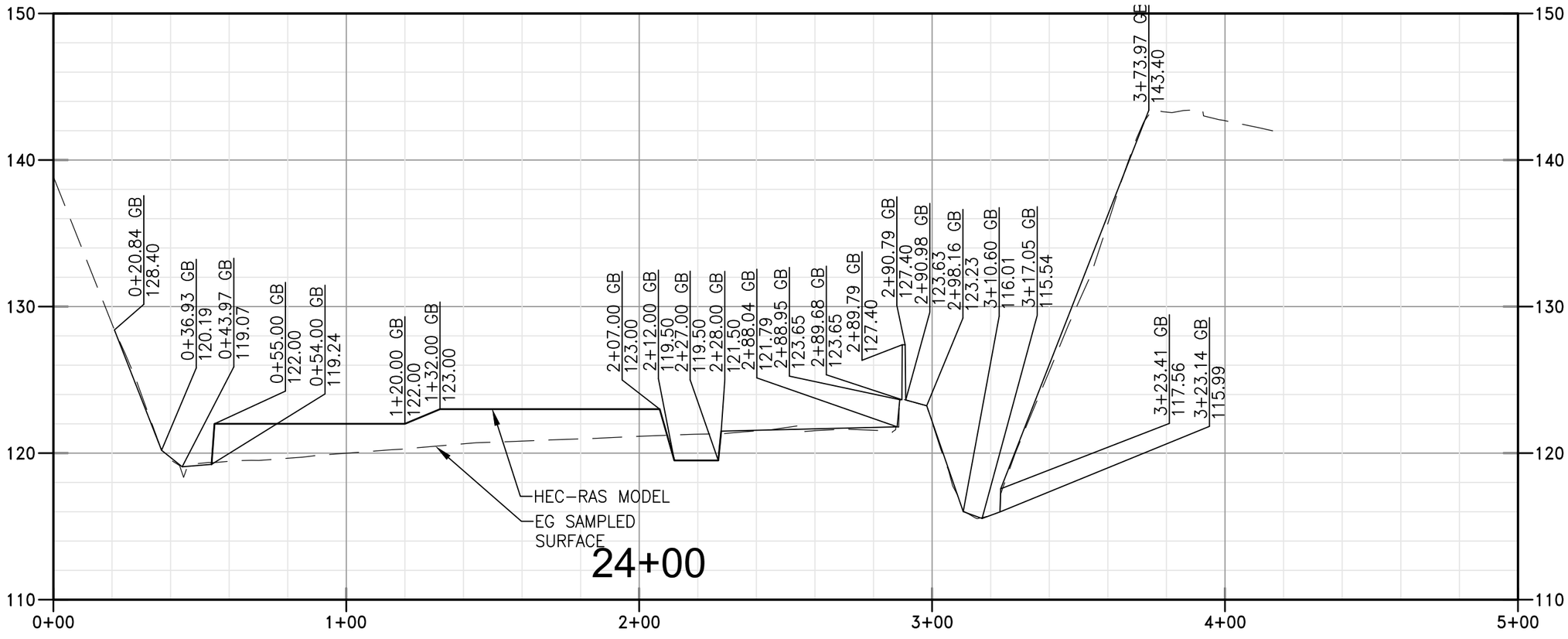


FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
5 of 23

DATE:
08/22/2018



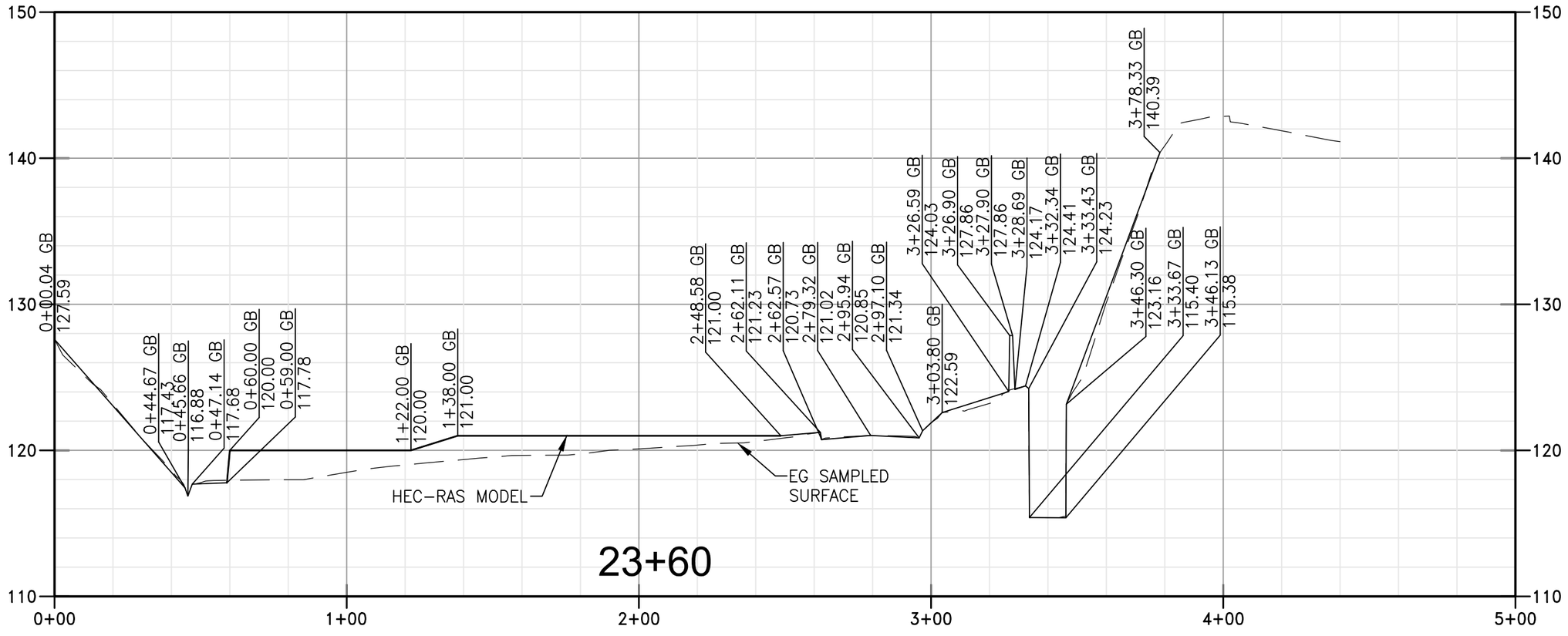
FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
6 of 23

DATE:
08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:54:56PM) Plotted by: rroberts

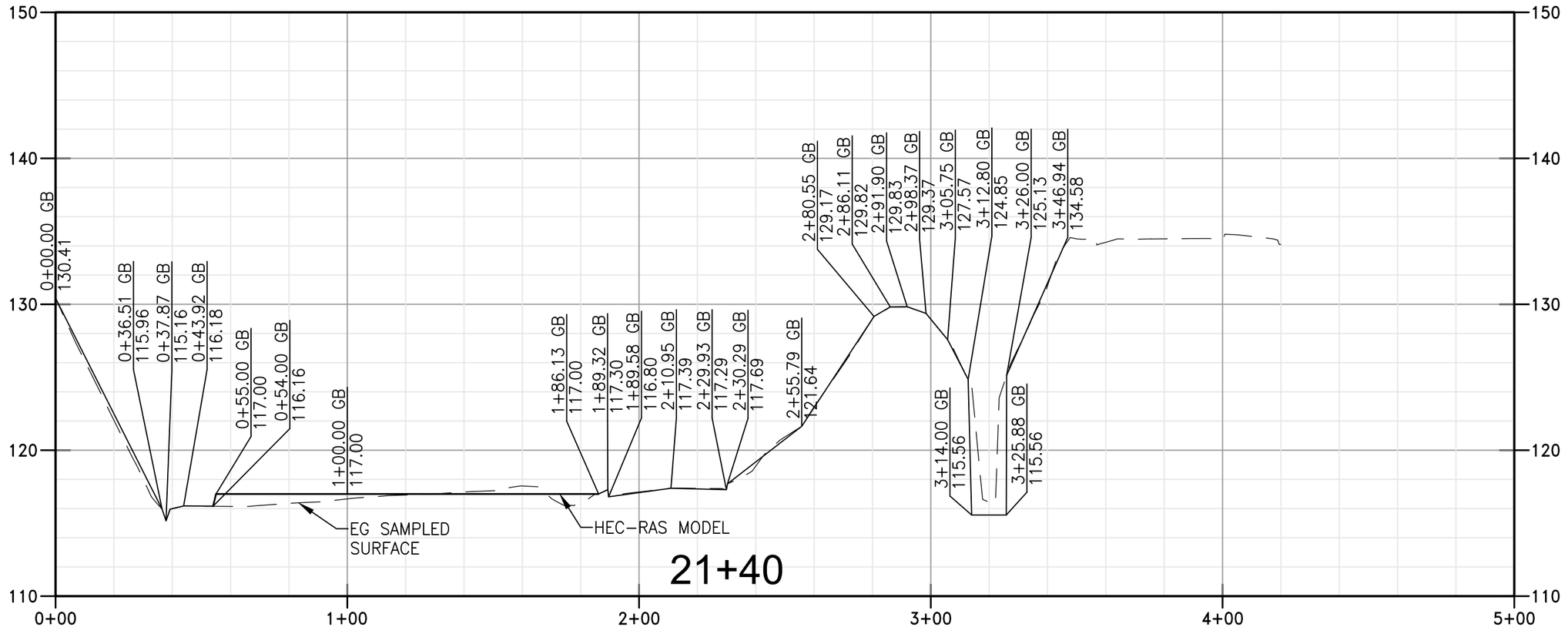


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 7 of 23

DATE: 08/22/2018



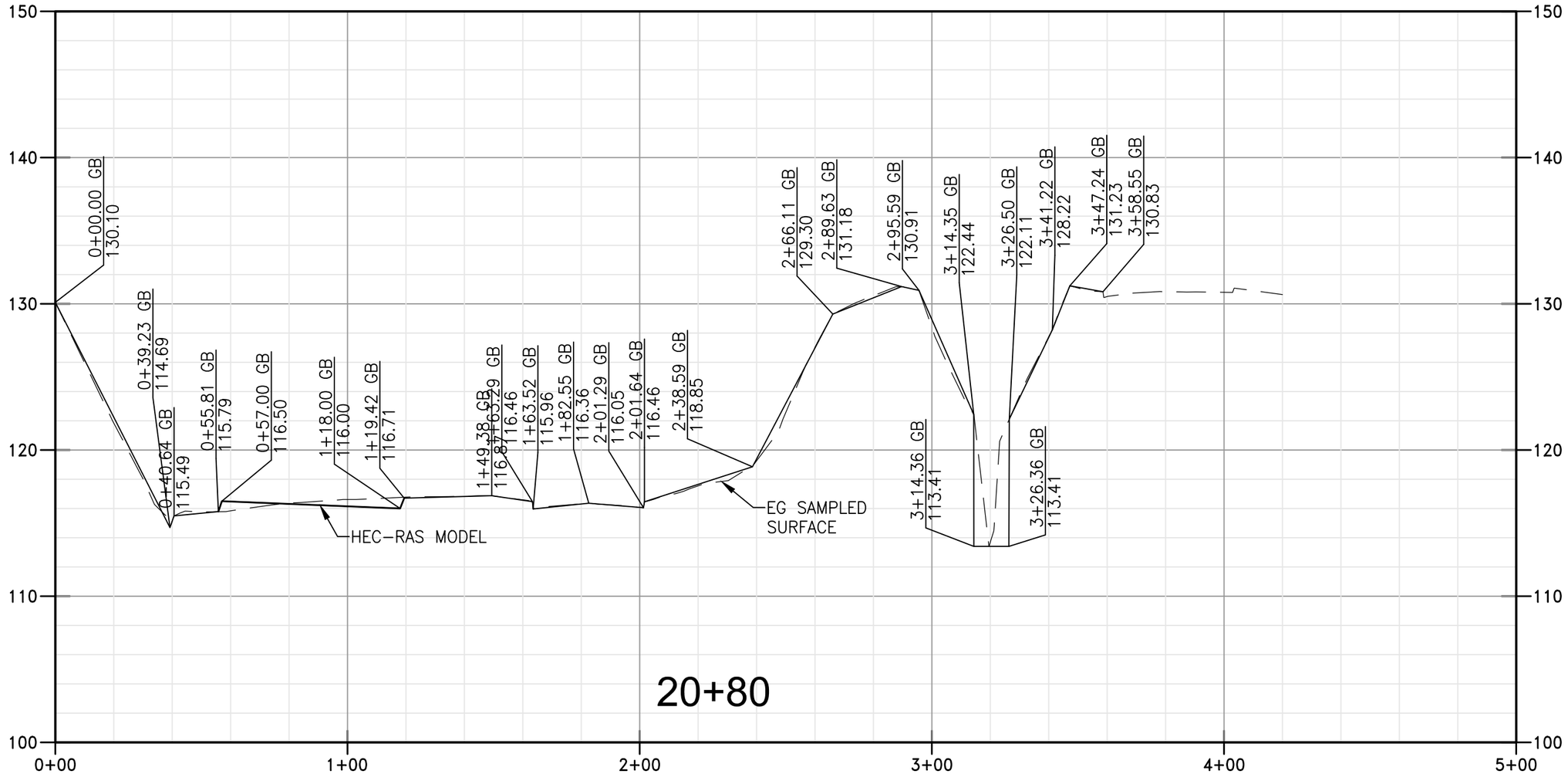
FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
8 of 23

DATE:
08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:55:00PM) Plotted by: rroberts

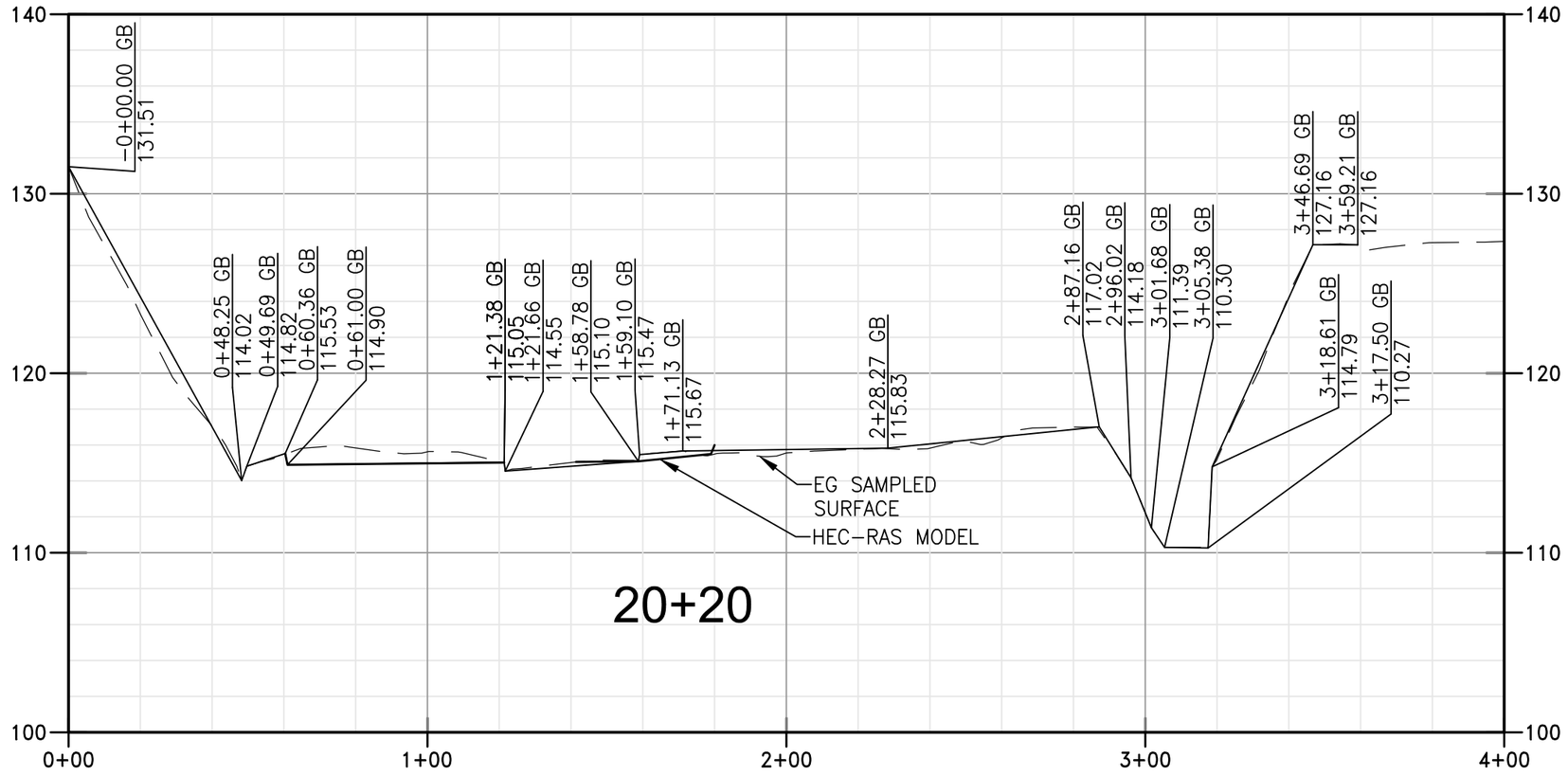


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 9 of 23

DATE: 08/22/2018



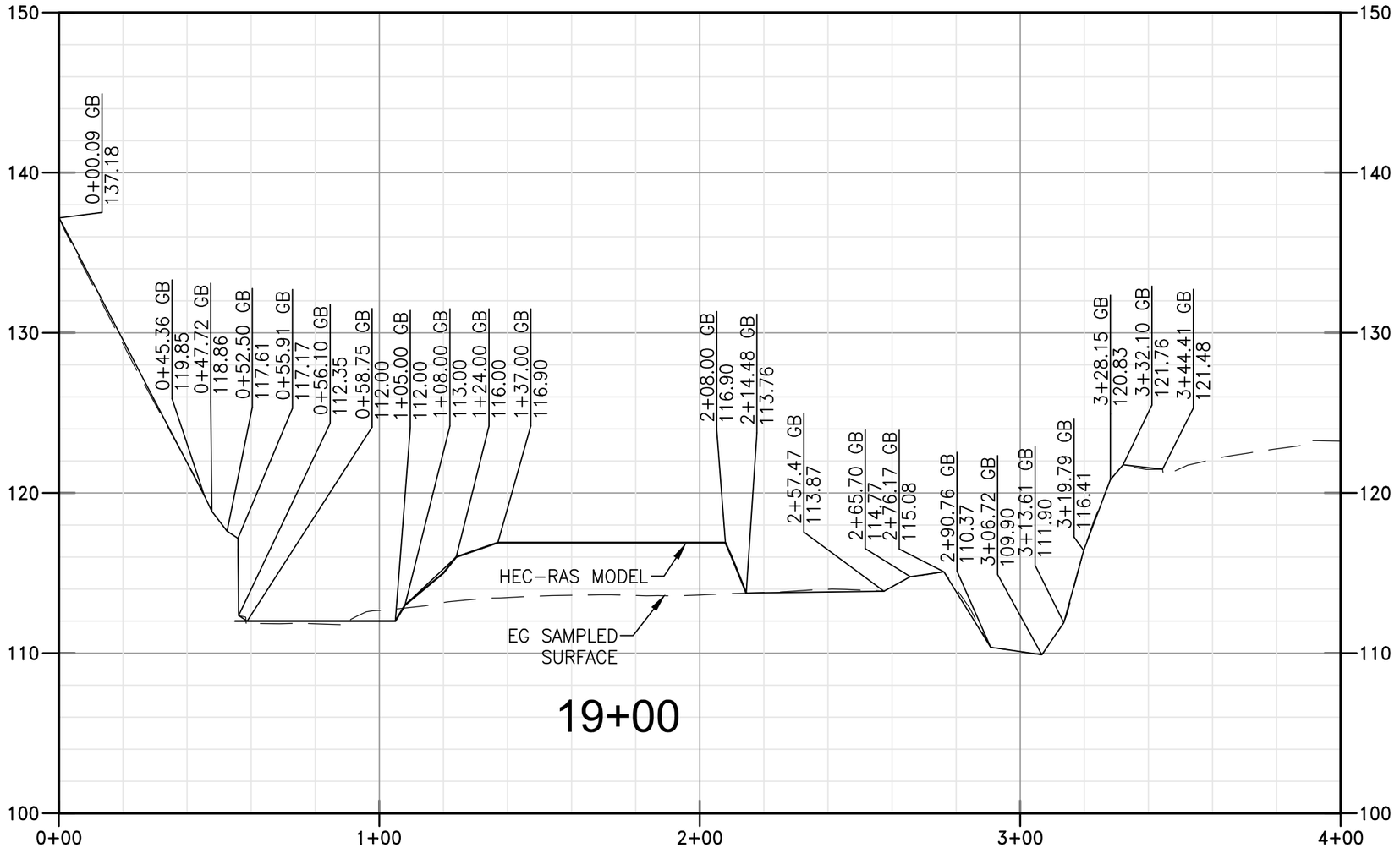
FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 10 of 23

DATE: 08/22/2018

C:\USERS\RROBERTS\APPDATA\LOCAL\TEMP\ACPUBLISH_9760\HEC-RAS SECTIONS-PROPOSED.DWG (01-16-2019 3:55:04PM) Plotted by: rroberts

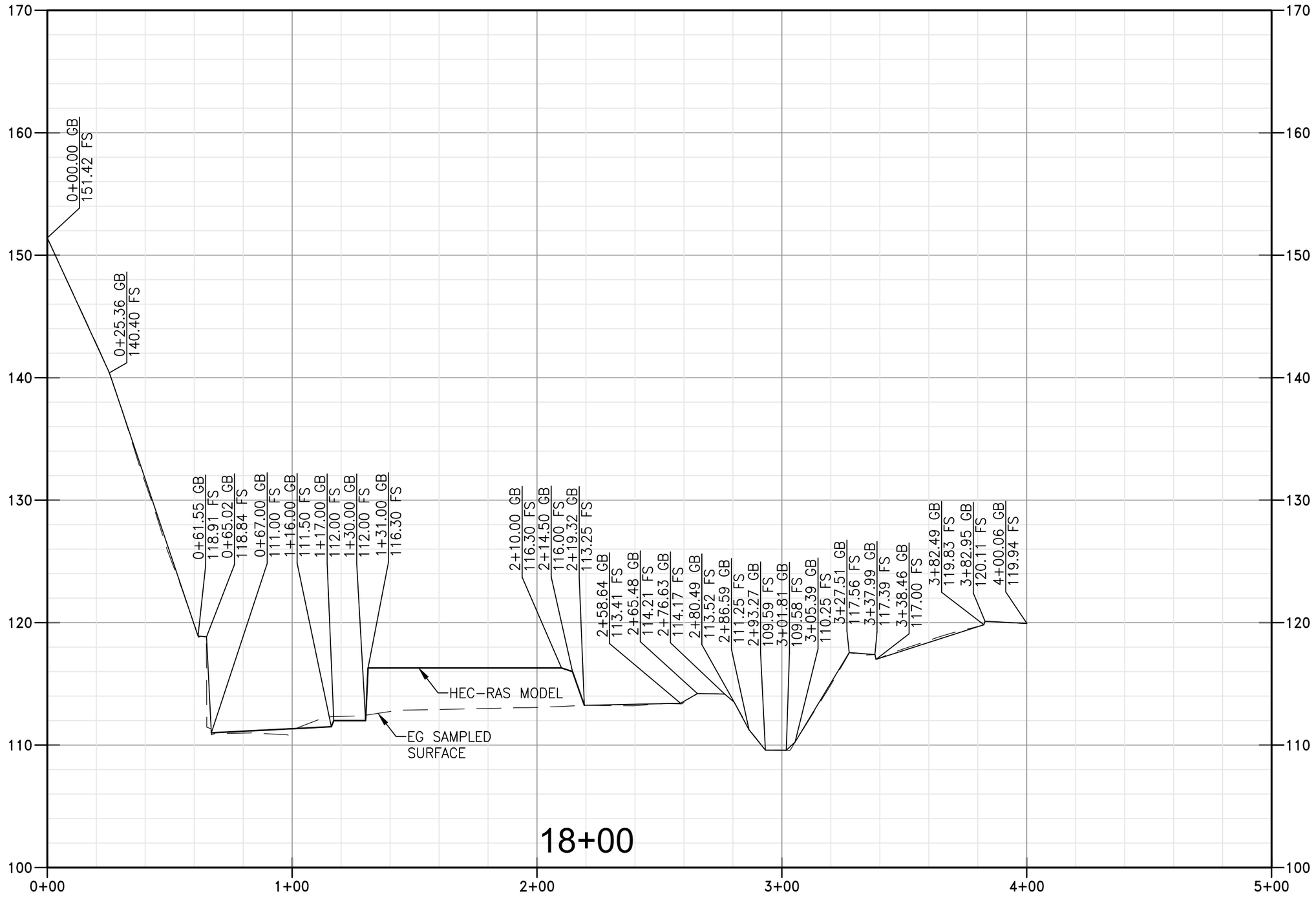


FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
11 of 23

DATE:
08/22/2018



FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 12 of 23

DATE: 08/22/2018

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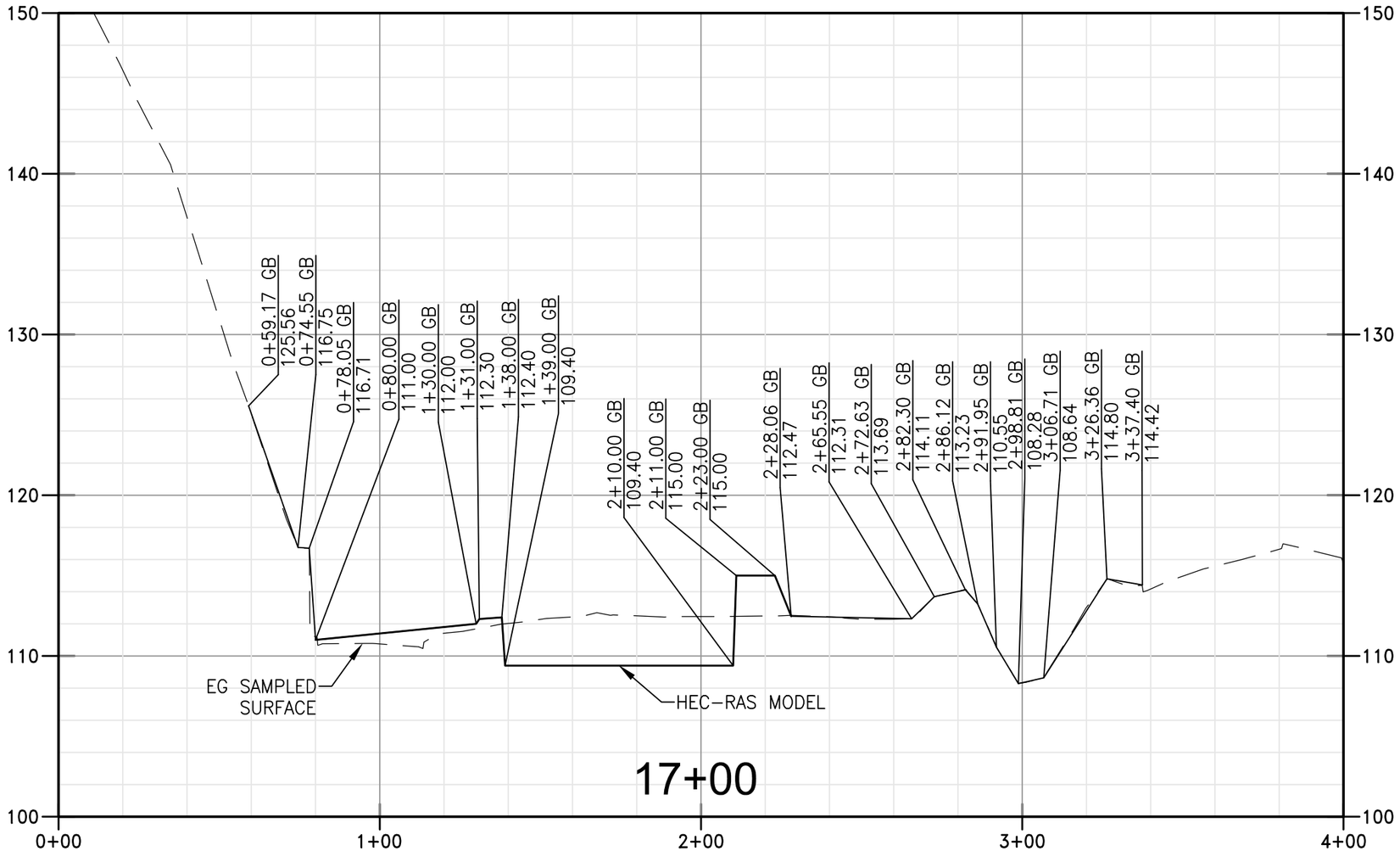

FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 13 of 23

DATE: 08/22/2018

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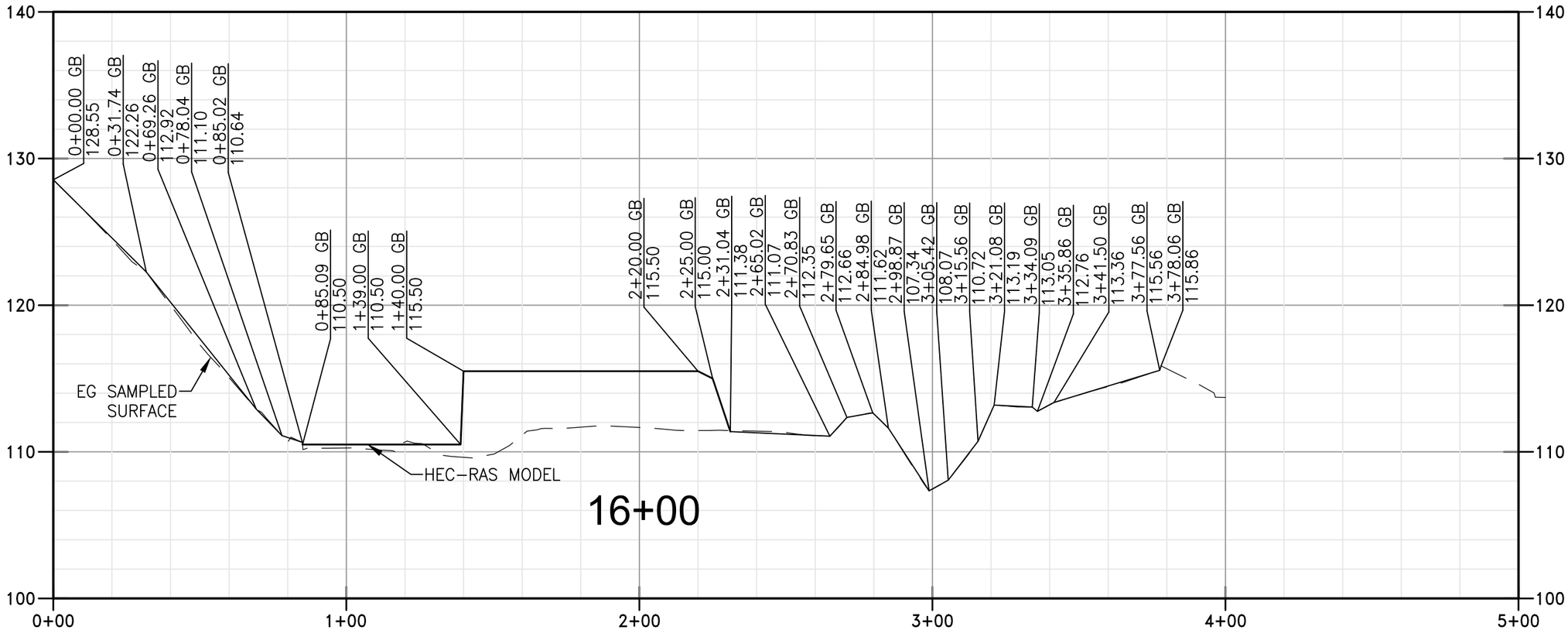

FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
14 of 23

DATE:
08/22/2018

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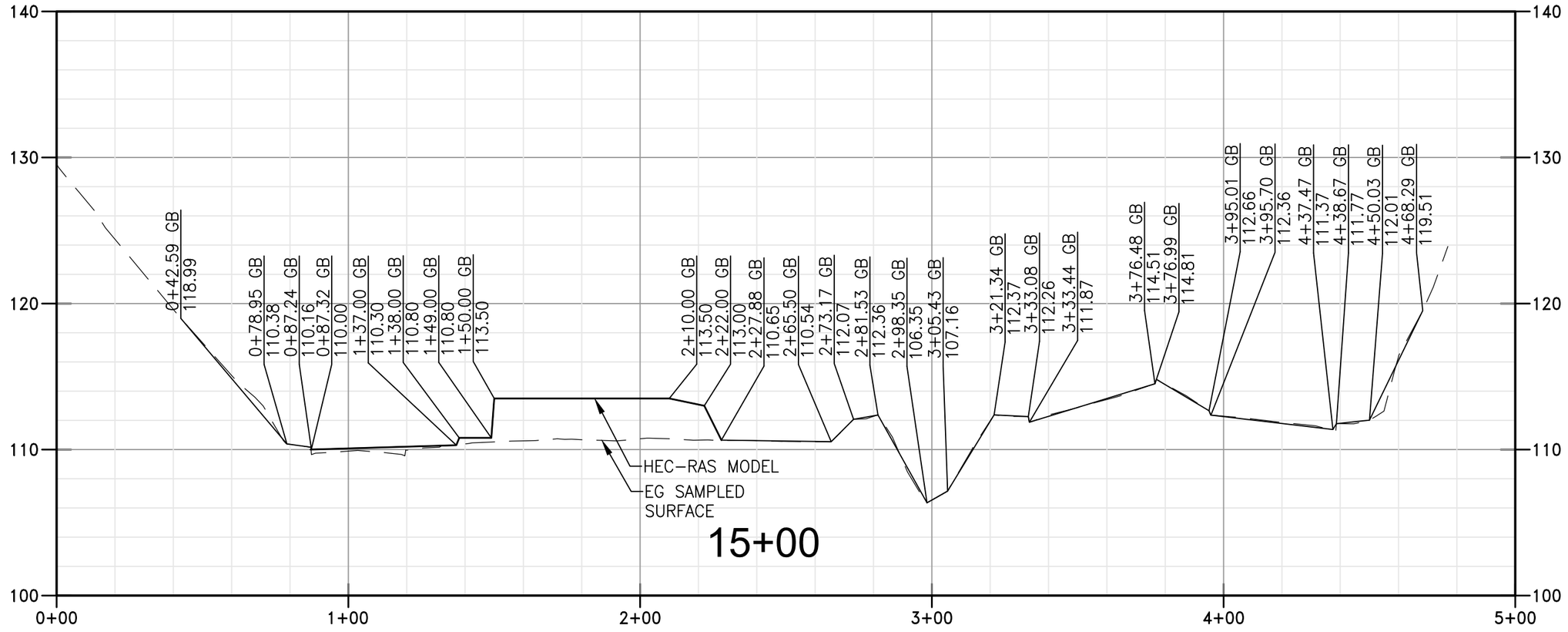
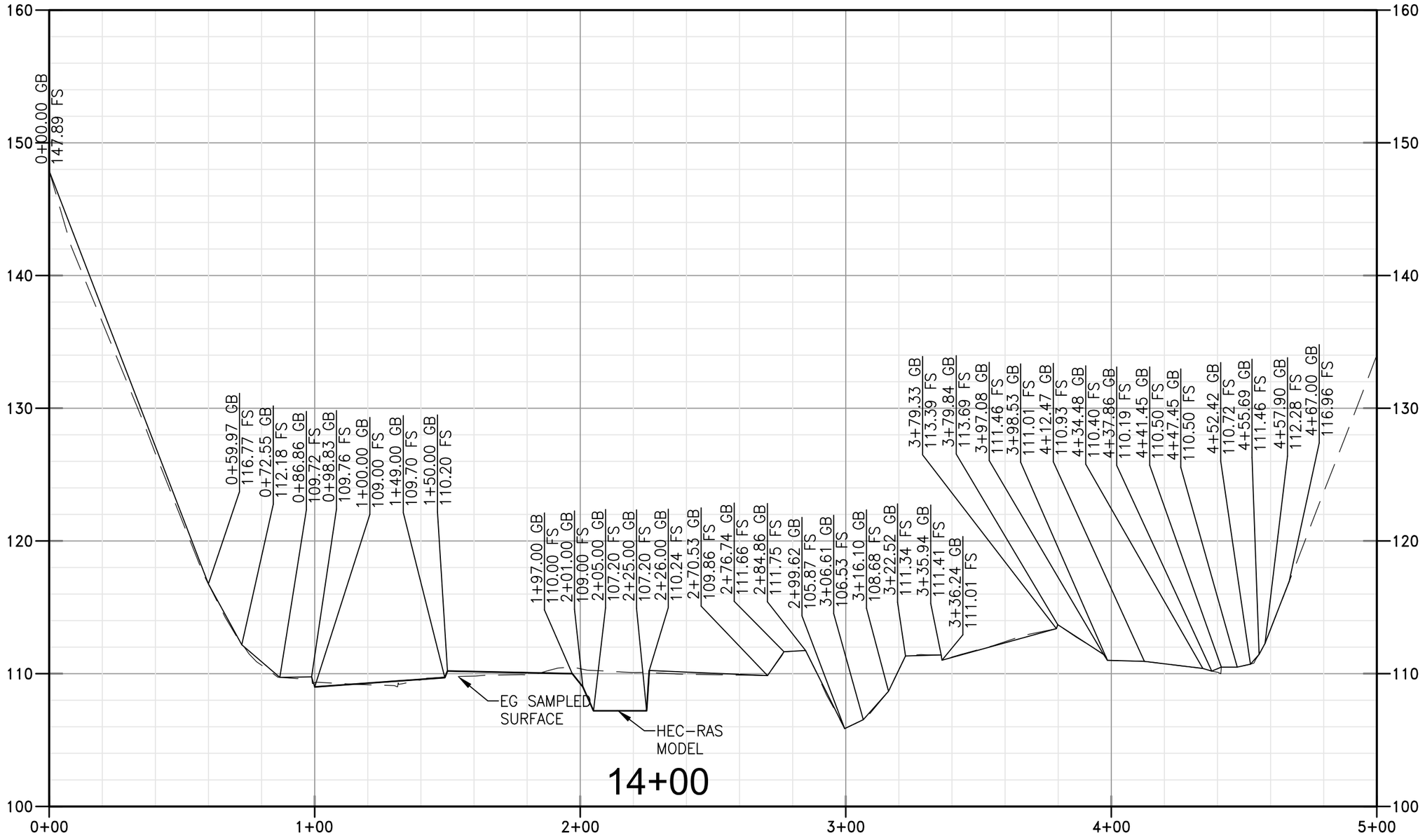


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 15 of 23

DATE: 08/22/2018



FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 16 of 23

DATE: 08/22/2018

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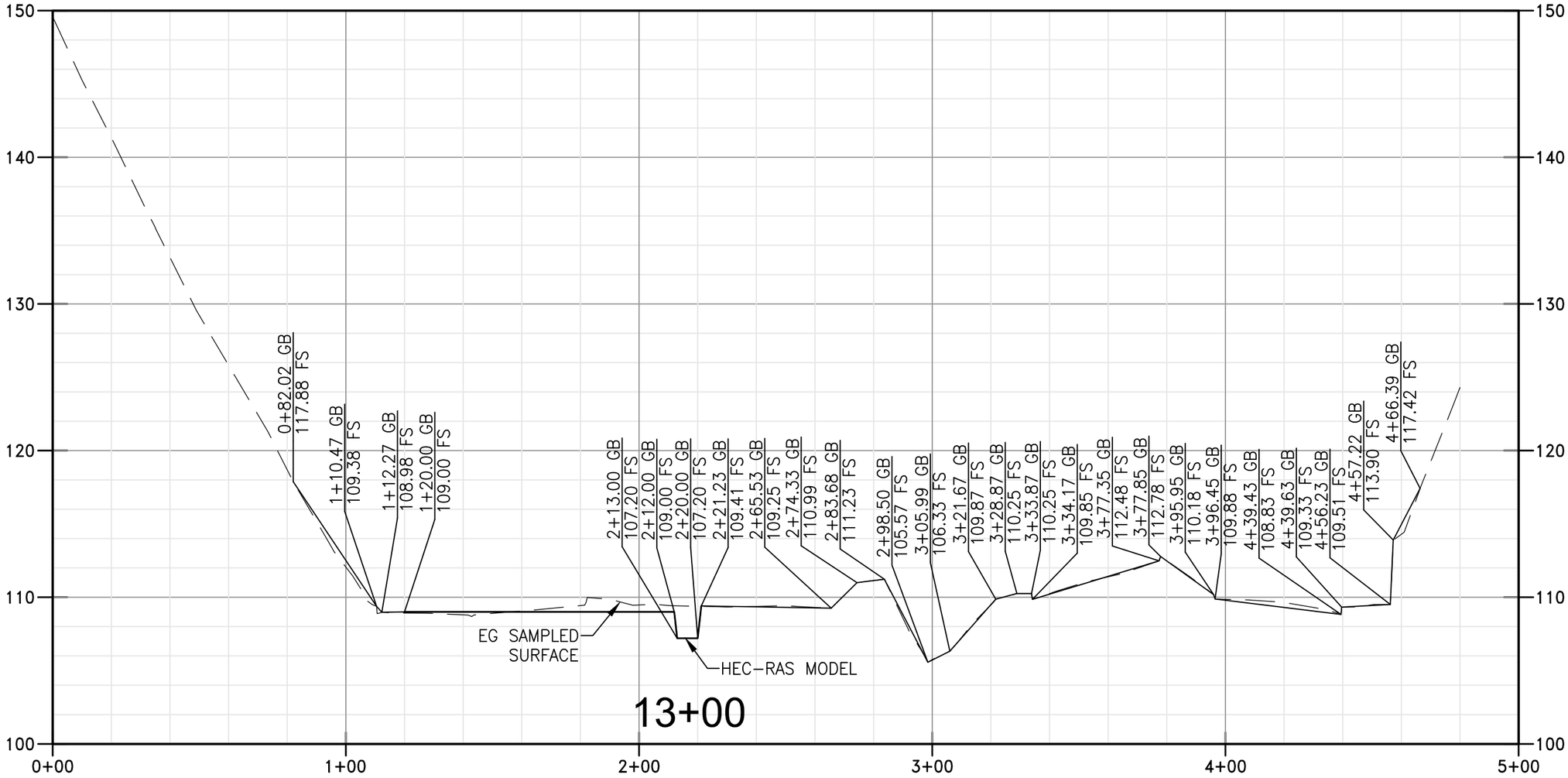

FUSCOE ENGINEERING

HORIZ SCALE:
1"=40'
VERT SCALE:
1"=8'

SHEET
17 of 23

DATE:
08/22/2018

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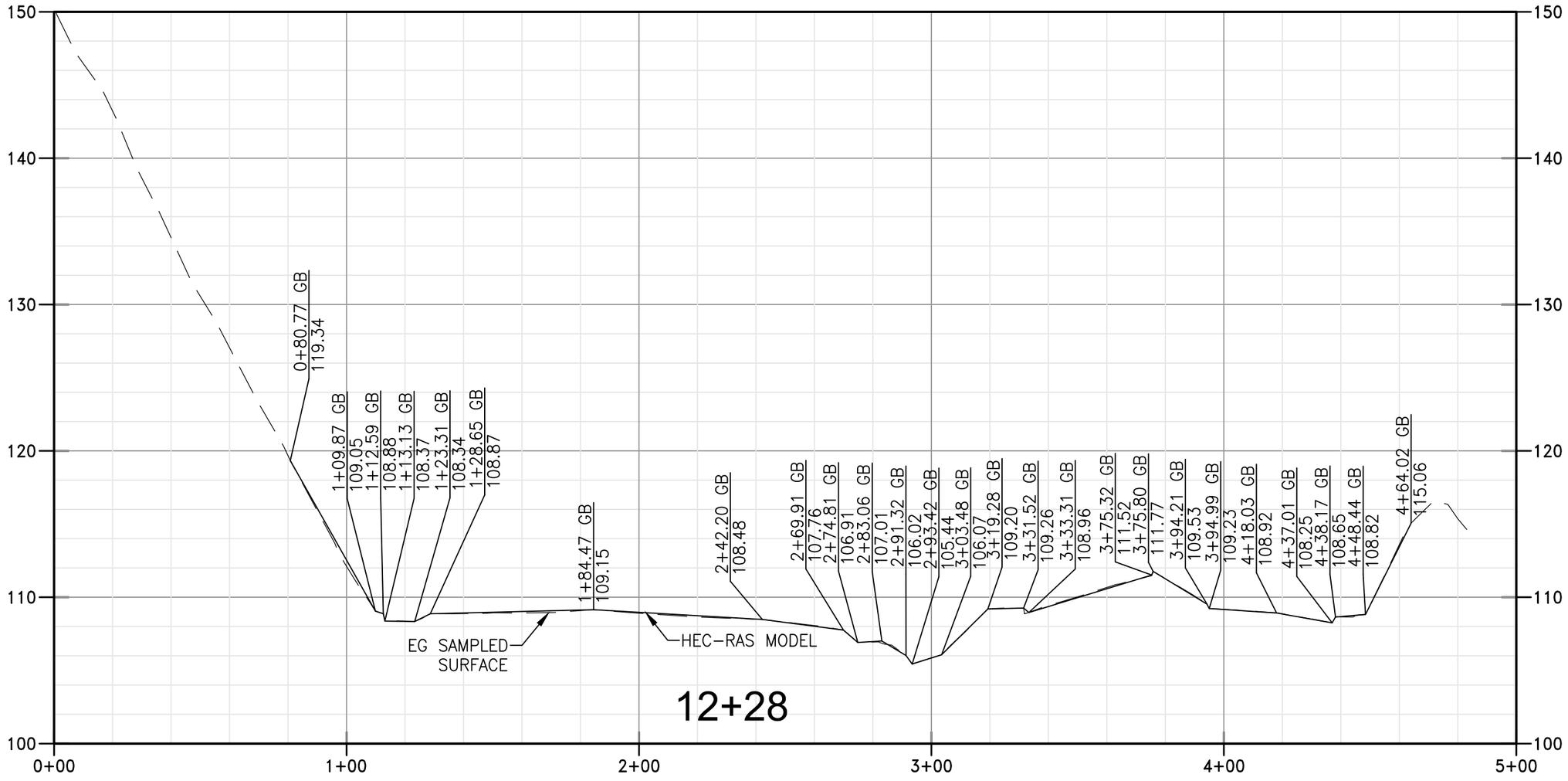
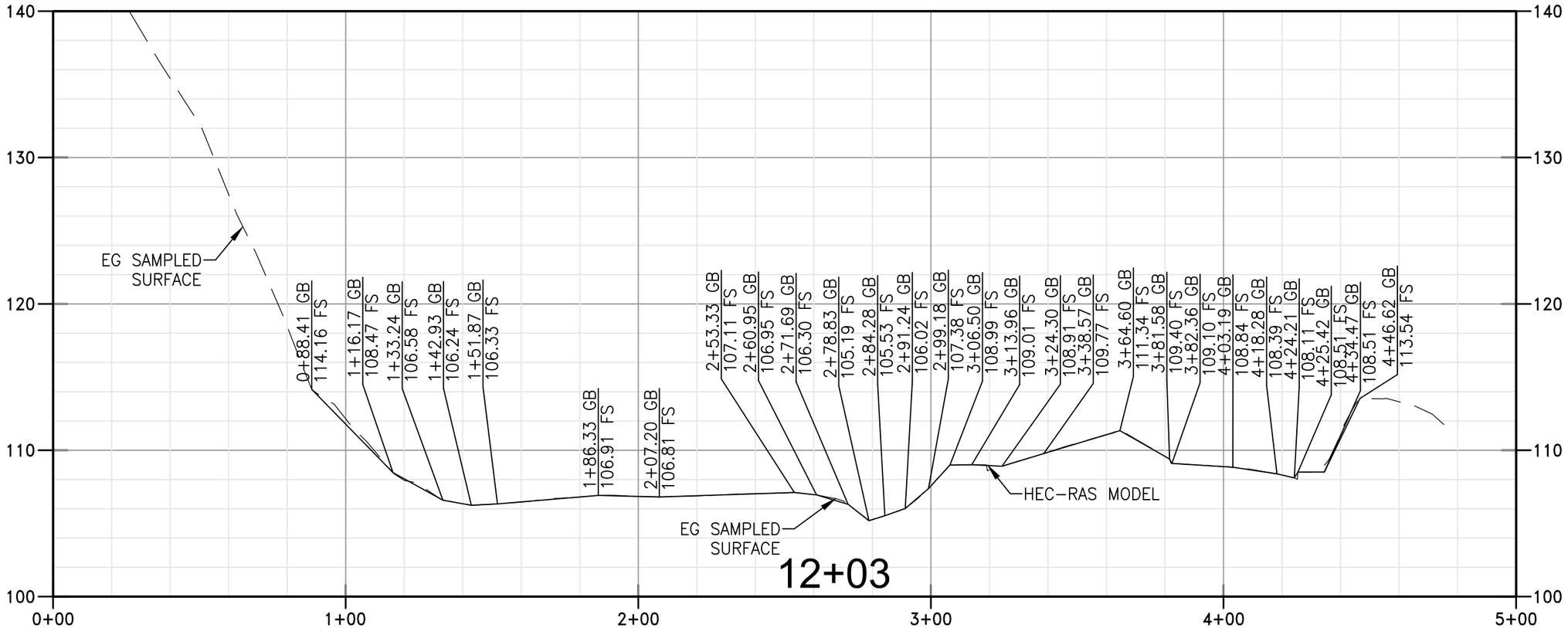


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 18 of 23

DATE: 08/22/2018



FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 19 of 23

DATE: 08/22/2018

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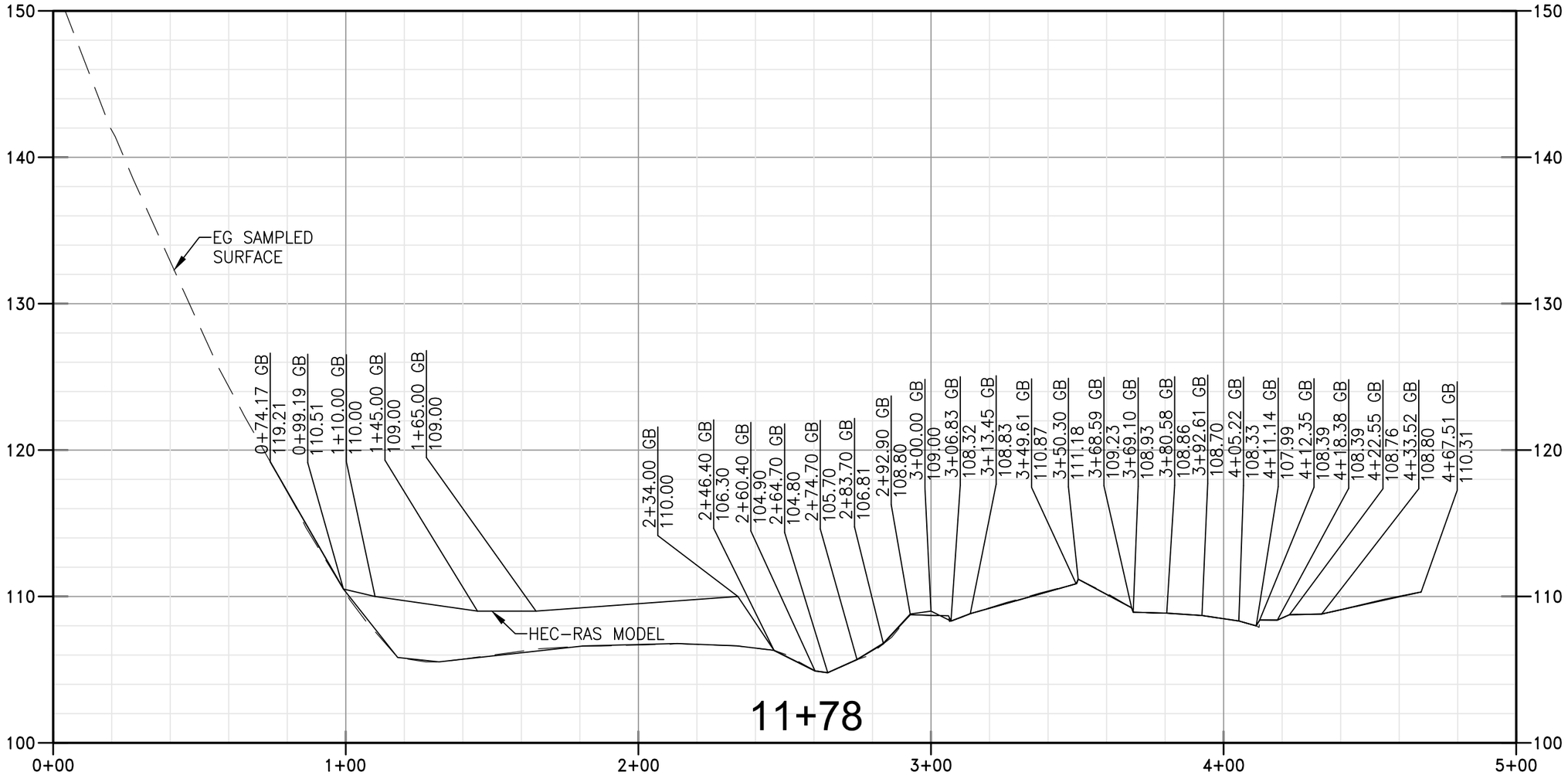
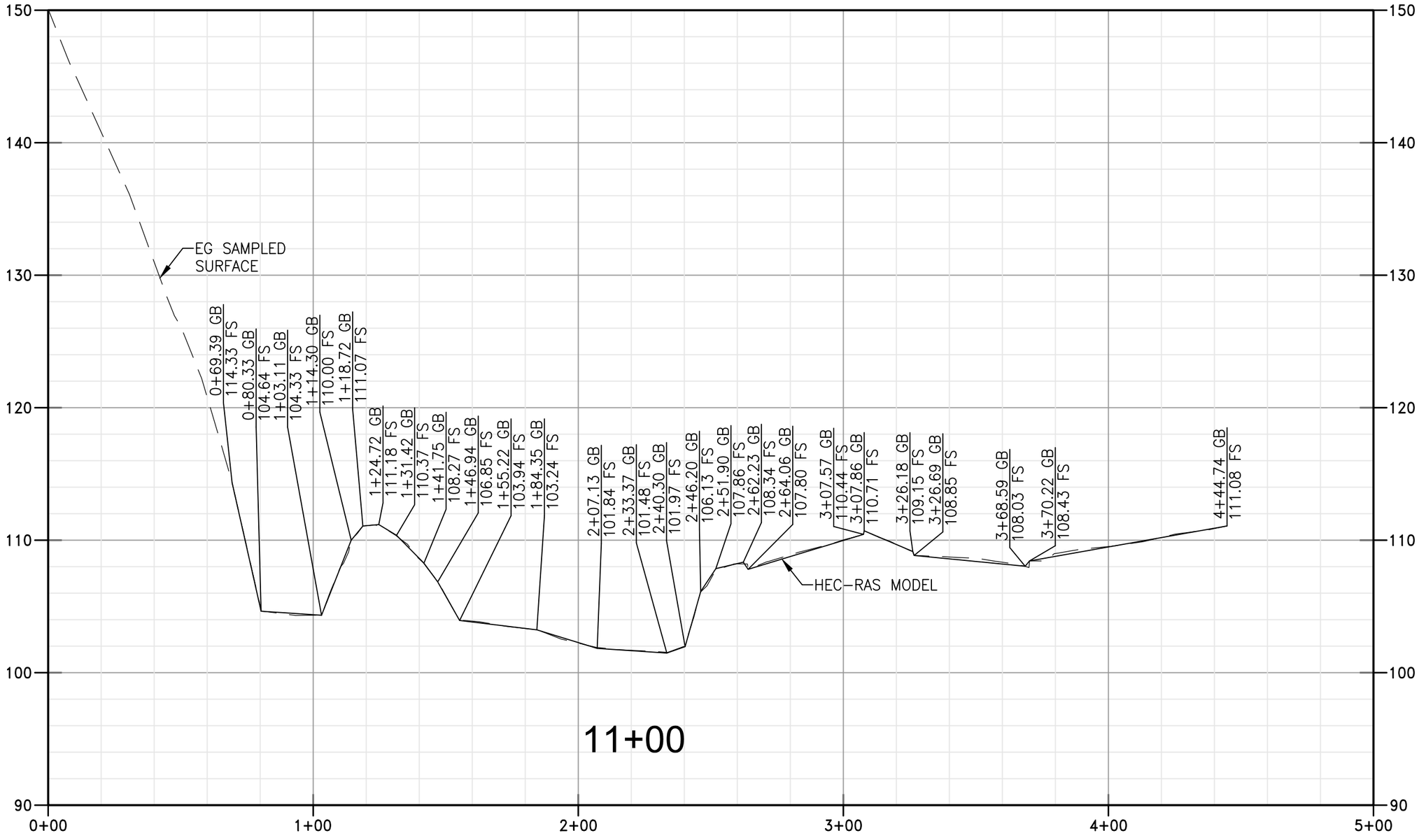


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 20 of 23

DATE: 08/22/2018

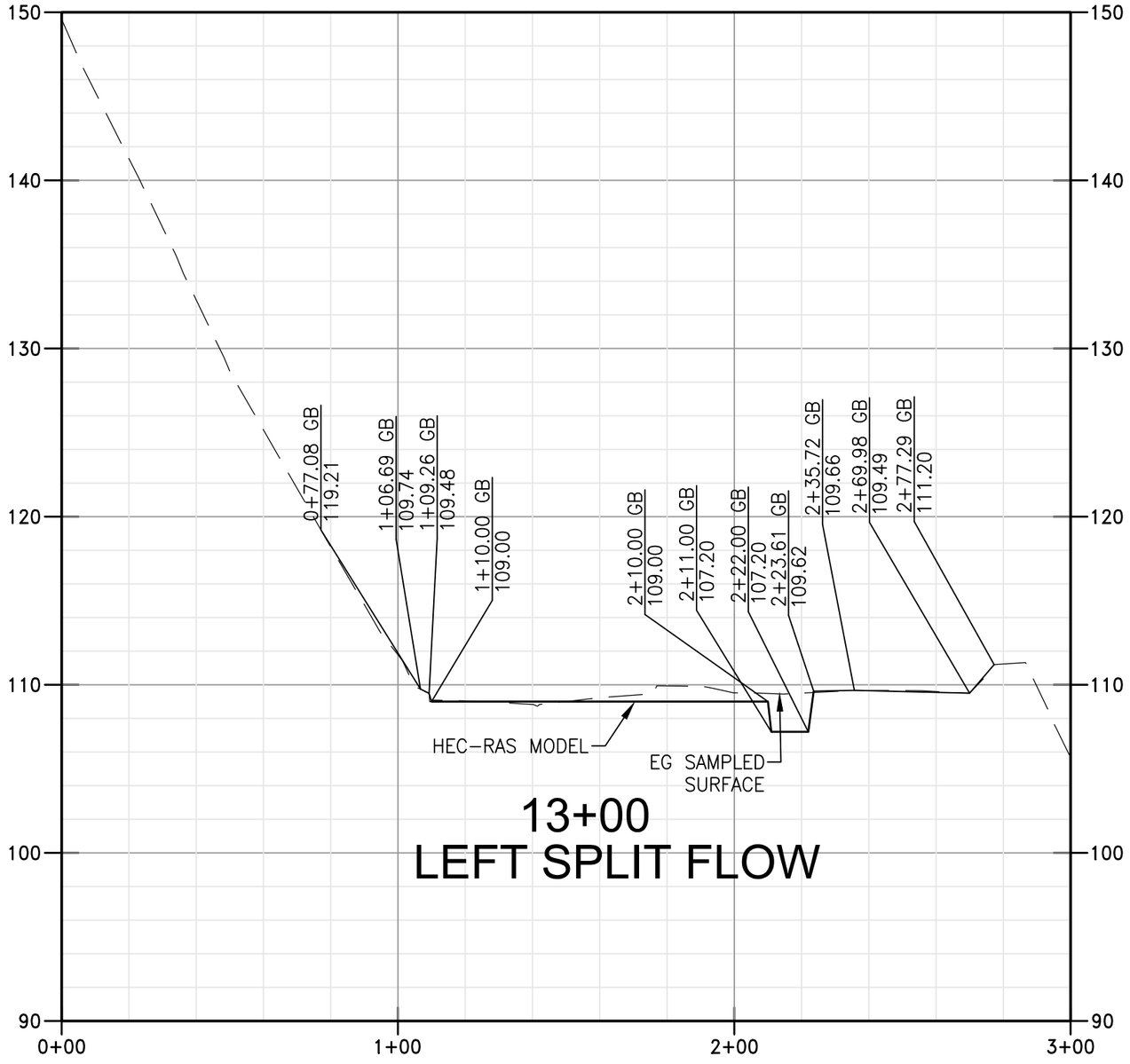


FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 21 of 23

DATE: 08/22/2018



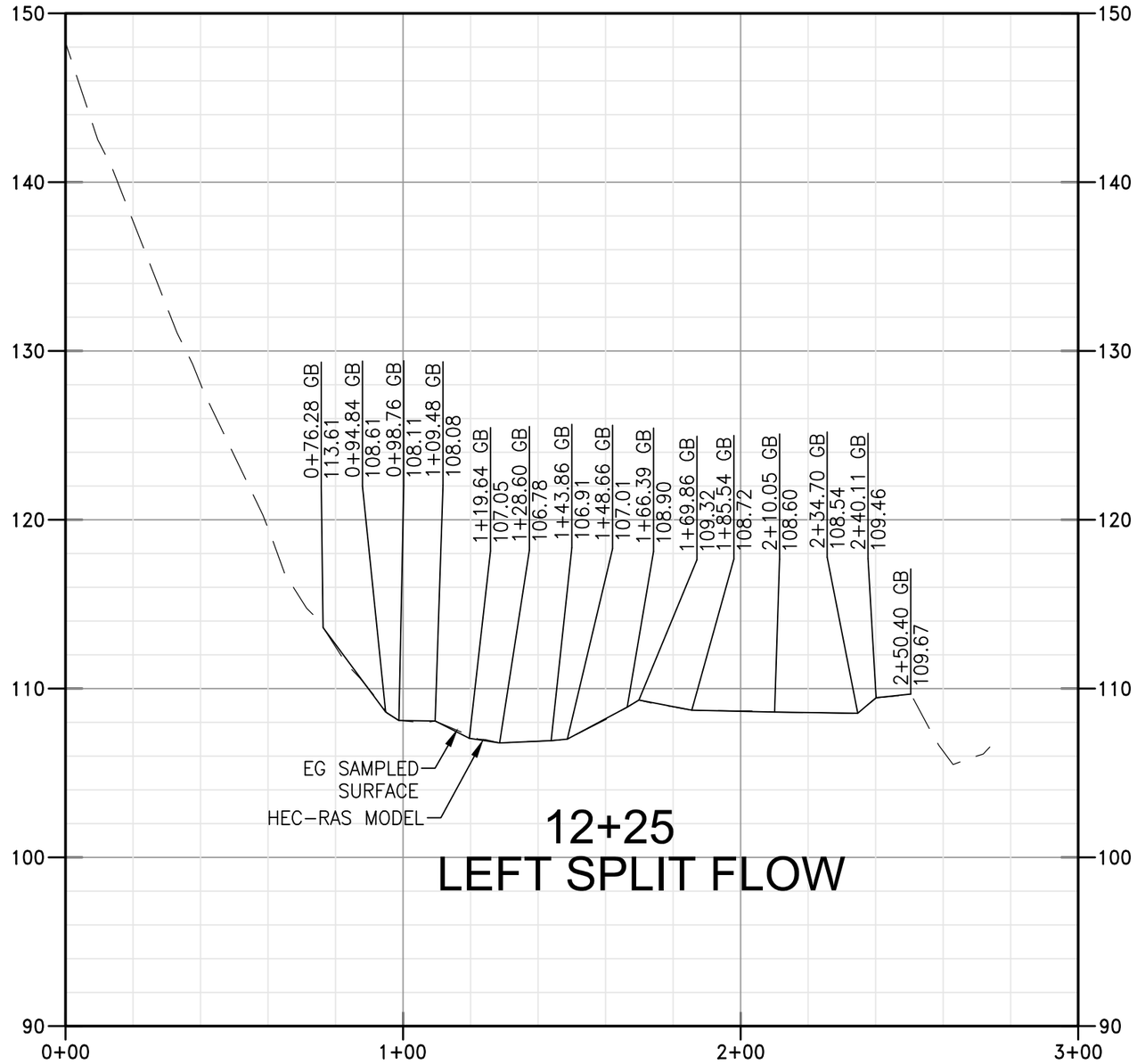
13+00
LEFT SPLIT FLOW

FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 22 of 23

DATE: 08/22/2018



FUSCOE ENGINEERING

HORIZ SCALE: 1"=40'
VERT SCALE: 1"=8'

SHEET 23 of 23

DATE: 08/22/2018

Appendix H

Map Pockets
Existing Conditions Hydrology Exhibit
Proposed Conditions Hydrology Exhibit
100 Year Storm Inundation Exhibit
DMA Exhibit

LEGEND

- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- INITIAL AREA
- FLOW PATH (SURFACE)
- FLOW PATH (PIPE)
- NODE
- POINT OF CONFLUENCE
- EXISTING STORM DRAIN

80' 0' 40' 80' 160'

SCALE: 1" = 80'

WEST OAKS

EXISTING HYDROLOGY EXHIBIT

JANUARY 2019

FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

LEGEND

- BASIN BOUNDARY
- SUB-BASIN BOUNDARY
- INITIAL AREA
- DRAINAGE FLOW PATH
- NODE (100)
- POINT OF CONFLUENCE (A)
- EXISTING STORM DRAIN

WEST OAKS

PROPOSED HYDROLOGY EXHIBIT

August 30, 2018

80' 0' 40' 80' 160'

SCALE: 1" = 80'

FUSCOE ENGINEERING
16795 Von Karman, Suite 100, Irvine, California 92606
tel 949.474.1960 ◦ fax 949.474.5315 ◦ www.fuscoe.com

LEGEND

100 YEAR FLOODPLAIN - EXISTING

100 YEAR FLOODPLAIN - PROPOSED

FF ELEVATION 113.0

LEFT SPLIT FLOW

CHANNEL BANK

DOWNSTREAM REACH LENGTHS (FT) 34

40' 0' 20' 40' 80'

SCALE: 1" = 40'

WEST OAKS

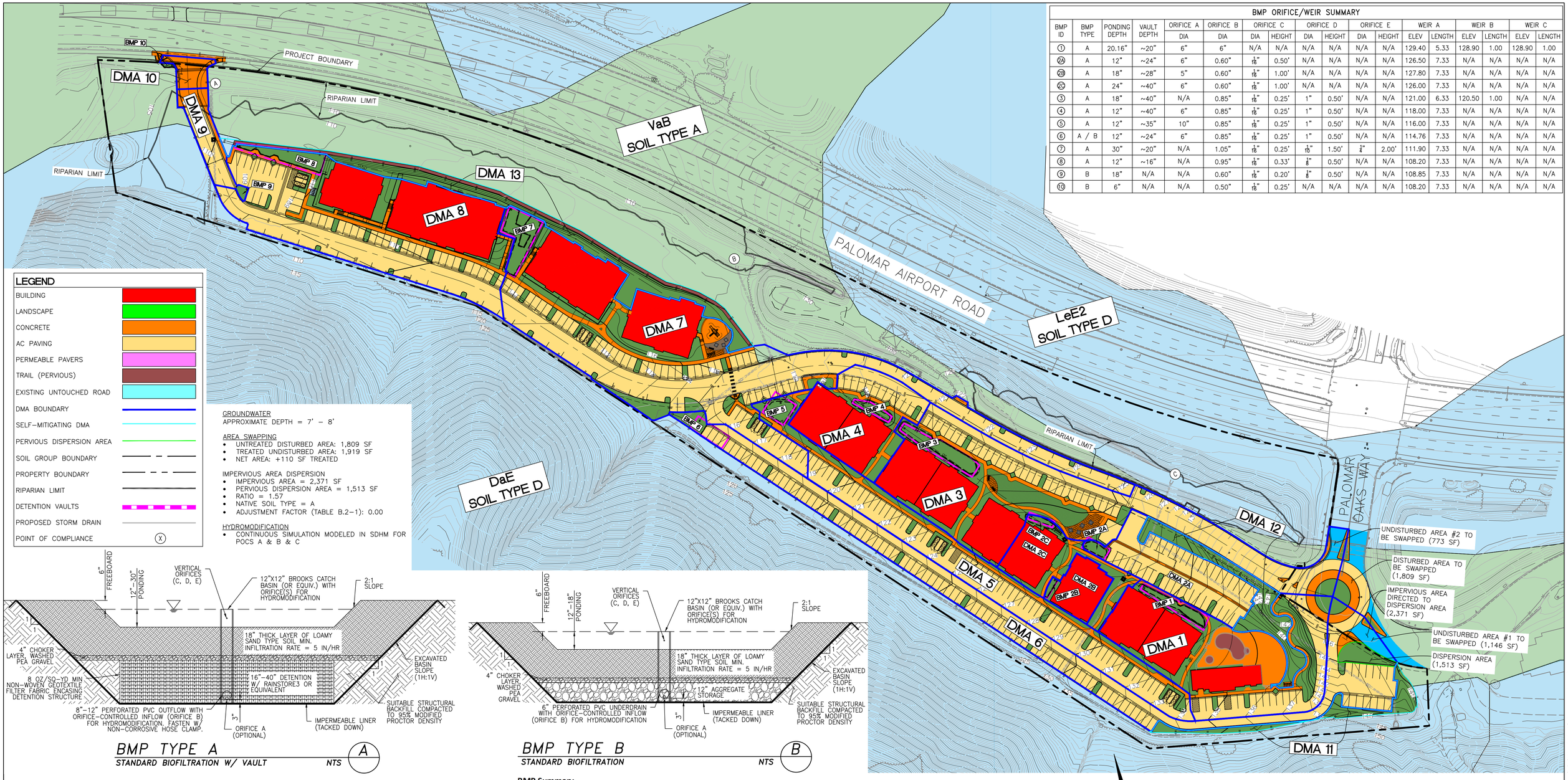
HEC-RAS STUDY

1/16/2019

FUSCOE ENGINEERING

6390 Greenwich Dr., Suite 170, San Diego, California 92122

tel 858.554.1500 = fax 858.597.0335 = www.fuscoe.com



LEGEND

- BUILDING
- LANDSCAPE
- CONCRETE
- AC PAVING
- PERMEABLE PAVERS
- TRAIL (PERVIOUS)
- EXISTING UNTOUCHED ROAD
- DMA BOUNDARY
- SELF-MITIGATING DMA
- PERVIOUS DISPERSION AREA
- SOIL GROUP BOUNDARY
- PROPERTY BOUNDARY
- RIPARIAN LIMIT
- DETENTION VAULTS
- PROPOSED STORM DRAIN
- POINT OF COMPLIANCE (X)

GROUNDWATER
APPROXIMATE DEPTH = 7' – 8'

AREA SWAPPING
- UNTREATED DISTURBED AREA: 1,809 SF
- TREATED UNDISTURBED AREA: 1,919 SF
- NET AREA: +110 SF TREATED

IMPERVIOUS AREA DISPERSION
- IMPERVIOUS AREA = 2,371 SF
- PERVIOUS DISPERSION AREA = 1,513 SF
- RATIO = 1.57
- NATIVE SOIL TYPE = A
- ADJUSTMENT FACTOR (TABLE B.2-1): 0.00

HYDROMODIFICATION
- CONTINUOUS SIMULATION MODELED IN SDHM FOR POCS A & B & C

BMP TYPE A
STANDARD BIOFILTRATION W/ VAULT NTS — A

BMP TYPE B
STANDARD BIOFILTRATION NTS — B

BMP ORIFICE/WEIR SUMMARY

BMP ID	BMP TYPE	PONDING DEPTH	VAULT DEPTH	ORIFICE A	ORIFICE B	ORIFICE C		ORIFICE D		ORIFICE E		WEIR A		WEIR B		WEIR C	
				DIA	DIA	DIA	HEIGHT	DIA	HEIGHT	DIA	HEIGHT	ELEV	LENGTH	ELEV	LENGTH	ELEV	LENGTH
①	A	20.16"	~20"	6"	6"	N/A	N/A	N/A	N/A	N/A	N/A	129.40	5.33	128.90	1.00	128.90	1.00
②A	A	12"	~24"	6"	0.60"	1/16"	0.50'	N/A	N/A	N/A	N/A	126.50	7.33	N/A	N/A	N/A	N/A
②B	A	18"	~28"	5"	0.60"	1/16"	1.00'	N/A	N/A	N/A	N/A	127.80	7.33	N/A	N/A	N/A	N/A
②C	A	24"	~40"	6"	0.60"	1/16"	1.00'	N/A	N/A	N/A	N/A	126.00	7.33	N/A	N/A	N/A	N/A
③	A	18"	~40"	N/A	0.85"	1/16"	0.25'	1"	0.50'	N/A	N/A	121.00	6.33	120.50	1.00	N/A	N/A
④	A	12"	~40"	6"	0.85"	1/16"	0.25'	1"	0.50'	N/A	N/A	118.00	7.33	N/A	N/A	N/A	N/A
⑤	A	12"	~35"	10"	0.85"	1/16"	0.25'	1"	0.50'	N/A	N/A	116.00	7.33	N/A	N/A	N/A	N/A
⑥	A / B	12"	~24"	6"	0.85"	1/16"	0.25'	1"	0.50'	N/A	N/A	114.76	7.33	N/A	N/A	N/A	N/A
⑦	A	30"	~20"	N/A	1.05"	1/16"	0.25'	1/16"	1.50'	1/2"	2.00'	111.90	7.33	N/A	N/A	N/A	N/A
⑧	A	12"	~16"	N/A	0.95"	1/16"	0.33'	1/8"	0.50'	N/A	N/A	108.20	7.33	N/A	N/A	N/A	N/A
⑨	B	18"	N/A	N/A	0.60"	1/16"	0.20'	1/8"	0.50'	N/A	N/A	108.85	7.33	N/A	N/A	N/A	N/A
⑩	B	6"	N/A	N/A	0.50"	1/16"	0.25'	N/A	N/A	N/A	N/A	108.20	7.33	N/A	N/A	N/A	N/A

BMP Summary

DMA ID / BMP ID	1		2a		2b		2c		3		4		5		6		7		8		9		10		11		12		13	
DMA Type	Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Drains to BMP		Self-Mitigating		Self-Mitigating		Self-Mitigating	
POC	C		B		B		B		B		B		B		B		A		A		A		A		C		C		A	
BMP Type	Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Biofiltration		Permeable Pavers							
BMP Soil	A		A		A		A		A		A		A		D		A		A		D		A		D		A		A	
Total Area (SF)	34,456		13,483		4,779		9,657		48,378		16,407		28,594		36,657		69,414		48,292		4,631		2,072		3,918		7,022		13,201	
Total Pervious (SF)	25%	8,614	5%	646	3%	155	44%	4,250	20%	9,676	25%	4,102	10%	2,859	12%	4,294	17%	12,075	16%	7,507	5%	232	0%	0	100%	3,918	100%	7,022	100%	13,201
Total Impervious (SF)	75%	25,842	95%	12,837	97%	4,624	56%	5,407	80%	38,702	75%	12,305	90%	25,735	88%	32,363	83%	57,339	84%	40,785	95%	4,399	100%	2,072	0%	0	0%	0	0%	0
Pervious Dispersion Area (SF)	0		0		0		0		0		0		0		1,513		0		0		0		0							
Impervious Area for Dispersion (SF)	0		0		0		0		0		0		0		2,371		0		0		0		0							
$C_{weighted}$ *(adj. for Dispersion)*	0.70		0.86		0.87		0.55		0.74		0.70		0.82		0.76		0.76		0.78		0.87		0.90							
DCV (CF)	1,206		580		208		266		1,790		574		1,172		1,393		2,638		1,883		201		93							
Biofiltration	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required	Proposed	Required						
BMP (SF)	754	724	350	348	155	125	170	159	1,594	1,074	350	345	704	703	857	836	1,758	1,583	1,650	1,130	198	121	58	56						

BMP Elevations/Depths

	1	2a	2b	2c	3	4	5	6	7	8	9	10
Top of Basin	129.90	127.00	128.30	126.50	121.50	118.50	116.50	115.36	112.40	108.70	109.35	108.70
Freeboard Provided (IN)	6	6	6	6	6	6	6	6	6	6	6	6
Ponding Elevation	129.40	126.50	127.80	126.00	121.00	118.00	116.00	114.76	111.90	108.20	108.85	108.20
Total Ponding Depth (IN)	20.16	12	18	24	18	12	12	12	30	12	18	6
WQ/Hydromod Ponding Depth (IN)	6	12	18	24	12	12	12	11	30	12	18	6
Bottom of Basin	127.72	125.50	126.30	124.00	119.50	117.00	115.00	113.76	109.40	107.20	107.35	107.70
Biofiltration Underdrain Invert	-	-	-	-	-	-	-	112.68	-	-	106.27	106.62
RainStore3 Units	5	6	7	10	10	10	9	6	5	4	-	-
RainStore3 Depth (IN)	19.69	23.62	27.56	39.37	39.37	39.37	35.43	23.62	19.69	15.75	-	-
Detention Underdrain Invert	124.50	121.95	122.42	119.14	114.64	112.14	110.46	110.21	106.18	104.30	-	-
Bottom of Detention	124.25	121.70	122.17	118.89	114.39	111.89	110.21	109.96	105.93	104.05	-	-

60' 0' 30' 60' 120'
SCALE: 1" = 60'

FUSCOE
ENGINEERING
6390 Greenwich Dr., Suite 170, San Diego, California 92122
tel 858.554.1500 ∘ fax 858.597.0335 ∘ www.fuscoe.com

DATE	INITIAL	REVISION DESCRIPTION	DATE	INITIAL	DATE	INITIAL
ENGINEER OF WORK			OTHER APPROVAL		CITY APPROVAL	

SHEET | CITY OF CARLSBAD ENGINEERING DEPARTMENT | SHEETS

DMA, SINGLE SHEET BMP, & HYDROMODIFICATION MANAGEMENT EXHIBIT

WEST OAKS

RECORD COPY

INITIAL ____ DATE ____

PROJECT NO.

DRAWING NO.

F:\Projects\2690\005_Support Files\Reports\SWQMP\Attachments\Attachment 1a - DMA Exhibit.dwg (4/9/2019 7:15 AM) Plotted by: Sarah Putz