

County of San Diego PRIORITY DEVELOPMENT PROJECT (PDP) SWQMP

SVBF TEMPLE MAJOR USE PERMIT

OLD SAN PASQUAL ROAD
ESCONDIDO, CA 92025

ASSESSOR'S PARCEL NUMBER(S):
241-080-47

ENGINEER OF WORK:



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DATE OF SWQMP:
March 22, 2017

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Attachments

- Attachment 1: Backup for PDP Pollutant Control BMPs
 - Attachment 1a: Storm Water Pollutant Control Worksheet Calculations
 - Attachment 1b: DMA Exhibit
 - Attachment 1c: Individual Structural BMP DMA Mapbook
- Attachment 2: Backup for PDP Hydromodification Control Measures
 - Attachment 2a: Flow Control Facility Design
 - Attachment 2b: Hydromodification Management Exhibit
 - Attachment 2c: Management of Critical Coarse Sediment Yield Areas
 - Attachment 2d: Geomorphic Assessment of Receiving Channels (optional)
 - Attachment 2e: Vector Control Plan (if applicable)
- Attachment 3: Structural BMP Maintenance Plan
 - Attachment 3a: Structural BMP Maintenance Thresholds and Actions
 - Attachment 3b: Draft Maintenance Agreements / Notifications(when applicable)
- Attachment 4: County of San Diego PDP Structural BMP Verification for DPW Permitted Land Development Projects
- Attachment 5: Copy of Plan Sheets Showing Permanent Storm Water BMPs
- Attachment 6: Copy of Project's Drainage Report
- Attachment 7: Copy of Project's Geotechnical and Groundwater Investigation Report

Acronyms

ACP	Alternative Compliance Project
APN	Assessor's Parcel Number
BMP	Best Management Practice
BMP DM	Best Management Practice Design Manual
HMP	Hydromodification Management Plan
HSG	Hydrologic Soil Group
MS4	Municipal Separate Storm Sewer System
N/A	Not Applicable
NRCS	Natural Resources Conservation Service
PDCI	Private Development Construction Inspection Section
PDP	Priority Development Project
PDS	Planning and Development Services
PE	Professional Engineer
RPO	Resource Protection Ordinance
SC	Source Control
SD	Site Design
SDRWQCB	San Diego Regional Water Quality Control Board
SIC	Standard Industrial Classification
SWQMP	Storm Water Quality Management Plan
WMAA	Watershed Management Area Analysis
WPO	Watershed Protection Ordinance
WQIP	Water Quality Improvement Plan

PDP SWQMP Preparer's Certification Page**Project Name: SVBF Temple Major Use Permit****Permit Application Number:****PREPARER'S CERTIFICATION**

I hereby declare that I am the Engineer in Responsible Charge of design of storm water best management practices (BMPs) for this project, and that I have exercised responsible charge over the design of the BMPs as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with the PDP requirements of the County of San Diego BMP Design Manual, which is a design manual for compliance with local County of San Diego Watershed Protection Ordinance (Sections 67.801 et seq.) and regional MS4 Permit (California Regional Water Quality Control Board San Diego Region Order No. R9-2013-0001 as amended by R9-2015-0001 and R9-2015-0100) requirements for storm water management.

I have read and understand that the County of San Diego has adopted minimum requirements for managing urban runoff, including storm water, from land development activities, as described in the BMP Design Manual. I certify that this PDP SWQMP has been completed to the best of my ability and accurately reflects the project being proposed and the applicable BMPs proposed to minimize the potentially negative impacts of this project's land development activities on water quality. I understand and acknowledge that the plan check review of this PDP SWQMP by County staff is confined to a review and does not relieve me, as the Engineer in Responsible Charge of design of storm water BMPs for this project, of my responsibilities for project design.



Engineer of Work's Signature, PE Number & Expiration Date

Carl M. Fiorica, P.E. #64715, Exp 06/30/2017

Print Name

BWE Inc.

Company

03/22/2017

Date

Engineer's Seal:



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Submittal Record

Use this Table to keep a record of submittals of this PDP SWQMP. Each time the PDP SWQMP is re-submitted, provide the date and status of the project. In column 4 summarize the changes that have been made or indicate if response to plancheck comments is included. When applicable, insert response to plancheck comments behind this page.

Preliminary Design / Planning / CEQA

Submittal Number	Date	Summary of Changes
1	January 15, 2016	Initial Submittal
2	June 7, 2016	2 nd Submittal
3	November 9, 2016	3 rd Submittal
4	March 22, 2017	4 th Submittal

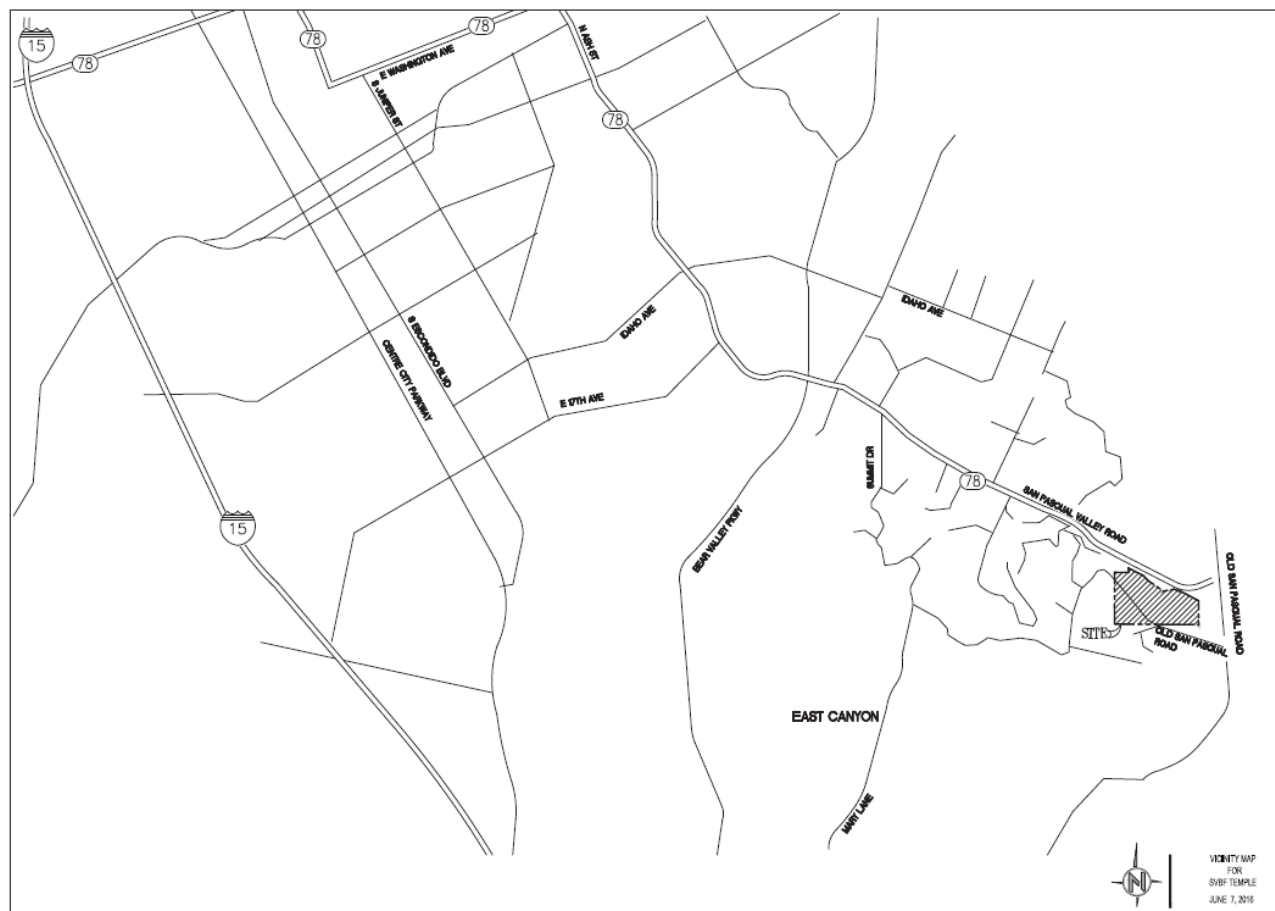
Final Design

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Plan Changes

Submittal Number	Date	Summary of Changes
1		Initial Submittal
2		
3		
4		

Project Name: SVBF Temple Major Use Permit
Record ID:



Step 1: Project type determination (Standard or Priority Development Project)

Is the project part of another Priority Development Project (PDP)?		(☒ Yes ☐ No	
If so, a PDP SWQMP is required. Go to Step 2.			
The project is (select one): ☒ New Development ☐ Redevelopment ¹			
The total proposed newly created or replaced impervious area is:		155,129 ft ²	
The total existing (pre-project) impervious area is:		0 ft ²	
The total area disturbed by the project is:		283,821 ft ²	
If the total area disturbed by the project is 1 acre (43,560 sq. ft.) or more OR the project is part of a larger common plan of development disturbing 1 acre or more, a Waste Discharger Identification (WDID) number must be obtained from the State Water Resources Control Board. WDID: <u>A WDID will be obtained during final engineering</u>			
Is the project in any of the following categories, (a) through (f)? ²			
Yes ☒	No ☐	(a)	New development projects that create 10,000 square feet or more of impervious surfaces ³ (collectively over the entire project site). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☐	No ☒	(b)	Redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site on an existing site of 10,000 square feet or more of impervious surfaces). This includes commercial, industrial, residential, mixed-use, and public development projects on public or private land.
Yes ☒	No ☐	(c)	New and redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface (collectively over the entire project site), and support one or more of the following uses: (i) Restaurants. This category is defined as a facility that sells prepared foods and drinks for consumption, including stationary lunch counters and refreshment stands selling prepared foods and drinks for immediate consumption (Standard Industrial Classification (SIC) code 5812). (ii) Hillside development projects. This category includes development on any natural slope that is twenty-five percent or greater. (iii) Parking lots. This category is defined as a land area or facility for the temporary parking or storage of motor vehicles used personally, for business, or for commerce. (iv) Streets, roads, highways, freeways, and driveways. This category is defined as any paved impervious surface used for the transportation of automobiles, trucks, motorcycles, and other vehicles.

¹ Redevelopment is defined as: The creation and/or replacement of impervious surface on an already developed site. Examples include the expansion of a building footprint, road widening, the addition to or replacement of a structure, and creation or addition of impervious surfaces. Replacement of impervious surfaces includes any activity that is not part of a routine maintenance activity where impervious material(s) are removed, exposing underlying soil during construction. Redevelopment does not include routine maintenance activities, such as trenching and resurfacing associated with utility work; pavement grinding; resurfacing existing roadways; new sidewalks construction; pedestrian ramps; or bike lanes on existing roads; and routine replacement of damaged pavement, such as pothole repair.

² Applicants should note that any development project that will create and/or replace 10,000 square feet or more of impervious surface (collectively over the entire project site) is considered a new development.

³ For solar energy farm projects, the area of the solar panels does not count toward the total impervious area of the site.

Project type determination (continued)

Yes ☐	No ☒	(d)	New or redevelopment projects that create and/or replace 2,500 square feet or more of impervious surface (collectively over the entire project site), and discharging directly to an Environmentally Sensitive Area (ESA). "Discharging directly to" includes flow that is conveyed overland a distance of 200 feet or less from the project to the ESA, or conveyed in a pipe or open channel any distance as an isolated flow from the project to the ESA (i.e. not commingled with flows from adjacent lands). <i>Note: ESAs are areas that include but are not limited to all Clean Water Act Section 303(d) impaired water bodies; areas designated as Areas of Special Biological Significance by the State Water Board and San Diego Water Board; State Water Quality Protected Areas; water bodies designated with the RARE beneficial use by the State Water Board and San Diego Water Board; and any other equivalent environmentally sensitive areas which have been identified by the Copermittees. See BMP Design Manual Section 1.4.2 for additional guidance.</i>
Yes ☐	No ☒	(e)	New development projects, or redevelopment projects that create and/or replace 5,000 square feet or more of impervious surface, that support one or more of the following uses: (i) Automotive repair shops. This category is defined as a facility that is categorized in any one of the following SIC codes: 5013, 5014, 5541, 7532-7534, or 7536-7539. (ii) Retail gasoline outlets (RGOs). This category includes RGOs that meet the following criteria: (a) 5,000 square feet or more or (b) a projected Average Daily Traffic (ADT) of 100 or more vehicles per day.
Yes ☐	No ☒	(f)	New or redevelopment projects that result in the disturbance of one or more acres of land and are expected to generate pollutants post construction. <i>Note: See BMP Design Manual Section 1.4.2 for additional guidance.</i>

Does the project meet the definition of one or more of the Priority Development Project categories (a) through (f) listed above?

☐ No – the project is not a Priority Development Project (Standard Project).

☒ Yes – the project is a Priority Development Project (PDP).

Further guidance may be found in Chapter 1 and Table 1-2 of the BMP Design Manual.

The following is for **redevelopment PDPs only**:

The area of existing (pre-project) impervious area at the project site is: ft² (A)

The total proposed newly created or replaced impervious area is ft² (B)

Percent impervious surface created or replaced (B/A)*100: %

The percent impervious surface created or replaced is (select one based on the above calculation):

☐ less than or equal to fifty percent (50%) – **only newly created or replaced impervious areas are considered a PDP and subject to stormwater requirements**

OR

☐ greater than fifty percent (50%) – **the entire project site is considered a PDP and subject to stormwater requirements**

Step 1.1: Storm Water Quality Management Plan requirements

Step	Answer	Progression
Is the project a Standard Project, Priority Development Project (PDP), or exception to PDP definitions?	☐ Standard Project	<u>Standard Project</u> requirements apply, including <u>Standard Project SWQMP</u> . Complete Standard Project SWQMP.
To answer this item, complete Step 1 Project Type Determination Checklist on Pages 1 and 2, and see PDP exemption information below. For further guidance, see Section 1.4 of the BMP Design Manual <i>in its entirety</i> .	☒ PDP	<u>Standard and PDP</u> requirements apply, including <u>PDP SWQMP</u> . Complete PDP SWQMP.
	☐ PDP with ACP	If participating in offsite alternative compliance, complete Step 6.3 and an ACP SWQMP.
	☐ PDP Exemption	Go to Step 1.2 below.

Step 1.2: Exemption to PDP definitions

Is the project exempt from PDP definitions based on either of the following:	If so:
☐ Projects that are only new or retrofit paved sidewalks, bicycle lanes, or trails that meet the following criteria: (i) Designed and constructed to direct storm water runoff to adjacent vegetated areas, or other non-erodible permeable areas; OR (ii) Designed and constructed to be hydraulically disconnected from paved streets or roads [i.e., runoff from the new improvement does not drain directly onto paved streets or roads]; OR (iii) Designed and constructed with permeable pavements or surfaces in accordance with County of San Diego Guidance on Green Infrastructure;	<u>Standard Project</u> requirements apply, AND <u>any additional requirements specific to the type of project</u> . <u>County concurrence</u> with the exemption is required. <i>Provide discussion and list any additional requirements below in this form.</i> Complete Standard Project SWQMP
☐ Projects that are only retrofitting or redeveloping existing paved alleys, streets or roads that are designed and constructed in accordance with the County of San Diego Guidance on Green Infrastructure.	Complete Green Streets PDP Exempt SWQMP.
<i>Discussion / justification, and additional requirements for exceptions to PDP definitions, if applicable:</i> The project is a Priority Development Project (PDP).	

Step 2: Construction Storm Water BMP Checklist

Minimum Required Standard Construction Storm Water BMPs		
If you answer "Yes" to any of the questions below, your project is subject to Table 1 on the following page (Minimum Required Standard Construction Stormwater BMPs). As noted in Table 1, please select at least the minimum number of required BMPs, or as many as are feasible for your project. If no BMP is selected, an explanation must be given in the box provided. The following questions are intended to aid in determining construction BMP requirements for your project. Note: All selected BMPs below must be included on the BMP plan incorporated into the construction plan sets.		
1. Will there be soil disturbing activities that will result in exposed soil areas? (This includes minor grading and trenching.) Reference Table 1 Items A, B, D, and E Note: Soil disturbances NOT considered significant include, but are not limited to, change in use, mechanical/electrical/plumbing activities, signs, temporary trailers, interior remodeling, and minor tenant improvement.	☒ Yes	☐ No
2. Will there be asphalt paving, including patching? Reference Table 1 Items D and F	☒ Yes	☐ No
3. Will there be slurries from mortar mixing, coring, or concrete saw cutting? Reference Table 1 Items D and F	☒ Yes	☐ No
4. Will there be solid wastes from concrete demolition and removal, wall construction, or form work? Reference Table 1 Items D and F	☒ Yes	☐ No
5. Will there be stockpiling (soil, compost, asphalt, concrete, solid waste) for over 24 hours? Reference Table 1 Items D and F	☒ Yes	☐ No
6. Will there be dewatering operations? Reference Table 1 Items C and D	☐ Yes	☒ No
7. Will there be temporary on-site storage of construction materials, including mortar mix, raw landscaping and soil stabilization materials, treated lumber, rebar, and plated metal fencing materials? Reference Table 1 Items E and F	☒ Yes	☐ No
8. Will trash or solid waste product be generated from this project? Reference Table 1 Item F	☒ Yes	☐ No
9. Will construction equipment be stored on site (e.g.: fuels, oils, trucks, etc.)? Reference Table 1 Item F	☒ Yes	☐ No
10. Will Portable Sanitary Services ("Porta-potty") be used on the site? Reference Table 1 Item F	☒ Yes	☐ No

Table 1. Construction Storm Water BMP Checklist

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook ⁴ Detail or County Std. Detail	✓ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.
A. Select Erosion Control Method for Disturbed Slopes (choose at least one for the appropriate season)			
Vegetation Stabilization Planting ⁵ (Summer)	SS-2, SS-4	☐	Not Applicable
Hydraulic Stabilization Hydroseeding ² (Summer)	SS-4	☐	
Bonded Fiber Matrix or Stabilized Fiber Matrix ⁶ (Winter)	SS-3	☐	
Physical Stabilization Erosion Control Blanket ³ (Winter)	SS-7	☒	
B. Select erosion control method for disturbed flat areas (slope < 5%) (choose at least one)			
County Standard Lot Perimeter Protection Detail	PDS 659 ⁷ , SC-2	☒	Not Applicable
Will use erosion control measures from Item A on flat areas also	SS-3, 4, 7	☐	
County Standard Desilting Basin (must treat all site runoff)	PDS 660 ⁸ , SC-2	☐	
Mulch, straw, wood chips, soil application	SS-6, SS-8	☐	

⁴ State of California Department of Transportation (Caltrans). 2003. Storm Water Quality Handbooks, Construction Site Best Management Practices (BMPs) Manual. March. Available online at: <http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>.

⁵ If Vegetation Stabilization (Planting or Hydroseeding) is proposed for erosion control it may be installed between May 1st and August 15th. Slope irrigation is in place and needs to be operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. The owner must implement a contingency physical BMP by August 15th if vegetation establishment does not occur by that date. If landscaping is proposed, erosion control measures must also be used while landscaping is being established. Established vegetation must have a subsurface mat of intertwined mature roots with a uniform vegetative coverage of 70 percent of the natural vegetative coverage or more on all disturbed areas.

⁶ All slopes over three feet must have established vegetative cover prior to final permit approval.

⁷ County of San Diego, Planning & Development Services. 2012. Standard Lot Perimeter Protection Design System. Building Division. PDS 659. Available online at <http://www.sandiegocounty.gov/pds/docs/pds659.pdf>.

⁸ County of San Diego, Planning & Development Services. 2012. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Building Division. PDS 660. Available online at <http://www.sandiegocounty.gov/pds/docs/pds660.pdf>.

Table 1. Construction Storm Water BMP Checklist (continued)

Minimum Required Best Management Practices (BMPs)	CALTRANS SW Handbook Detail or County Std. Detail	✓ BMP Selected	Reference sheet No.'s where each selected BMP is shown on the plans. If no BMP is selected, an explanation must be provided.	
C. If runoff or dewatering operation is concentrated, velocity must be controlled using an energy dissipater				
Energy Dissipater Outlet Protection ⁹	SS-10	☒		
D. Select sediment control method for all disturbed areas (choose at least one)				
Silt Fence	SC-1	☐	Not Applicable	
Fiber Rolls (Straw Wattles)	SC-5	☒		
Gravel & Sand Bags	SC-6 & 8	☐		
Dewatering Filtration	NS-2	☐		
Storm Drain Inlet Protection	SC-10	☐		
Engineered Desilting Basin (sized for 10-year flow)	SC-2	☐		
E. Select method for preventing offsite tracking of sediment (choose at least one)				
Stabilized Construction Entrance	TC-1	☒	Not Applicable	
Construction Road Stabilization	TC-2	☒		
Entrance/Exit Tire Wash	TC-3	☐		
Entrance/Exit Inspection & Cleaning Facility	TC-1	☐		
Street Sweeping and Vacuuming	SC-7	☒		
F. Select the general site management BMPs				
F.1 Materials Management				
Material Delivery & Storage	WM-1	☒	Not Applicable	
Spill Prevention and Control	WM-4	☒		
F.2 Waste Management¹⁰				
Waste Management	WM-8	☒	Not Applicable	
Concrete Waste Management				
Solid Waste Management	WM-5	☒		
Sanitary Waste Management	WM-9	☒		
Hazardous Waste Management	WM-6	☐		

Note: The Construction General Permit (Order No. 2009-0009-DWQ) also requires all projects not subject to the BMP Design Manual to comply with runoff reduction requirements through the implementation of post-construction BMPs as described in Section XIII of the order.

⁹ Regional Standard Drawing D-40 – Rip Rap Energy Dissipater is also acceptable for velocity reduction.

¹⁰ Not all projects will have every waste identified. The applicant is responsible for identifying wastes that will be onsite and applying the appropriate BMP. For example, if concrete will be used, BMP WM-8 must be selected.

Step 3: County of San Diego PDP SWQMP Site Information Checklist

Step 3.1: Description of Existing Site Condition

Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Dieguito - Las Lomas Muertas 905.32
Current Status of the Site (select all that apply): ☐ Existing development ☐ Previously graded but not built out ☐ Demolition completed without new construction ☐ Agricultural or other non-impervious use ☒ Vacant, undeveloped/natural <i>Description / Additional Information:</i> The existing site is currently undeveloped. The site topography is relatively steep on the west and flat on the north & east sides. The site slopes from the west to the southeast direction.	
Existing Land Cover Includes (select all that apply and provide each area on site): ☒ Vegetative Cover <u>2.97</u> Acres (<u>129373</u> Square Feet) ☒ Non-Vegetated Pervious Areas <u>6.63</u> Acres (<u>288,803</u> Square Feet) ☐ Impervious Areas <u>0</u> Acres (<u>0</u> Square Feet) <i>Description / Additional Information:</i>	
Underlying Soil belongs to Hydrologic Soil Group (select all that apply): ☐ NRCS Type A ☒ NRCS Type B ☐ NRCS Type C ☐ NRCS Type D	
Approximate Depth to Groundwater (GW) (or N/A if no infiltration is used): ☐ GW Depth < 5 feet ☐ 5 feet < GW Depth < 10 feet ☒ 10 feet < GW Depth < 20 feet ☐ GW Depth > 20 feet	

Existing Natural Hydrologic Features (select all that apply):

- ☒ Watercourses
- ☐ Seeps
- ☐ Springs
- ☒ Wetlands
- ☐ None
- ☐ Other

Description / Additional Information:

The site contains an existing unnamed creek. This creek originates from offsite drainage areas and runs across the subject property along the northeasterly direction. This creek is a tributary to the Cloverdale & Santa Ysabel Creeks which ultimately discharge to Pacific Ocean via San Dieguito River.

Step 3.2: Description of Existing Site Drainage Patterns

How is storm water runoff conveyed from the site? At a minimum, this description should answer:

- (1) Whether existing drainage conveyance is natural or urban;
- (2) Is runoff from offsite conveyed through the site? if yes, quantify all offsite drainage areas, design flows, and locations where offsite flows enter the project site, and summarize how such flows are conveyed through the site;
- (3) Provide details regarding existing project site drainage conveyance network, including any existing storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels; and
- (4) Identify all discharge locations from the existing project site along with a summary of conveyance system size and capacity for each of the discharge locations. Provide summary of the pre-project drainage areas and design flows to each of the existing runoff discharge locations.

Describe existing site drainage patterns:

The runoff from the site generally flows from west to southeast direction to the existing unnamed creek. This creek originates from offsite and runs across the subject property. The development footprint is located away from the existing creek. There are three existing storm drain culverts across Old San Pasqual Road which discharge into the subject property. The runoff from these culverts flows from west to southeast direction before being discharged into the existing creek.

Step 3.3: Description of Proposed Site Development*Project Description / Proposed Land Use and/or Activities:*

The 9.60 acre project site is located in the City of Escondido, California. The site is bounded by the San Pasqual Valley Road on the north, Old San Pasqual Road on the south, an undeveloped land on the west & a farm land on the east. The site is physically located at: 33.090 N & 117.020 W.

The existing site is currently undeveloped. The site topography is relatively steep on the west and flat on the north & east sides. The site slopes from the west to the southeast direction. The runoff originating from the site discharges towards southeast into an existing unnamed creek. This creek originates from offsite drainage areas and runs across the subject property along the northeasterly direction. This creek is tributary to the Cloverdale & Santa Ysabel Creeks which ultimately discharge to Pacific Ocean via San Dieguito River.

The proposed development work include but are not limited to the construction of a new SVBF Hindu Temple with a multi-purpose hall and kitchen/dining facility, priest residences, driveways, parking lot, and other associated improvement. The associated improvement work will include landscaping, drainage and dry & wet utilities construction and work within the Public Right of Way.

Current GP designation for the site is Semi-Rural Residential (SR-2) adopted in 08/03/2011 and the Zone Use Reg. is A70 (Limited Agriculture). Project is seeking for a Major Use permit for a Hindu Temple (civic, Fraternal or Religious Assembly).

List/describe proposed impervious features of the project (e.g., buildings, roadways, parking lots, courtyards, athletic courts, other impervious features):

The proposed development work include but are not limited to the construction of a new SVBF Hindu Temple with a multi-purpose hall and kitchen/dining facility, priest residences, driveways, parking lot, and other associated improvement.

List/describe proposed pervious features of the project (e.g., landscape areas):

Landscaped areas throughout the proposed development as well as infiltration BMPs comprise the pervious project features.

Does the project include grading and changes to site topography?

☒ Yes

☐ No

Description / Additional Information:

The site slopes west to southeast direction with the on-site elevations ranging from approximately 502 feet MSL in the west corner of the site to approximately 430 feet MSL in the southeast corner. The proposed condition topography is similar to the existing condition topography. The only difference will be the middle portion of the site will be elevated to create flatter slopes for the building and parking.

Insert acreage or square feet for the different land cover types in the table below:

Change in Land Cover Type Summary			
Land Cover Type	Existing (acres or ft ²)	Proposed (acres or ft ²)	Percent Change
Vegetation	2.97 acres	5.35 acres	+80%
Pervious (non-vegetated)	6.63 acres	0.63 acres	-91%
Impervious	0.0 acres	3.62 acres	N/A

Step 3.4: Description of Proposed Site Drainage Patterns

Does the project include changes to site drainage (e.g., installation of new storm water conveyance systems)?

☒ Yes

☐ No

If yes, provide details regarding the proposed project site drainage conveyance network, including storm drains, concrete channels, swales, detention facilities, storm water treatment facilities, natural or constructed channels, and the method for conveying offsite flows through or around the proposed project site. Identify all discharge locations from the proposed project site along with a summary of the conveyance system size and capacity for each of the discharge locations. Provide a summary of pre- and post-project drainage areas and design flows to each of the runoff discharge locations. Reference the drainage study for detailed calculations.

Describe proposed site drainage patterns:

In the existing pre-development condition, the runoff from the site generally flows from west to southeast direction to the existing unnamed creek. This creek originates from offsite and runs across the subject property. The proposed development elevates the middle section of the site to create a flattened area for the buildings and parking areas.

DMA #1 contains the slope, buildings, parking, and sidewalk areas on the northern end of the development. This area is directed to BMP #1, a Bioretention basin which provides pollutant and hydromodification control.

DMA #2 contains the remainder of the proposed parking and building areas, the roadway section to the north of DMA #1, and a portion of the western slope and Old San Pasqual Road. BMP #3 provides pollutant and hydromodification control for DMA #2.

DMA #3 is the slope wrapping around the northern and western portions of the development. This area is entirely pervious and is considered a self-mitigating area.

DMA #4 is the slope to the east of BMPs #2 & #3. The proposed barn is the only impervious surface in this area. Because less than 5% of the land use is impervious, DMA #4 is considered a self-mitigating area.

DMA #5 is on the southern side of the proposed development and is comprised of vegetated slopes and a portion of Old San Pasqual Road. The area contains less than 5% impervious area and is considered self-mitigating.

DMA #6 contains only a gravel ramp to the east of the parking area. This DMA's pervious surface provides its own pollutant control, and hydromodification impact is offset by BMP #3.

Combined (Onsite & Offsite)	Drainage Area (acres)		100 Yr Flow (cfs)			% Change
	Existing	Proposed	Existing	Proposed (Unmitigated)	Proposed (Mitigated)	
Exit Point 1	13.56	14.87	23.08	36.78	20.08	-13.00
Exit Point 2	0.77	0.63	1.20	1.12	1.12	-6.67
Exit Point 3	4.73	3.56	8.84	7.19	7.19	-18.67
Total	19.06	19.06	33.12	45.09	28.39	-14.28

Step 3.5: Potential Pollutant Source Areas

Identify whether any of the following features, activities, and/or pollutant source areas will be present (select all that apply). Select "Other" if the project is a phased development and provide a description:

- ☒ On-site storm drain inlets
- ☒ Interior floor drains and elevator shaft sump pumps
- ☐ Interior parking garages
- ☐ Need for future indoor & structural pest control
- ☒ Landscape/Outdoor Pesticide Use
- ☐ Pools, spas, ponds, decorative fountains, and other water features
- ☒ Food service
- ☐ Refuse areas
- ☐ Industrial processes
- ☐ Outdoor storage of equipment or materials
- ☐ Vehicle and Equipment Cleaning
- ☐ Vehicle/Equipment Repair and Maintenance
- ☐ Fuel Dispensing Areas
- ☐ Loading Docks
- ☐ Fire Sprinkler Test Water
- ☒ Miscellaneous Drain or Wash Water
- ☒ Plazas, sidewalks, and parking lots
- ☐ Other (provide description)

Description / Additional Information:

Step 3.6: Identification and Narrative of Receiving Water and Pollutants of Concern

Describe flow path of storm water from the project site discharge location(s), through urban storm conveyance systems as applicable, to receiving creeks, rivers, and lagoons as applicable, and ultimate discharge to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable):

After going through treatment and flow control BMPs, runoff from the entire project site discharges to an unnamed creek which flows northwest to south east along the site. The creek is a tributary to the Cloverdale & Santa Ysabel Creeks which discharge into the San Dieguito River, Hodges Lake, and ultimately the Pacific Ocean.

List any 303(d) impaired water bodies¹¹ within the path of storm water from the project site to the Pacific Ocean (or bay, lagoon, lake or reservoir, as applicable), identify the pollutant(s)/stressor(s) causing impairment, and identify any TMDLs and/or Highest Priority Pollutants from the WQIP for the impaired water bodies:

303(d) Impaired Water Body	Pollutant(s)/Stressor(s)	TMDLs / WQIP Highest Priority Pollutant
Cloverdale Creek	Phosphorus, Total Dissolved Solids	Phosphorus, Total Dissolved Solids
San Dieguito River	Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity	Enterococcus, Fecal Coliform, Nitrogen, Phosphorus, Total Dissolved Solids, Toxicity
Hodges Lake	Color, Manganese, Mercury, Nitrogen, pH, Phosphorus, Turbidity	Color, Manganese, Mercury, Nitrogen, pH, Phosphorus, Turbidity

Identification of Project Site Pollutants*

*Identification of project site pollutants below is only required if flow-thru treatment BMPs are implemented onsite in lieu of retention or biofiltration BMPs. Note the project must also participate in an alternative compliance program (unless prior lawful approval to meet earlier PDP requirements is demonstrated).

Identify pollutants expected from the project site based on all proposed use(s) of the site (see BMP Design Manual Appendix B.6):

Pollutant	Not Applicable to the Project Site	Anticipated from the Project Site	Also a Receiving Water Pollutant of Concern
Sediment	☐	☒	☒
Nutrients	☐	☒	☒
Heavy Metals	☐	☒	☒
Organic Compounds	☐	☒	☐
Trash & Debris	☐	☒	☐

¹¹ The current list of Section 303(d) impaired water bodies can be found at http://www.waterboards.ca.gov/water_issues/programs/water_quality_assessment/#impaired

Oxygen Demanding Substances	☐	☒	☐
Oil & Grease	☐	☒	☐
Bacteria & Viruses	☐	☐	☐
Pesticides	☐	☒	☐

Step 3.7: Hydromodification Management Requirements

Do hydromodification management requirements apply (see Section 1.6 of the BMP Design Manual)?

- ☒ Yes, hydromodification management requirements for flow control and preservation of critical coarse sediment yield areas are applicable.
- ☐ No, the project will discharge runoff directly to existing underground storm drains discharging directly to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to conveyance channels whose bed and bank are concrete-lined all the way from the point of discharge to water storage reservoirs, lakes, enclosed embayments, or the Pacific Ocean.
- ☐ No, the project will discharge runoff directly to an area identified as appropriate for an exemption by the WMAA¹² for the watershed in which the project resides.

Description / Additional Information (to be provided if a 'No' answer has been selected above):

¹² The Watershed Management Area Analysis (WMAA) is an optional element for inclusion in the Water Quality Improvement Plans (WQIPs) described in the 2013 MS4 Permit [Provision B.3.b.(4)]. It is available online at the Project Clean Water website:
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=248

Step 3.7.1: Critical Coarse Sediment Yield Areas*

***This Section only required if hydromodification management requirements apply**

Projects must satisfy critical coarse sediment yield area (CCSYA) requirements by characterizing the project as one of the scenario-types presented below and satisfying associated criteria. Projects must appropriately satisfy all requirements for identification, avoidance, and bypass, OR may alternatively elect to demonstrate no net impact.

☒ **Scenario 1:** Project is subject to and in compliance with RPO requirements (*without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3) that result in impacts to more than 15% of the project-scale CCSYAs*).

☒ Identify: Project has identified both onsite and upstream CCSYAs as areas that are coarse, $\geq 25\%$ slope, and $\geq 50'$ tall. (*Optional refinement methods may be performed per guidance in Section H.1.2*). AND,

☒ Avoid: Project has avoided onsite CCSYAs per existing RPO steep slope encroachment criteria. AND,

☒ Bypass: Project has demonstrated that both onsite and upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,

☐ No Net Impact: Project does not satisfy all Scenario 1 criteria above and must alternatively demonstrate no net impact to the receiving water.

☐ **Scenario 2:** Project is entirely exempt/not subject to RPO requirements without utilization of RPO exemptions 86.604(e)(2)(cc) or 86.604(e)(3).

☐ Identify: Project has identified upstream CCSYAs that are coarse, $\geq 25\%$ slope, and $\geq 50'$ tall. (*Optional refinement methods may be performed per guidance in Section H.1.2*). AND,

☐ Avoid: Project is not required to avoid onsite CCSYAs as none were identified in the previous step. AND,

☐ Bypass: Project has demonstrated that upstream CCSYAs are bypassed through or around the project site with a 2 year peak storm velocity of 3 feet per second or greater. OR,

☐ No Net Impact: Project does not satisfy all Scenario 2 criteria above and must alternatively demonstrate no net impact to the receiving water. (*Skip to next row*).

☐ **Scenario 3:** Project utilizes exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3) and impacts more than 15% of the project-scale CCSYAs.

☐ No Net Impact: Project is not eligible for traditional methods of identification, avoidance, and bypass. Project must demonstrate no net impact to the receiving water.

Critical Coarse Sediment Yield Areas Continued
Demonstrate No Net Impact
If the project elects to satisfy CCSYA criteria through demonstration of no net impact to the receiving water. Applicants must identify the methods utilized from the list below and provide supporting documentation in Attachment 2c of the SWQMP. Check all that are applicable. ☐ N/A, the project appropriately identifies, avoids, and bypasses CCSYAs. ☐ Project has performed additional analysis to demonstrate that impacts to CCSYAs satisfy the no net impact standard of $Ep/Sp \leq 1.1$. ☐ Project has provided alternate mapping of CCSYAs. ☐ Project has implemented additional onsite hydromodification flow control measures. ☐ Project has implemented an offsite stream rehabilitation project to offset impacts. ☐ Project has implemented other applicant-proposed mitigation measures.

Step 3.7.2: Flow Control for Post-Project Runoff*

*This Section only required if hydromodification management requirements apply
<i>List and describe point(s) of compliance (POCs) for flow control for hydromodification management (see Section 6.3.1). For each POC, provide a POC identification name or number correlating to the project's HMP Exhibit and a receiving channel identification name or number correlating to the project's HMP Exhibit.</i> This project has three Points of Compliance (POCs). POC #1 is located at the storm drain pipe outfall which carries runoff from the main portion of the development to the unnamed creek. POC #2 is located at the edge of the slope east of BMPs #2 & #3. POC #3 is located at the outfall of a swale which carries runoff along the southern portion of the site. Refer to Attachments 2 and 6 for specific POC Locations.
Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold) ☐ Yes, the result is the low flow threshold is 0.1Q2 ☐ Yes, the result is the low flow threshold is 0.3Q2 ☐ Yes, the result is the low flow threshold is 0.5Q2 <i>If a geomorphic assessment has been performed, provide title, date, and preparer:</i> <i>Discussion / Additional Information: (optional)</i> The default threshold of 0.1Q2 is used.

Step 3.8: Other Site Requirements and Constraints

When applicable, list other site requirements or constraints that will influence storm water management design, such as zoning requirements including setbacks and open space, or local codes governing minimum street width, sidewalk construction, allowable pavement types, and drainage requirements.

Not Applicable.

Optional Additional Information or Continuation of Previous Sections As Needed

This space provided for additional information or continuation of information from previous sections as needed.

Step 4: Source Control BMP Checklist

Source Control BMPs			
All development projects must implement source control BMPs 4.2.1 through 4.2.6 where applicable and feasible. See Chapter 4.2 and Appendix E of the County BMP Design Manual for information to implement source control BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the source control BMP as described in Chapter 4.2 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project has no outdoor materials storage areas). Discussion / justification must be provided.			
Source Control Requirement	Applied?		
4.2.1 Prevention of Illicit Discharges into the MS4	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.2.1 not implemented:</i>			
4.2.2 Storm Drain Stenciling or Signage	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.2.2 not implemented:</i>			
4.2.3 Protect Outdoor Materials Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
<i>Discussion / justification if 4.2.3 not implemented:</i> Material Storage Areas are not proposed.			
4.2.4 Protect Materials Stored in Outdoor Work Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
<i>Discussion / justification if 4.2.4 not implemented:</i> Outdoor work areas are not proposed.			

Source Control Requirement	Applied?		
4.2.5 Protect Trash Storage Areas from Rainfall, Run-On, Runoff, and Wind Dispersal	☐ Yes	☐ No	☒ N/A
<i>Discussion / justification if 4.2.5 not implemented:</i> Trash Storage areas are not proposed.			
4.2.6 Additional BMPs Based on Potential Sources of Runoff Pollutants (must answer for each source listed below):			
☒ A. On-site storm drain inlets	☒ Yes	☐ No	☐ N/A
☒ B. Interior floor drains and elevator shaft sump pumps	☒ Yes	☐ No	☐ N/A
☐ C. Interior parking garages	☐ Yes	☐ No	☒ N/A
☐ D. Need for future indoor & structural pest control	☐ Yes	☐ No	☒ N/A
☒ E. Landscape/outdoor pesticide use	☒ Yes	☐ No	☐ N/A
☐ F. Pools, spas, ponds, fountains, and other water features	☐ Yes	☐ No	☒ N/A
☒ G. Food service	☒ Yes	☐ No	☐ N/A
☐ H. Refuse areas	☐ Yes	☐ No	☒ N/A
☐ I. Industrial processes	☐ Yes	☐ No	☒ N/A
☐ J. Outdoor storage of equipment or materials	☐ Yes	☐ No	☒ N/A
☐ K. Vehicle and equipment cleaning	☐ Yes	☐ No	☒ N/A
☐ L. Vehicle/equipment repair and maintenance	☐ Yes	☐ No	☒ N/A
☐ M. Fuel dispensing areas	☐ Yes	☐ No	☒ N/A
☐ N. Loading docks	☐ Yes	☐ No	☒ N/A
☐ O. Fire sprinkler test water	☐ Yes	☐ No	☒ N/A
☒ P. Miscellaneous drain or wash water	☒ Yes	☐ No	☐ N/A
☒ Q. Plazas, sidewalks, and parking lots	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.2.6 not implemented. Clearly identify which sources of runoff pollutants are discussed. Justification must be provided for <u>all</u> "No" answers shown above.</i> Miscellaneous drain and wash water will result from on-site residences.			

Note: Show all source control measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 5: Site Design BMP Checklist

Site Design BMPs			
All development projects must implement site design BMPs SD-A through SD-H where applicable and feasible. See Chapter 4.3 and Appendix E of the County BMP Design Manual for information to implement site design BMPs shown in this checklist. Answer each category below pursuant to the following: • "Yes" means the project will implement the site design BMP as described in Chapter 4.3 and/or Appendix E of the County BMP Design Manual. Discussion / justification is not required. • "No" means the BMP is applicable to the project but it is not feasible to implement. Discussion / justification must be provided. • "N/A" means the BMP is not applicable at the project site because the project does not include the feature that is addressed by the BMP (e.g., the project site has no existing natural areas to conserve). Discussion / justification must be provided.			
Site Design Requirement	Applied?		
4.3.1 Maintain Natural Drainage Pathways and Hydrologic Features	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.1 not implemented:</i>			
4.3.2 Conserve Natural Areas, Soils, and Vegetation	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.2 not implemented:</i> A large portion of open area will remain undeveloped including wetland areas and the unnamed creek to the north of the proposed development.			
4.3.3 Minimize Impervious Area	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.3 not implemented:</i> Impervious area will be minimized			
4.3.4 Minimize Soil Compaction	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.4 not implemented:</i> Soil compaction will be minimized by restricting vehicle traffic to non-stabilized areas.			
4.3.5 Impervious Area Dispersion	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.5 not implemented:</i> Landscaped areas will be implemented throughout the site.			

Site Design Requirement	Applied?		
4.3.6 Runoff Collection	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.6 not implemented:</i> Storm water management is integrated with landscape design to promote runoff collection, infiltration, and minimize the transport of runoff & pollutants from the source. Roof downspouts as well as other impervious areas are disconnected and directed into adjacent landscape area for this purpose. Permeable pavement option for runoff collection is not implemented in the current design but will be considered in the final engineering and SWQMP.			
4.3.7 Landscaping with Native or Drought Tolerant Species	☒ Yes	☐ No	☐ N/A
<i>Discussion / justification if 4.3.7 not implemented:</i> Landscaping with native or drought tolerant species will be used throughout the site where feasible.			
4.3.8 Harvesting and Using Precipitation	☐ Yes	☒ No	☐ N/A
<i>Discussion / justification if 4.3.8 not implemented:</i> There is not enough reliable toilet and irrigation demand to implement the harvest and reuse of precipitation.			

Note: Show all site design measures described above that are included in design capture volume calculations in the plan sheets of Attachment 5.

Step 6: PDP Structural BMPs

All PDPs must implement structural BMPs for storm water pollutant control (see Chapter 5 of the BMP Design Manual). Selection of PDP structural BMPs for storm water pollutant control must be based on the selection process described in Chapter 5. PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management (see Chapter 6 of the BMP Design Manual). Both storm water pollutant control and flow control for hydromodification management can be achieved within the same structural BMP(s).

PDP structural BMPs must be verified by the County at the completion of construction. This may include requiring the project owner or project owner's representative and engineer of record to certify construction of the structural BMPs (see Section 1.12 of the BMP Design Manual). PDP structural BMPs must be maintained into perpetuity, and the County must confirm the maintenance (see Section 7 of the BMP Design Manual).

Use this section to provide narrative description of the general strategy for structural BMP implementation at the project site in the box below. Then complete the PDP structural BMP summary information sheet (Step 6.2) for each structural BMP within the project (copy the BMP summary information sheet [Step 6.2] as many times as needed to provide summary information for each individual structural BMP).

Step 6.1: Description of structural BMP strategy

Describe the general strategy for structural BMP implementation at the site. This information must describe how the steps for selecting and designing storm water pollutant control BMPs presented in Section 5.1 of the BMP Design Manual were followed, and the results (type of BMPs selected). For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate. At the end of this discussion provide a summary of all the structural BMPs within the project including the type and number.

Storm Water Pollutant Control BMP Selection Flow Charts (Figure 5-1 and 5-2) of the County of San Diego BMP Design Manual are utilized to select and size the pollutant control BMPs for this project. Since the storm runoff from the site discharges to the natural canyon prior to discharging into the exempt water body, the County's hydromodification requirements applies to the site. BMPs are sized to comply with the pollutant control as well as hydromodification requirements.

The site is divided into multiple DMAs based on the locations of the BMPs to evaluate the applicability of the pollutant control BMPs. DMAs that meet the criteria in section 5.2 (self-mitigating and self-retaining areas via qualifying site design BMPs are identified. A Design Capture Volume (DCV) is estimated for each of the DMAs that do not meet the above criteria to determine the feasibility of harvest and use BMPs. The 36 hour wet season demand is calculated for the site per Sections B.3.1 & 2 of the BMP design manual to determine the feasibility of harvest and use BMPs. It is determined that the harvested water demand for the site is less than 25% of the total DCV and therefore, harvest and use is not feasible. Landscaped islands within the parking area are utilized as site design BMPs where possible.

A Bioretention Basin (INF-2) is selected to treat DMA #1. BMP #1 provides pollutant and hydromodification control for DMA #1. This 5810 square-foot basin has a ponding depth 12", 3" of mulch over 18" of amended soils, and 18" of gravel storage. BMP #1 receives runoff which has been pre-treated by a vegetated swale and catch basin inserts (BMP #4).

BMP #3 is an Infiltration Basin (INF-1) with 36,562 cubic-feet of storage, and provides hydromodification control for the southern portion of the site. BMP #3 receives stormwater via both infiltration and overflow (through a riser) from its above-ground 5,900 SF forebay (BMP #2). The outlet riser within the basin has three orifices to prevent the BMP from discharging at flows higher than the existing condition for 10% 2-year through the 10-year storm. The 6' riser has the following: 1.58" orifice at 1.3', 3.9" at 3.8', and 4.5" at 4.2'. See Detail B on the DMA Exhibit for the specific configuration. The lowest orifice sits 1.3' above the basin bottom to ensure the full DCV will infiltrate to the native soil. Maintenance access is provided by a port in the southeast corner of the basin.

(Continue on following page as necessary.)

**Description of structural BMP strategy continued
(Page reserved for continuation of description of general strategy for structural BMP implementation at the site)**

(Continued from previous page)

Maintenance Access

The northern bioretention BMP #1 will be accessed from the adjacent parking lot if major maintenance is required. Heavy equipment or machinery will not be permitted in the bioretention basin unless required. This will prevent or reduce compaction of the soil media.

Driveway access to barn will be used for maintenance of the Infiltration Basin (BMP #3) and its associated forebay. BMP #2 is a forebay which provides pre-treatment for BMP #3 and can be easily accessed from the eastern side of the basin. The Infiltration Basin (BMP #3) will be accessed from the same location. An access hatch will be provided in the infiltration basin so that maintenance can be completed.

The proposed BMPs will require a Stormwater Facilities Maintenance Agreement, with Easement and Covenants be entered into between the owner and the County of San Diego. This document will mandate that the owner maintain the BMPs into perpetuity. Prior to acceptance of the agreement, the owner/ developer will provide the County with a security deposit to substantiate the maintenance agreement. This will remain in place for a period of 5 years from the date of approval. The amount of the deposit shall equal the estimated cost of 2 years of maintenance activities.

Step 6.2 Structural BMP Checklist	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BMP #1	
Construction Plan Sheet No. C1.0	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☒ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the City Engineer (See Section 1.12 of the manual)	BWE/Carl Fiorica 9449 Balboa Avenue, Suite 270 San Diego, CA 92123 619-299-5550
Who will be the final owner of this BMP?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
Who will maintain this BMP into perpetuity?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
What is the funding mechanism for maintenance?	TBD
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	Category 2
Discussion (as needed): BMP #1 is a Bioretention Basin (INF-2) providing pollutant and hydromodification control.	

Step 6.2 Structural BMP Checklist (Continued)	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BMP #2	
Construction Plan Sheet No. C1.0	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☒ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☒ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the City Engineer (See Section 1.12 of the manual)	BWE/Carl Fiorica 9449 Balboa Avenue, Suite 270 San Diego, CA 92123 619-299-5550
Who will be the final owner of this BMP?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
Who will maintain this BMP into perpetuity?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
What is the funding mechanism for maintenance?	TBD
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	Category 2
Discussion (as needed): BMP #2 a 5,900 SF above-ground forebay which provides pre-treatment for BMP #3.	

Step 6.2 Structural BMP Checklist (Continued)	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BMP #3	
Construction Plan Sheet No. C1.0	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☒ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☐ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification control ☐ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the City Engineer (See Section 1.12 of the manual)	BWE/Carl Fiorica 9449 Balboa Avenue, Suite 270 San Diego, CA 92123 619-299-5550
Who will be the final owner of this BMP?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
Who will maintain this BMP into perpetuity?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
What is the funding mechanism for maintenance?	TBD
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	Category 2
Discussion (as needed): BMP #3 is an Infiltration Basin (INF-1) providing pollutant and hydromodification control.	

Step 6.2 Structural BMP Checklist (Continued)	
Structural BMP Summary Information (Copy this page as needed to provide information for each individual proposed structural BMP)	
Structural BMP ID No. BMP #4	
Construction Plan Sheet No. C1.0	
Type of structural BMP: ☐ Retention by harvest and use (HU-1) ☐ Retention by infiltration basin (INF-1) ☐ Retention by bioretention (INF-2) ☐ Retention by permeable pavement (INF-3) ☐ Partial retention by biofiltration with partial retention (PR-1) ☐ Biofiltration (BF-1) ☐ Flow-thru treatment control with prior lawful approval to meet earlier PDP requirements (provide BMP type/description in discussion section below) ☒ Flow-thru treatment control included as pre-treatment/forebay for an onsite retention or biofiltration BMP (provide BMP type/description and indicate which onsite retention or biofiltration BMP it serves in discussion section below) ☐ Flow-thru treatment control with alternative compliance (provide BMP type/description in discussion section below) ☐ Detention pond or vault for hydromodification management ☐ Other (describe in discussion section below)	
Purpose: ☐ Pollutant control only ☐ Hydromodification control only ☐ Combined pollutant control and hydromodification control ☒ Pre-treatment/forebay for another structural BMP ☐ Other (describe in discussion section below)	
Who will certify construction of this BMP? Provide name and contact information for the party responsible to sign BMP verification forms if required by the City Engineer (See Section 1.12 of the manual)	BWE/Carl Fiorica 9449 Balboa Avenue, Suite 270 San Diego, CA 92123 619-299-5550
Who will be the final owner of this BMP?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
Who will maintain this BMP into perpetuity?	SBVF Inc 5 Yates Drive East Brunswick, NJ 08816 732-238-1119
What is the funding mechanism for maintenance?	TBD
What Category (1-4) is the Structural BMP? Refer to the Category definitions in Section 7.3 of the BMP DM. Attach the appropriate maintenance agreement in Attachment 3.	Category 2
Discussion (as needed): BMP #4 consists of two catch basin inserts which serve as pre-treatment for BMP #1.	

Step 6.3: Offsite Alternative Compliance Participation Form

PDP INFORMATION	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
What are your PDP Pollutant Control Debits? *See Attachment 1 of the PDP SWQMP	
What are your PDP HMP Debits? (if applicable) *See Attachment 2 of the PDP SWQMP	
ACP Information	
Record ID:	
Assessor's Parcel Number(s) [APN(s)]	
Project Owner/Address	
What are your ACP Pollutant Control Credits? *See Attachment 1 of the ACP SWQMP	
What are your ACP HMP Debits? (if applicable) *See Attachment 2 of the ACP SWQMP	
Is your ACP in the same watershed as your PDP? ☐ Yes ☐ No	Will your ACP project be completed prior to the completion of the PDP? ☐ Yes ☐ No
Does your ACP account for all Deficits generated by the PDP? ☐ Yes ☐ No (PDP and/or ACP must be redesigned to account for all deficits generated by the PDP.	What is the difference between your PDP debits and ACP Credits? *(ACP Credits -Total PDP Debits = Total Earned Credits)

ATTACHMENT 1

BACKUP FOR PDP POLLUTANT CONTROL BMPS

This is the cover sheet for Attachment 1.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 1a	Storm Water Pollutant Control Worksheet Calculations -Worksheet B.3-1 (Required) -Worksheet B.1-1 (Required) -Worksheet B.4-1 (if applicable) -Worksheet B.4-2 (if applicable) -Worksheet B.5-1 (if applicable) -Worksheet B.5-2 (if applicable) -Worksheet B.5-3 (if applicable) -Worksheet B.6-1 (if applicable) -Summary Worksheet (optional)	☒ Included
Attachment 1b	Form I-8, Categorization of Infiltration Feasibility Condition (Required unless the project will use harvest and use BMPs) Refer to Appendices C and D of the BMP Design Manual to complete Form I-8.	☒ Included ☐ Not included because the entire project will use harvest and use BMPs
Attachment 1c	DMA Exhibit (Required) See DMA Exhibit Checklist on the back of this Attachment cover sheet.	☒ Included
Attachment 1d	Individual Structural BMP DMA Mapbook (Required) -Place each map on 8.5"x11" paper. -Show at a minimum the DMA, Structural BMP, and any existing hydrologic features within the DMA.	☒ Included

**Use this checklist to ensure the required information has been included on the
DMA Exhibit:**

The DMA Exhibit must identify:

- ☒ Underlying hydrologic soil group
- ☒ Approximate depth to groundwater
- ☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☒ Critical coarse sediment yield areas to be protected
- ☒ Existing topography and impervious areas
- ☒ Existing and proposed site drainage network and connections to drainage offsite
- ☒ Proposed demolition
- ☒ Proposed grading
- ☒ Proposed impervious features
- ☒ Proposed design features and surface treatments used to minimize imperviousness
- ☒ Drainage management area (DMA) boundaries, DMA ID numbers, and DMA areas (square footage or acreage), and DMA type (i.e., drains to BMP, self-retaining, or self-mitigating)
- ☒ Potential pollutant source areas and corresponding required source controls (see Chapter 4, Appendix E.1, and Step 3.5)
- ☒ Structural BMPs (identify location, structural BMP ID#, type of BMP, and size/detail)

ATTACHMENT 1a:
Storm Water Pollutant Control Worksheet Calculations

Automated Worksheet B.3-1: Project-Scale BMP Feasibility Analysis (V1.3)

Category	#	Description	Value	Units
Capture & Use Inputs	0	Design Capture Volume for Entire Project Site	8,729	cubic-feet
	1	Proposed Development Type	Office	unitless
	2	Number of Residents or Employees at Proposed Development	50	#
	3	Total Planted Area within Development	284,540	sq-ft
	4	Water Use Category for Proposed Planted Areas	Moderate	unitless
Infiltration Inputs	5	Is Average Site Design Infiltration Rate $\leq$ 0.500 Inches per Hour?	No	yes/no
	6	Is Average Site Design Infiltration Rate $\leq$ 0.010 Inches per Hour?	No	yes/no
	7	Is Infiltration of the Full DCV Anticipated to Produce Negative Impacts?	No	yes/no
	8	Is Infiltration of Any Volume Anticipated to Produce Negative Impacts?	No	yes/no
Calculations	9	36-Hour Toilet Use Per Resident or Employee	1.40	cubic-feet
	10	Subtotal: Anticipated 36 Hour Toilet Use	70	cubic-feet
	11	Anticipated 1 Acre Landscape Use Over 36 Hours	196.52	cubic-feet
	12	Subtotal: Anticipated Landscape Use Over 36 Hours	1,284	cubic-feet
	13	Total Anticipated Use Over 36 Hours	1,354	cubic-feet
	14	Total Anticipated Use / Design Capture Volume	0.16	cubic-feet
	15	Are Full Capture and Use Techniques Feasible for this Project?	No	unitless
	16	Is Full Retention Feasible for this Project?	Yes	yes/no
	17	Is Partial Retention Feasible for this Project?	Yes	yes/no
Result	18	Feasibility Category	3	1, 2, 3, 4, 5

Worksheet B.3-1 General Notes:

- A. Applicants may use this worksheet to determine the types of structural BMPs that are acceptable for implementation at their project site (as required in Section 5 of the BMPDM). User input should be provided for yellow shaded cells, values for all other cells will be automatically generated. Projects demonstrating feasibility or potential feasibility via this worksheet are encouraged to incorporate capture and use features in their project.
- B. Negative impacts associated with retention may include geotechnical, groundwater, water balance, or other issues identified by a geotechnical engineer and substantiated through completion of Form I-8.
- C. Feasibility Category 1: Applicant must implement capture & use, retention, and/or infiltration elements for the entire DCV.
- D. Feasibility Category 2: Applicant must implement capture & use elements for the entire DCV.
- E. Feasibility Category 3: Applicant must implement retention and/or infiltration elements for all DMAs with Design Infiltration Rates greater than 0.50 in/hr.
- F. Feasibility Category 4: Applicant must implement standard unlined biofiltration BMPs sized at $\geq$ 3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.011 to 0.50 in/hr. Applicants may be permitted to implement lined BMPs, reduced size BMPs, and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- G. Feasibility Category 5: Applicant must implement standard lined biofiltration BMPs sized at $\geq$ 3% of the effective impervious tributary area for all DMAs with Design Infiltration Rates of 0.010 in/hr or less. Applicants may also be permitted to implement reduced size and/or specialized biofiltration BMPs provided additional criteria identified in "Supplemental Retention Criteria for Non-Standard Biofiltration BMPs" are satisfied.
- H. PDPs participating in an offsite alternative compliance program are not held to the feasibility categories presented herein.

Automated Worksheet B.1-1: Calculation of Design Capture Volume (V1.3)													
Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
Standard Drainage Basin Inputs	0	Drainage Basin ID or Name	1	2									unitless
	1	Basin Drains to the Following BMP Type	Retention	Retention									unitless
	2	85th Percentile 24-hr Storm Depth	0.67	0.67									inches
	3	Design Infiltration Rate Recommended by Geotechnical Engineer	0.530	0.530									in/hr
	4	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	30,317	128,724									sq-ft
	5	Semi-Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft
	6	Engineered Pervious Surfaces <u>Not Serving as Dispersion Area</u> (C=0.10)	57,725	69,485									sq-ft
	7	Natural Type A Soil <u>Not Serving as Dispersion Area</u> (C=0.10)											sq-ft
	8	Natural Type B Soil <u>Not Serving as Dispersion Area</u> (C=0.14)											sq-ft
	9	Natural Type C Soil <u>Not Serving as Dispersion Area</u> (C=0.23)											sq-ft
	10	Natural Type D Soil <u>Not Serving as Dispersion Area</u> (C=0.30)											sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	11	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	No	No	No	No	yes/no
	12	Impervious Surfaces Directed to Dispersion Area per SD-B (Ci=0.90)											sq-ft
	13	Semi-Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	14	Engineered Pervious Surfaces Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	15	Natural Type A Soil Serving as Dispersion Area per SD-B (Ci=0.10)											sq-ft
	16	Natural Type B Soil Serving as Dispersion Area per SD-B (Ci=0.14)											sq-ft
	17	Natural Type C Soil Serving as Dispersion Area per SD-B (Ci=0.23)											sq-ft
	18	Natural Type D Soil Serving as Dispersion Area per SD-B (Ci=0.30)											sq-ft
	19	Number of Tree Wells Proposed per SD-A											#
	20	Average Mature Tree Canopy Diameter											ft
	21	Number of Rain Barrels Proposed per SD-E											#
	22	Average Rain Barrel Size											gal
Treatment Train Inputs & Calculations	23	Does BMP Overflow to Stormwater Features in <u>Downstream</u> Drainage?	No	No	No	No	No	No	No	No	No	No	unitless
	24	Identify Downstream Drainage Basin Providing Treatment in Series											unitless
	25	Percent of Upstream Flows Directed to Downstream Dispersion Areas											percent
	26	Upstream Impervious Surfaces Directed to Dispersion Area (Ci=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
	27	Upstream Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	0	0	0	0	0	0	0	0	0	0	cubic-feet
Initial Runoff Factor Calculation	28	Total Tributary Area	88,042	198,209	0	0	0	0	0	0	0	0	sq-ft
	29	Initial Runoff Factor for Standard Drainage Areas	0.38	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	30	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	31	Initial Weighted Runoff Factor	0.38	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	32	Initial Design Capture Volume	1,868	6,861	0	0	0	0	0	0	0	0	cubic-feet
Dispersion Area Adjustments	33	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	0	0	0	0	sq-ft
	34	Total Pervious Dispersion Area	0	0	0	0	0	0	0	0	0	0	sq-ft
	35	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	36	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	37	Runoff Factor After Dispersion Techniques	0.38	0.62	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	unitless
Tree & Barrel Adjustments	38	Design Capture Volume After Dispersion Techniques	1,868	6,861	0	0	0	0	0	0	0	0	cubic-feet
	39	Total Tree Well Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
Results	40	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	0	0	0	0	cubic-feet
	41	Final Adjusted Runoff Factor	0.38	0.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	42	Final Effective Tributary Area	33,456	122,890	0	0	0	0	0	0	0	0	sq-ft
	43	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	0	0	0	0	cubic-feet
	44	Final Design Capture Volume Tributary to BMP	1,868	6,861	0	0	0	0	0	0	0	0	cubic-feet

Worksheet B.1-1 General Notes:

A. Applicants may use this worksheet to calculate design capture volumes for up to 10 drainage areas User input must be provided for yellow shaded cells, values for all other cells will be automatically generated, errors/notifications will be highlighted in red and summarized below. Upon completion of this worksheet, proceed to the appropriate BMP Sizing worksheet(s).

Automated Worksheet B.4-1: Sizing Retention BMPs (V1.3)													
Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
BMP Inputs	0	Drainage Basin ID or Name	1	2	-	-	-	-	-	-	-	-	unitless
	1	Design Infiltration Rate Recommended by Geotechnical Engineer	0.530	0.530	-	-	-	-	-	-	-	-	in/hr
	2	Design Capture Volume Tributary to BMP	1,868	6,861	-	-	-	-	-	-	-	-	cubic-feet
	3	Is Retention BMP Vegetated or Non-Vegetated?	Vegetated	Non-Vegetated									unitless
	4	Provided Surface Area	5,810	5,625									sq-ft
	5	Provided Surface Ponding Depth	12	15.6									inches
	6	Provided Soil Media Thickness	21	0									inches
	7	Provided Gravel Storage Thickness	18	0									inches
Infiltration Calculations	8	Volume Infiltrated Over 6 Hour Storm	1,540	1,491	0	0	0	0	0	0	0	0	cubic-feet
	9	Soil Media Pore Space	0.25	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	10	Gravel Pore Space	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	11	Effective Depth of Retention Storage	24.5	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	inches
	12	Drawdown Time for Surface Ponding (Post-Storm)	23	29	0	0	0	0	0	0	0	0	hours
	13	Drawdown Time for Entire Basin (Including 6 Hour Storm)	52	35	0	0	0	0	0	0	0	0	hours
	14	Volume Retained by BMP	13,378	8,803	0	0	0	0	0	0	0	0	cubic-feet
	15	Fraction of DCV Retained	3.00	1.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	16	Percentage of Performance Requirement Satisfied	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	17	Fraction of DCV Retained (normalized to 36-hr drawdown)	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	ratio
	18	This BMP Overflows to the Following Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
Result	19	Deficit of Effectively Treated Stormwater	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	cubic-feet

Worksheet B.4-1 General Notes:

A. Applicants may use this worksheet to size Infiltration, Bioretention, and/or Permeable Pavement BMPs (INF-1, INF-2, INF-3) for up to 10 basins. User input must be provided for yellow shaded cells, values for blue cells are automatically populated based on user inputs from previous worksheets, values for all other cells will be automatically generated, errors/notifications will be highlighted in red/orange and summarized below. BMPs fully satisfying the pollutant control performance standards will have a deficit treated volume of zero and be highlighted in green.

Summary of Stormwater Pollutant Control Calculations (V1.3)													
Category	#	Description	<i>i</i>	<i>ii</i>	<i>iii</i>	<i>iv</i>	<i>v</i>	<i>vi</i>	<i>vii</i>	<i>viii</i>	<i>ix</i>	<i>x</i>	Units
General Info	0	Drainage Basin ID or Name	1	2	-	-	-	-	-	-	-	-	unitless
	1	85th Percentile Storm Depth	0.67	0.67	-	-	-	-	-	-	-	-	inches
	2	Design Infiltration Rate Recommended by Geotechnical Engineer	0.530	0.530	-	-	-	-	-	-	-	-	in/hr
	3	Total Tributary Area	88,042	198,209	-	-	-	-	-	-	-	-	sq-ft
	4	85th Percentile Storm Volume (Rainfall Volume)	4,916	11,067	-	-	-	-	-	-	-	-	cubic-feet
Initial DCV	5	Initial Weighted Runoff Factor	0.38	0.62	-	-	-	-	-	-	-	-	unitless
	6	Initial Design Capture Volume	1,868	6,861	-	-	-	-	-	-	-	-	cubic-feet
Site Design Volume Reductions	7	Dispersion Area Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
	8	Tree Well and Rain Barrel Reductions	0	0	-	-	-	-	-	-	-	-	cubic-feet
BMP Volume Reductions	9	Effective Area Tributary to BMP	33,456	122,890	-	-	-	-	-	-	-	-	square feet
	10	Final Design Capture Volume Tributary to BMP	1,868	6,861	-	-	-	-	-	-	-	-	cubic-feet
	11	Basin Drains to the Following BMP Type	Retention	Retention	-	-	-	-	-	-	-	-	unitless
	12	Volume Retained by BMP (normalized to 36 hour drawdown)	1,868	6,861	-	-	-	-	-	-	-	-	cubic-feet
Total Volume Reductions	13	Total Fraction of Initial DCV Retained within DMA	1.00	1.00	-	-	-	-	-	-	-	-	fraction
	14	Percent of Average Annual Runoff Retention Provided	80.4%	80.4%	-	-	-	-	-	-	-	-	%
	15	Percent of Average Annual Runoff Retention Required	80.0%	80.0%	-	-	-	-	-	-	-	-	%
Performance Standard	16	Percent of Pollution Control Standard Satisfied	100.0%	100.0%	-	-	-	-	-	-	-	-	%
Treatment Train	17	Discharges to Secondary Treatment in Drainage Basin	-	-	-	-	-	-	-	-	-	-	unitless
	18	Impervious Surface Area Still Requiring Treatment	0	0	-	-	-	-	-	-	-	-	square feet
	19	Impervious Surfaces Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
	20	Impervious Surfaces Not Directed to Downstream Dispersion Area	-	-	-	-	-	-	-	-	-	-	square feet
Result	21	Deficit of Effectively Treated Stormwater	0	0	-	-	-	-	-	-	-	-	cubic-feet

Summary Notes:

All fields in this summary worksheet are populated based on previous user inputs. If applicable, drainage basin elements that require revisions and/or supplemental information outside the scope of these worksheets are highlighted in orange and summarized in the red text below. If all drainage basins achieve full compliance without a need for supplemental information, a green message will appear below.

-Congratulations, all specified drainage basins and BMPs are in compliance with stormwater pollutant control requirements. Include 11x17 color prints of this summary sheet and supporting worksheet calculations as part of the SWQMP submittal package.

False

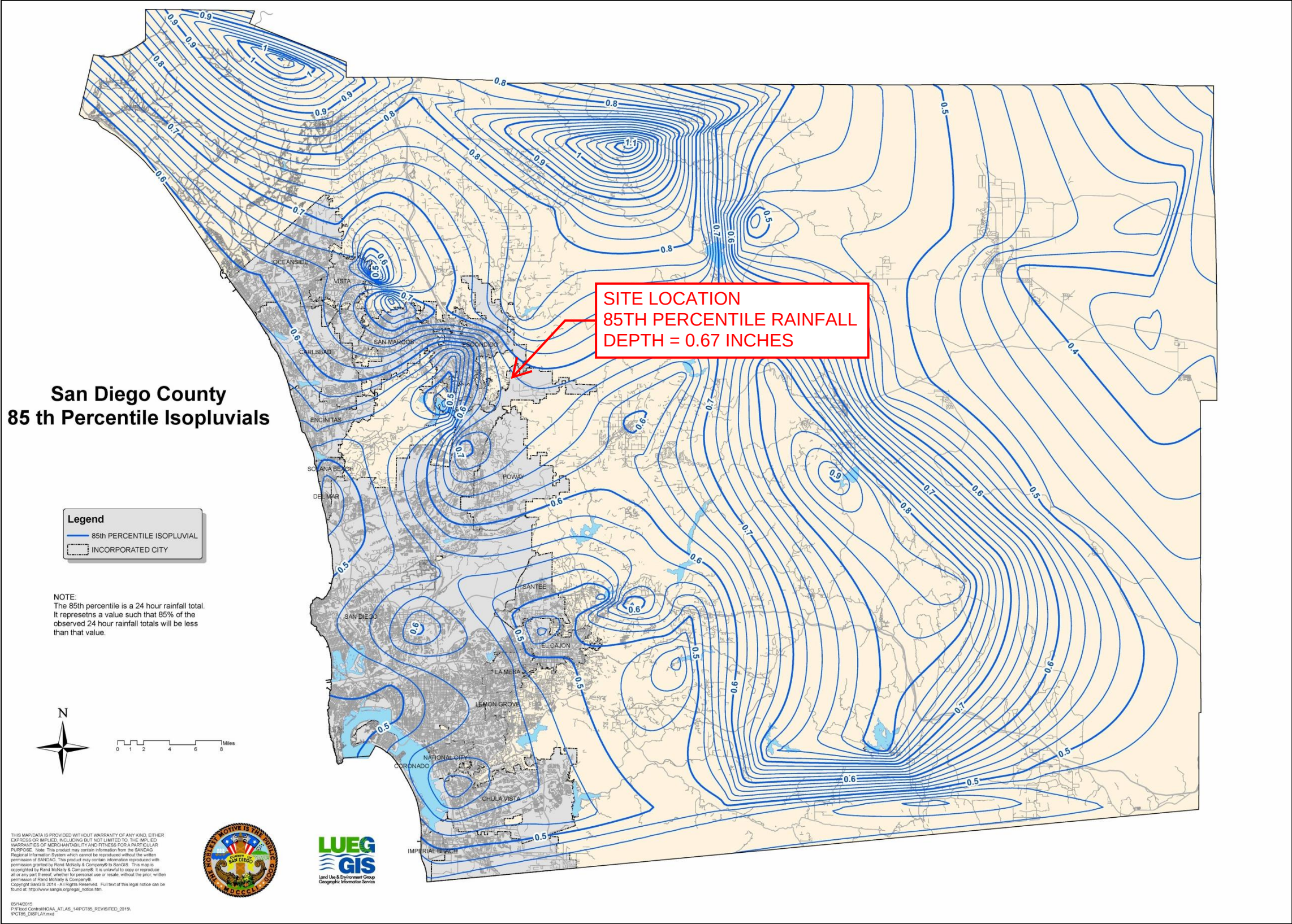


Figure B.1-1: 85th Percentile 24-hour Isopluvial Map

ATTACHMENT 1b:
Form I-8: Categorization of Infiltration Feasibility Condition

Categorization of Infiltration Feasibility Condition		Worksheet C.4-1	
Part 1 - Full Infiltration Feasibility Screening Criteria Would infiltration of the full design volume be feasible from a physical perspective without any undesirable consequences that cannot be reasonably mitigated?			
Criteria	Screening Question	Yes	No
1	Is the estimated reliable infiltration rate below proposed facility locations greater than 0.5 inches per hour? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	
Provide basis: The site was found to have a percolation rate of 2 inches/hour. After applying a safety factor of 3.75, the site has a reliable infiltration rate of 0.53 inches/hour. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
2	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			

Criteria	Screening Question	Yes	No
3	Can infiltration greater than 0.5 inches per hour be allowed without increasing risk of groundwater contamination (shallow water table, storm water pollutants or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
4	Can infiltration greater than 0.5 inches per hour be allowed without causing potential water balance issues such as change of seasonality of ephemeral streams or increased discharge of contaminated groundwater to surface waters? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability.			
Part 1 Result*	If all answers to rows 1 - 4 are “Yes” a full infiltration design is potentially feasible. The feasibility screening category is Full Infiltration If any answer from row 1-4 is “No”, infiltration may be possible to some extent but would not generally be feasible or desirable to achieve a “full infiltration” design. Proceed to Part 2	Full Infiltration	

Part 2 – Partial Infiltration vs. No Infiltration Feasibility Screening Criteria

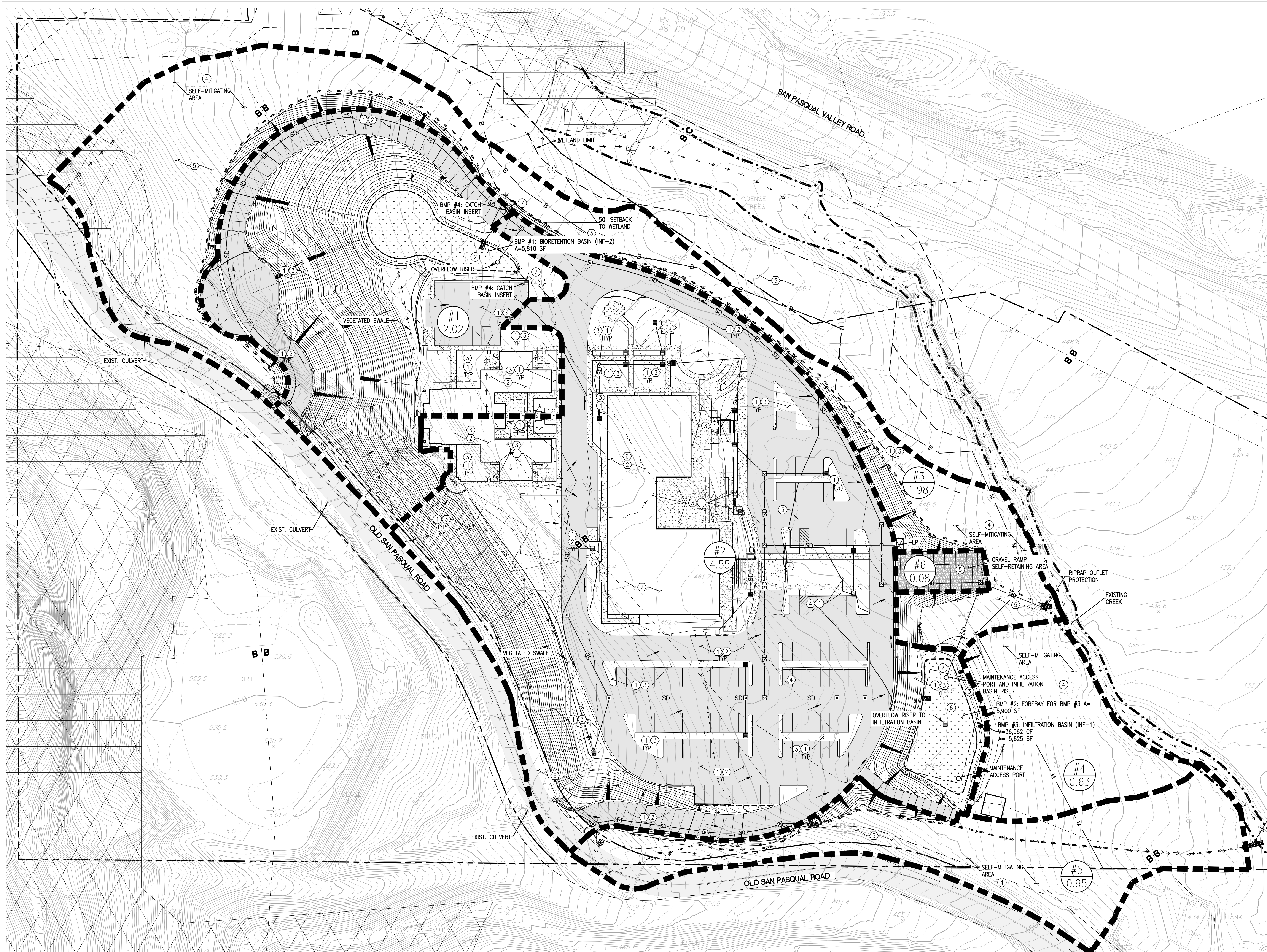
Would infiltration of water in any appreciable amount be physically feasible without any negative consequences that cannot be reasonably mitigated?

Criteria	Screening Question	Yes	No
5	Do soil and geologic conditions allow for infiltration in any appreciable rate or volume? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2 and Appendix D.	X	
Provide basis: The site was found to have a percolation rate of 2 inches/hour. After applying a safety factor of 3.75, the site has a reliable infiltration rate of 0.53 inches/hour. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
6	Can Infiltration in any appreciable quantity be allowed without increasing risk of geotechnical hazards (slope stability, groundwater mounding, utilities, or other factors) that cannot be mitigated to an acceptable level? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.2.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			

Criteria	Screening Question	Yes	No
7	Can Infiltration in any appreciable quantity be allowed without posing significant risk for groundwater related concerns (shallow water table, storm water pollutants or other factors)? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
8	Can infiltration be allowed without violating downstream water rights? The response to this Screening Question shall be based on a comprehensive evaluation of the factors presented in Appendix C.3.		N/A
Provide basis: This question will be answered by a geotechnical engineer during the final design stage. Summarize findings of studies; provide reference to studies, calculations, maps, data sources, etc. Provide narrative discussion of study/data source applicability and why it was not feasible to mitigate low infiltration rates.			
Part 2 Result*	If all answers from row 5-8 are yes then partial infiltration design is potentially feasible. The feasibility screening category is Partial Infiltration. If any answer from row 5-8 is no, then infiltration of any volume is considered to be infeasible within the drainage area. The feasibility screening category is No Infiltration.		Full Infiltration

Factor of Safety and Design Infiltration Rate Worksheet				Worksheet D.5-1	
Factor Category		Factor Description	Assigned Weight (w)	Factor Value (v)	Product (p) p = w x v
A	Suitability Assessment	Soil assessment methods	0.25	3	0.75
		Predominant soil texture	0.25	1	0.25
		Site soil variability	0.25	3	0.75
		Depth to groundwater / impervious layer	0.25	1	0.25
		Suitability Assessment Safety Factor, S _A = Σp			
B	Design	Level of pretreatment/ expected sediment loads	0.5	2	1.0
		Redundancy/resiliency	0.25	2	0.5
		Compaction during construction	0.25	1	0.25
		Design Safety Factor, S _B = Σp			
Combined Safety Factor, S _{total} = S _A x S _B				3.75	
Observed Infiltration Rate, inch/hr, K _{observed} (corrected for test-specific bias)				2.0 inches/hour	
Design Infiltration Rate, in/hr, K _{design} = K _{observed} / S _{total}				0.53 inches/hour	
Supporting Data					
Soil assessment methods: Borehole methods were used without continuous boring logs.					
Predominant soil texture: The predominant soil texture at 4'-25' is “DG with fines, tan moist.”					
Site soil variability: The Site’s soil variability is unknown.					
Depth to groundwater / impervious layer: Groundwater is >29 ft deep.					
Level of pretreatment/ expected sediment loads: BMP #1 will achieve 50% TSS removal pretreatment through catch basin inserts. BMP #2 will serve as pretreatment for BMP #3.					
Redundancy/resiliency: Access to the BMPs will be provided and infiltration rates can be restored via maintenance.					
Compaction during construction: Compaction around BMPs will be minimized during construction.					

ATTACHMENT 1c:
DMA Exhibit



LEGEND

- DMA BOUNDARY
- NEW CONCRETE PAVEMENT
- FLOW DIRECTION
- BIORETENTION BASIN
- ASPHALT PAVEMENT
- FLOODPLAIN EXTENTS
- SOIL TYPE BOUNDARY
- DMA MARKER & AREA (AC)
- CRITICAL COURSE SEDIMENT YIELD AREA
- CONCRETE BROW DITCH (0-75)
- GRAVEL (SELF-RETAINING)

SOURCE CONTROL BMPs

- 1 SWEEPING (PLAZA, SIDEWALKS, STREET & PARKING LOTS)
- 2 DISCONNECTED IMPERVIOUS AREA
- 3 LANDSCAPE/OUTDOOR PESTICIDE USE
- 4 STORM DRAIN INLET MARKING
- 5 PRESERVE EXISTING NATURAL AREA
- 6 INTERIOR FLOOR DRAINS

LID, SITE DESIGN AND TREATMENT CONTROL STRATEGIES:

- 1 MINIMIZE SOIL COMPACTION, RESTRICT HEAVY CONSTRUCTION EQUIPMENT ACCESS TO PLANNED GREEN/LANDSCAPE AREAS
- 2 BIORETENTION BASIN
- 3 INFILTRATION BASIN
- 4 SELF-MITIGATING AREA
- 5 SELF-RETAINING AREA
- 6 FOREBAY
- 7 CATCH BASIN INSERT

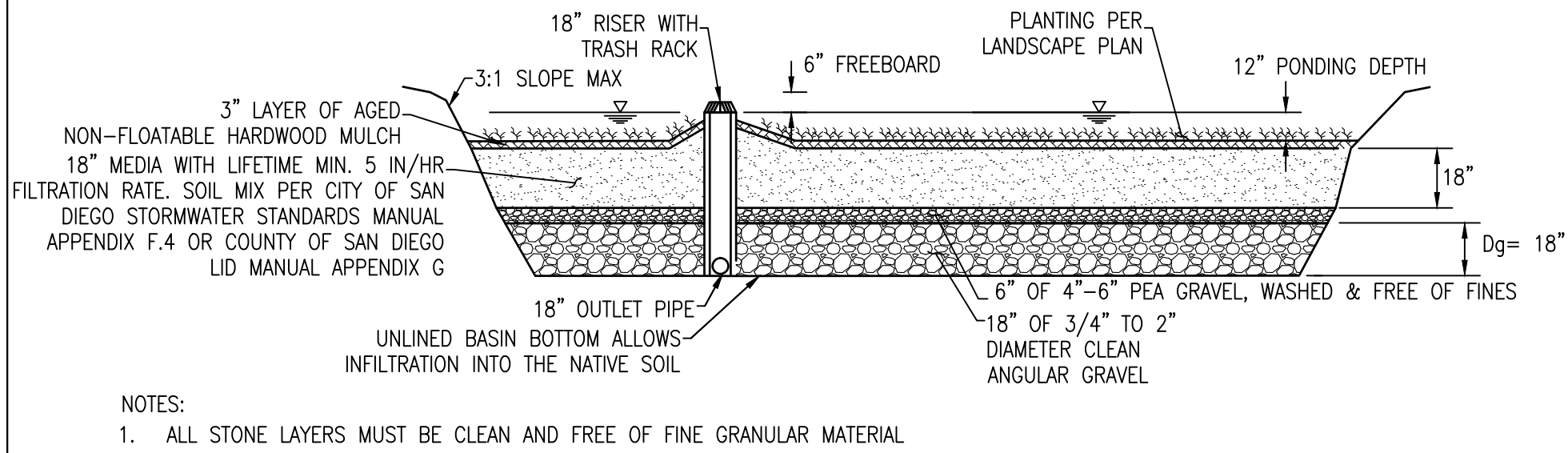
NOTES

- 1. SITE IS COMPRISED OF HYDROLOGIC SOIL TYPE B.
- 2. APPROXIMATE DEPTH TO GROUNDWATER IS 10-15 FT

Summary of DMAs

DMA#	Total DMA Area (ac)	Total DMA Area (sqft)	Soil Group B	Flat Landscape (sqft)	Moderate Landscape (sqft)	Steep Landscape (sqft)	Gravel (sqft)	Concrete/Asphalt (sqft)	Building Roof (sqft)	Sum Pervious Area (sqft)	Sum Impervious Area (sqft)	% Impervious
1	2.02	88042		11269	6155	40301	0	26440	3877	57725	30317	34.4%
2	4.55	198239		34516	11364	23605	0	107341	21383	69485	128724	64.9%
3*	1.98	86218		0	72120	14098	0	0	0	86218	0	0.0%
4*	0.63	27398		0	23637	3350	0	0	411	26987	411	1.5%
5*	0.95	41449		0	39014	2435	0	0	0	41449	0	0.0%
6**	0.08	3323		0	0	0	3323	0	0	3323	0	0.0%
Total	10.21	444669	45785	152290	83789	3323	133781	25671	285187	159452	35.9%	

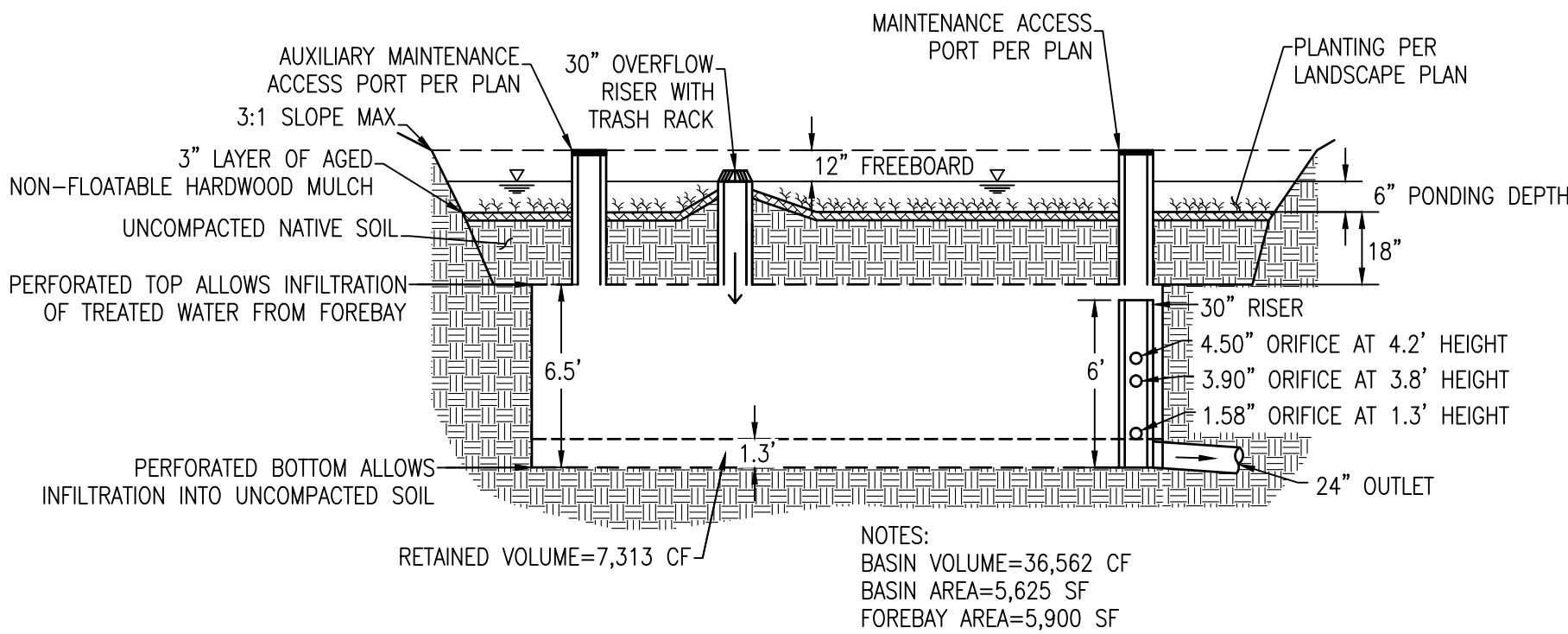
Note: "Flat", "Moderate", and "Steep" slope classifications are defined as 0-5%, 5-15%, and 15%+ respectively
*DMAs #3-#5 are self-mitigating areas
**DMA #6 is a self-retaining area



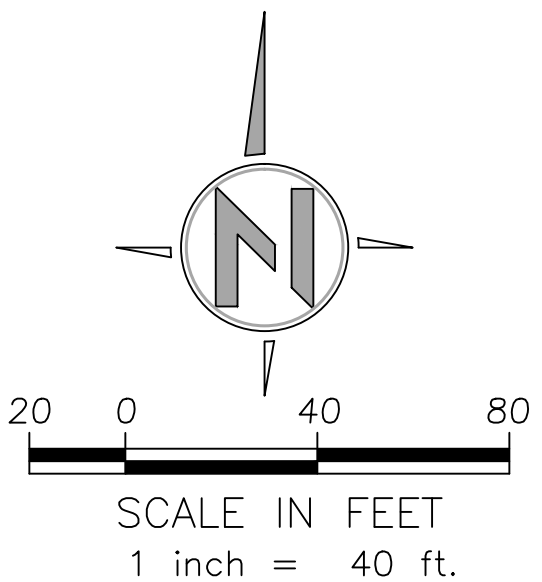
A BMP #1: BIORETENTION BASIN DETAIL (INF-2)
NO SCALE

CERTIFICATION NOTES

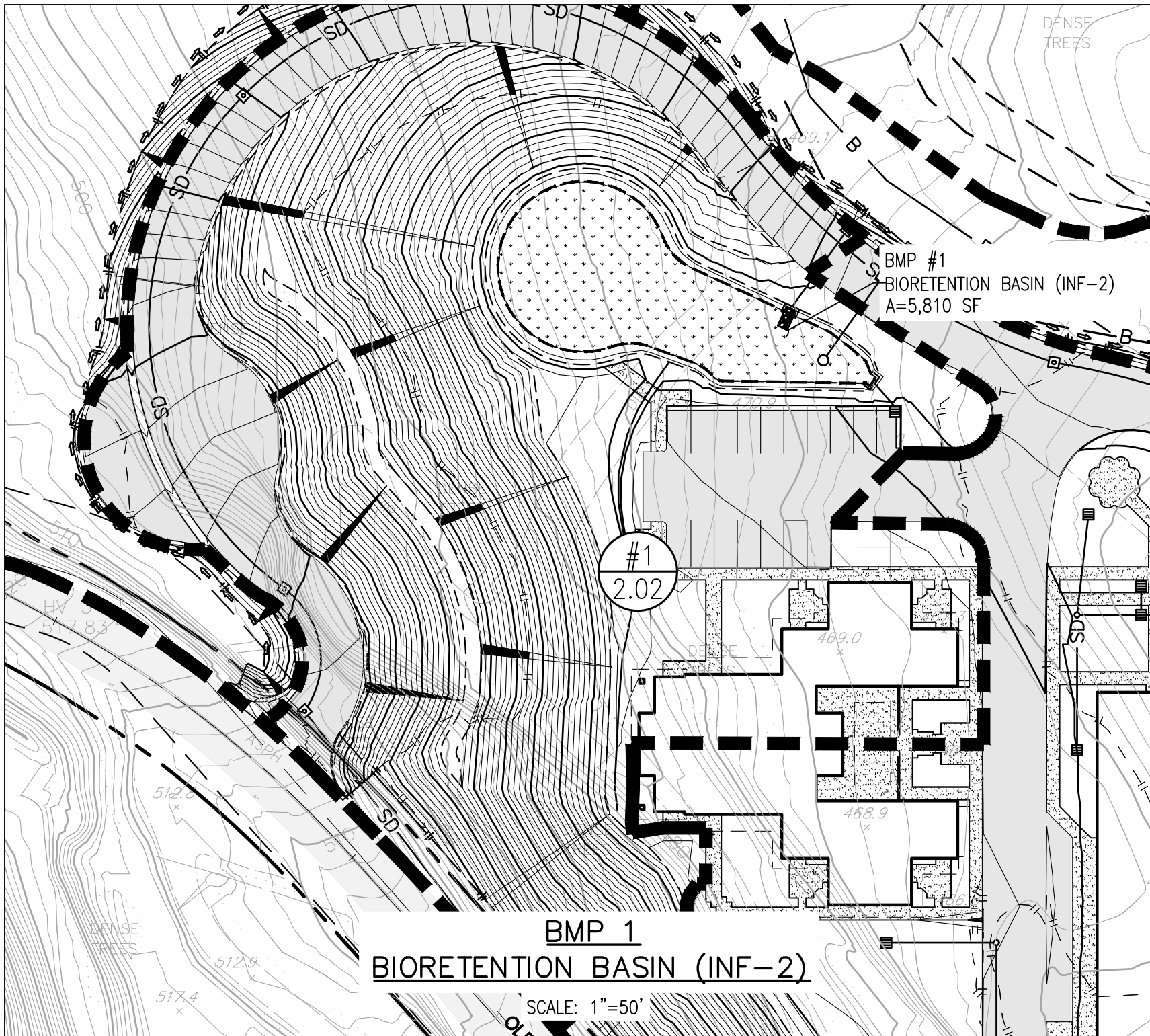
- CONTRACTOR SHALL HIRE A LICENSED LAND SURVEYOR TO STAKE THE SUBGRADE OF THE ROCK STORAGE LAYER, BIORETENTION PONDING SURFACE, AND TOP SLOPE OF BIORETENTION BASIN. MINIMUM SURFACE AREAS AND DEPTHS SHALL BE PROVIDED PER PLANS.
- CONTRACTOR IS REQUIRED TO NOTIFY ENGINEER OF RECORD (EOR) DURING CONSTRUCTION FOR INSPECTION OF THE SUBGRADE AND INSTALLATION OF THE LINER, ROCK STORAGE, SUBDRAINAGE, SOIL MEDIA AND OVERFLOW STRUCTURE. IF EOR IS NOT NOTIFIED, CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH REMOVING LAYERS AND REPLACING AS NEEDED FOR PROPER INSPECTION.
- CONTRACTOR SHALL PROVIDE AN AS-BUILT SURVEY PREPARED BY A LICENSED LAND SURVEYOR OF THE BIORETENTION BASIN.
- CONTRACTOR SHALL PROVIDE CONTRACTOR SUBMITTALS FOR ALL BIORETENTION MATERIALS FOR THE EOR'S REVIEW. THIS INCLUDES, BUT IS NOT LIMITED TO: SOIL MIX, MULCH, FILTER LAYER, AGGREGATE BASE, IMPERMEABLE LINER AND OVERFLOW STRUCTURE.



B BMPS #2 & #3: INFILTRATION BASIN (INF-1) AND FOREBAY DETAIL
NO SCALE



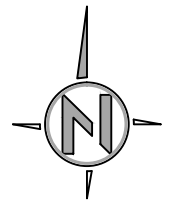
ATTACHMENT 1d:
Individual Structural BMP DMA Mapbook



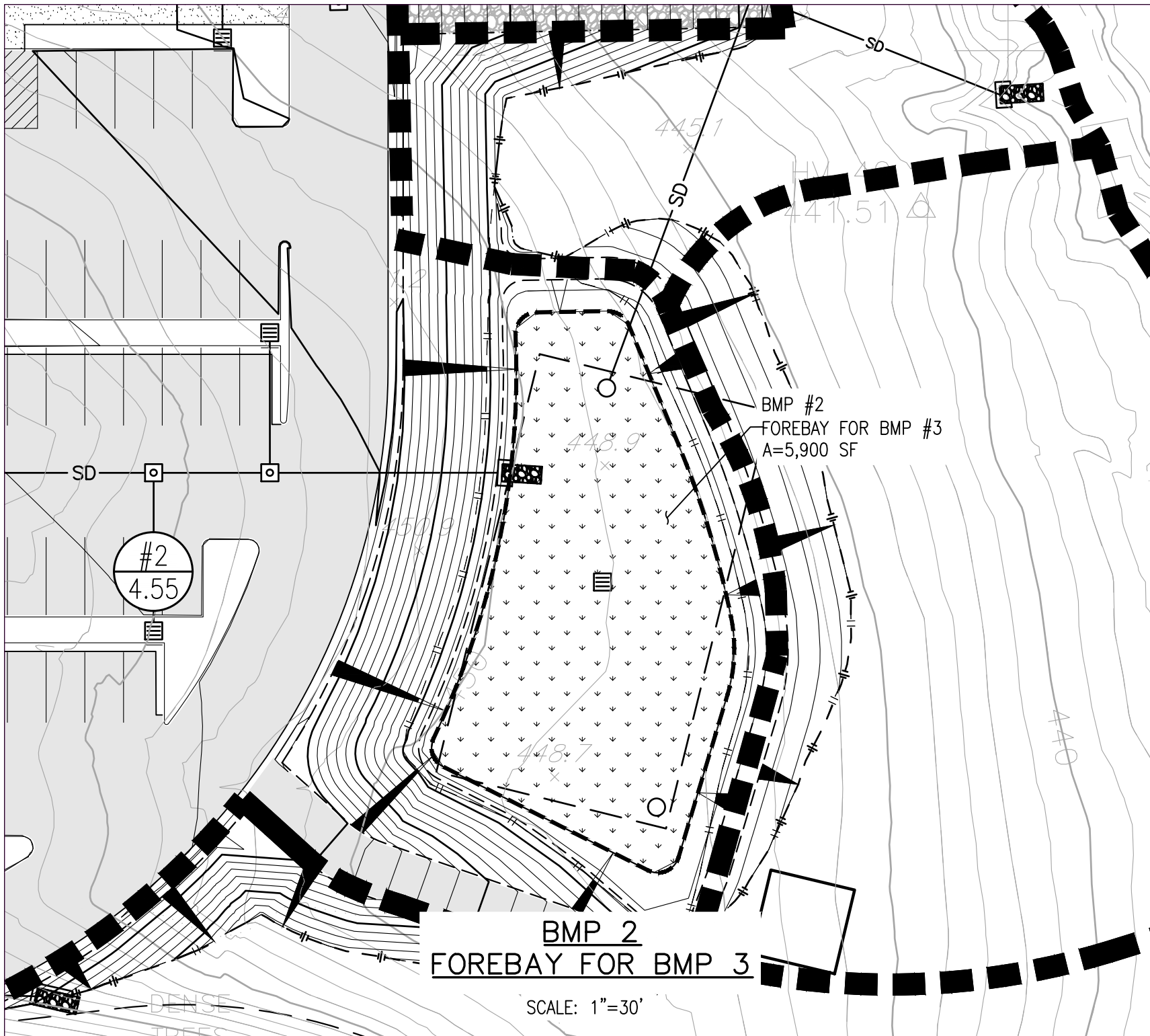
BMP 1
BIORETENTION BASIN (INF-2)

SCALE: 1"=50'

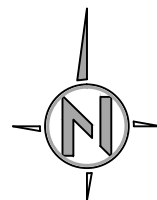
DMA DESIGNATION 



BWE
WWW.BWESD.COM 619.299.5550



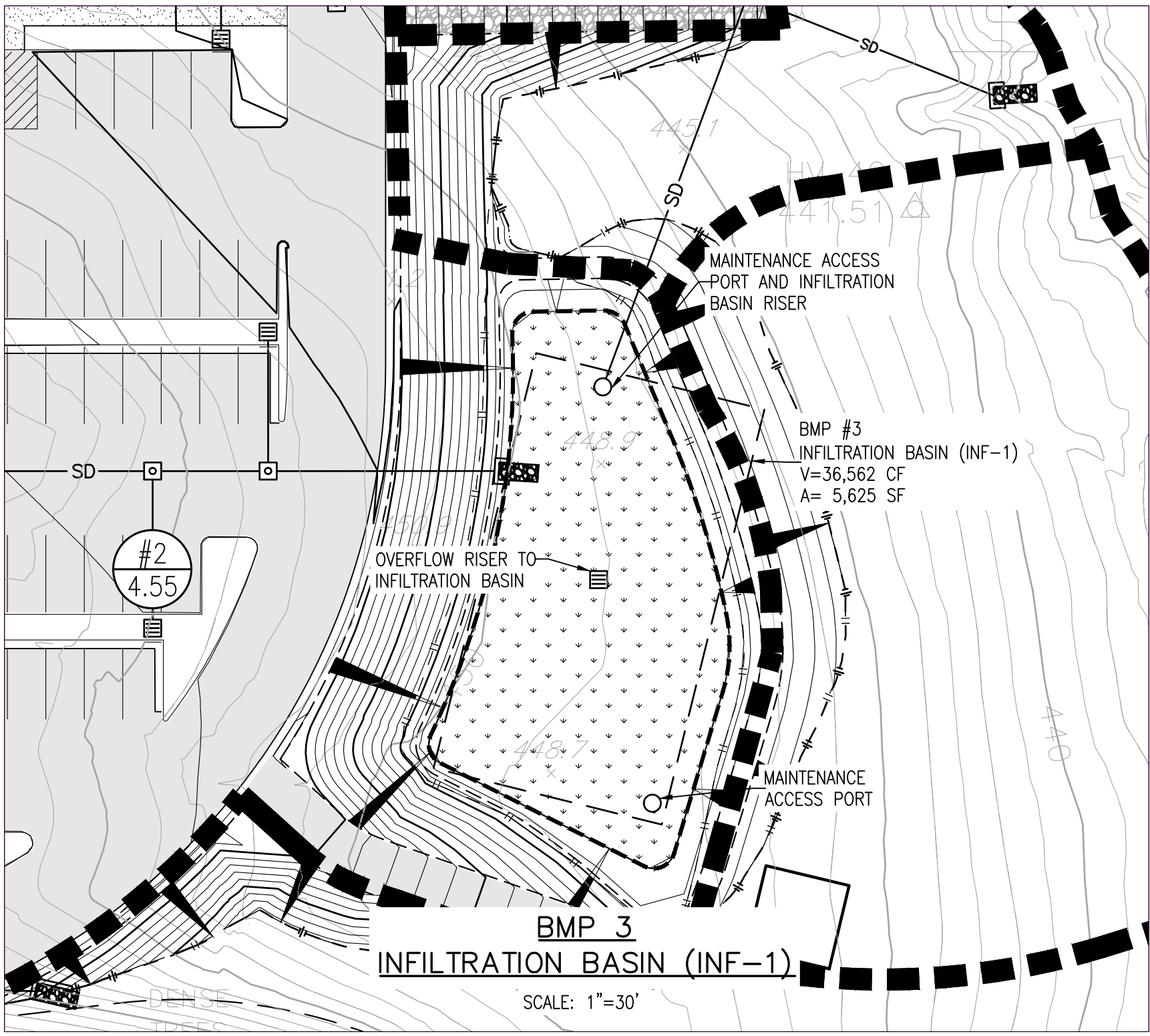
DMA DESIGNATION 



BWE
WWW.BWESD.COM 619.299.5550

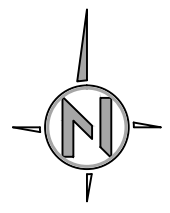
BMP 2
FOREBAY FOR BMP 3

SCALE: 1"=30'



BMP #3
INFILTRATION BASIN (INF-1)
V=36,562 CF
A= 5,625 SF

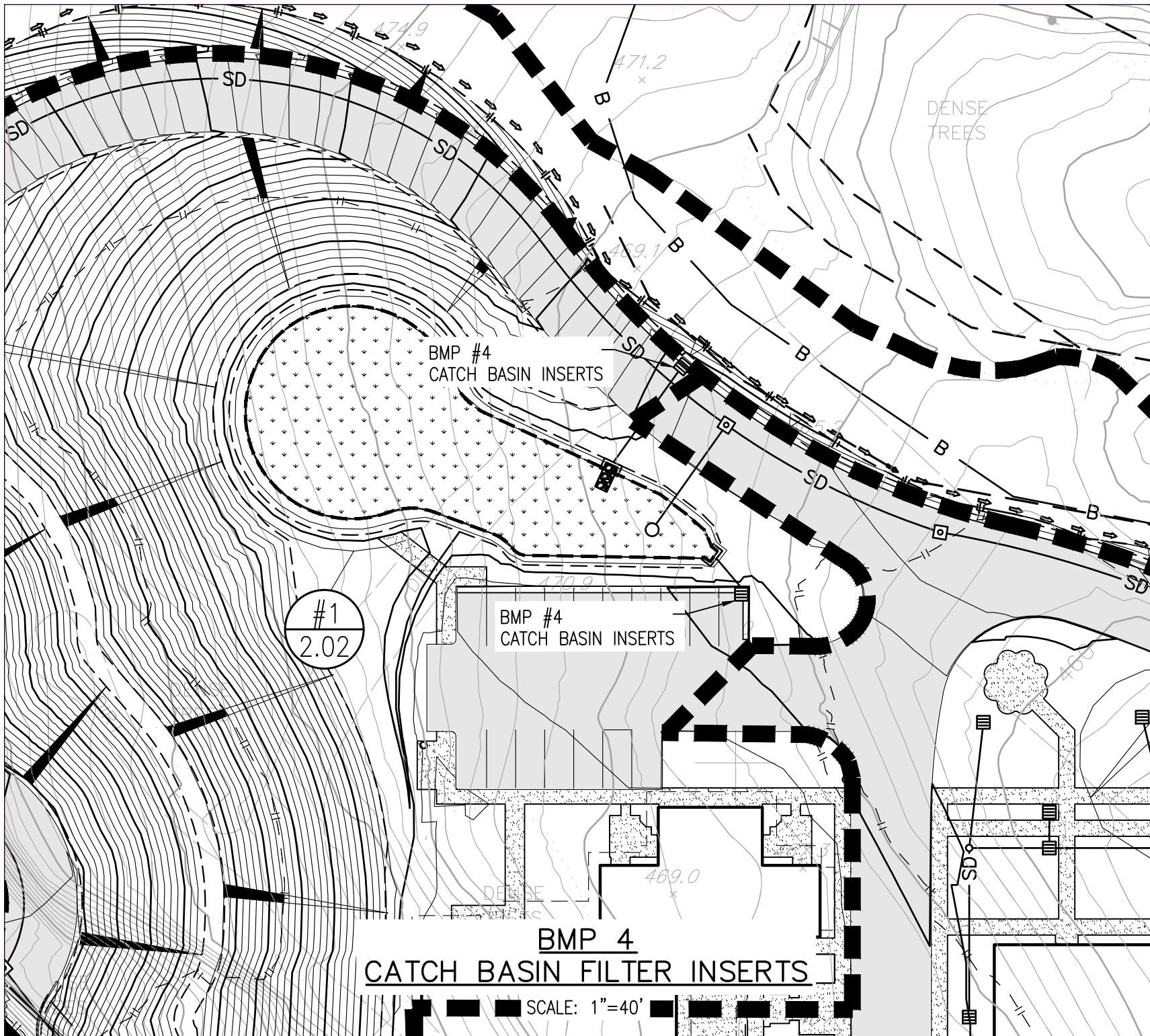
DMA DESIGNATION



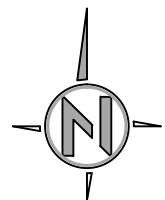
BWE
WWW.BWESD.COM 619.299.5550

BMP 3
INFILTRATION BASIN (INF-1)

SCALE: 1"=30'



DMA DESIGNATION # X.XX



BWE
WWW.BWESD.COM 619.299.5550

ATTACHMENT 2

BACKUP FOR PDP HYDROMODIFICATION CONTROL MEASURES

This is the cover sheet for Attachment 2.

- ☐ Mark this box if this attachment is empty because the project is exempt from PDP hydromodification management requirements.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 2a	Flow Control Facility Design, including Structural BMP Drawdown Calculations and Overflow Design Summary (Required) See Chapter 6 and Appendix G of the BMP Design Manual	☒ Included ☐ Submitted as separate stand-alone document
Attachment 2b	Hydromodification Management Exhibit (Required)	☒ Included See Hydromodification Management Exhibit Checklist on the back of this Attachment cover sheet.
Attachment 2c	Management of Critical Coarse Sediment Yield Areas See Section 6.2 and Appendix H of the BMP Design Manual.	☒ Exhibit depicting onsite and/or upstream sources of critical coarse sediment as mapped by Regional or Jurisdictional approaches outlined in Appendix H.1 AND, ☐ Demonstration that the project effectively avoids and bypasses sources of mapped critical coarse sediment per approaches outlined in Appendix H.2 and H.3. OR, ☐ Demonstration that project does not generate a net impact on the receiving water per approaches outlined in Appendix H.4.
Attachment 2d	Geomorphic Assessment of Receiving Channels (Optional) See Section 6.3.4 of the BMP Design Manual.	☒ Not performed ☐ Included ☐ Submitted as separate stand-alone document
Attachment 2e	Vector Control Plan (Required when structural BMPs will not drain in 96 hours)	☐ Included ☒ Not required because BMPs will drain in less than 96 hours

Use this checklist to ensure the required information has been included on the Hydromodification Management Exhibit:

The Hydromodification Management Exhibit must identify:

- ☒ Underlying hydrologic soil group
- ☒ Approximate depth to groundwater
- ☒ Existing natural hydrologic features (watercourses, seeps, springs, wetlands)
- ☒ Critical coarse sediment yield areas to be protected
- ☒ Existing topography
- ☒ Existing and proposed site drainage network and connections to drainage offsite
- ☒ Proposed grading
- ☒ Proposed impervious features
- ☒ Proposed design features and surface treatments used to minimize imperviousness
- ☒ Point(s) of Compliance (POC) for Hydromodification Management
- ☒ Existing and proposed drainage boundary and drainage area to each POC (when necessary, create separate exhibits for pre-development and post-project conditions)
- ☒ Structural BMPs for hydromodification management (identify location, type of BMP, and size/detail)

ATTACHMENT 2A:
Flow Control Facility Design

**HYDROMODIFICATION MANAGEMENT PLAN
FOR
SVBF TEMPLE**

Purpose

This project falls under PDP category and required to manage hydromodification impacts due to the development. Hydromodification management plan is required for all Priority Development Projects (PDPs) to demonstrate that the project is designed to manage increases in runoff discharge rates and durations in the proposed condition. Increased flow rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force. The results of a hydromodification management analysis must comply with the following design criteria:

- Post-development flow rates and durations must not exceed pre-development flow rates and durations by more than 10 percent for flow rates ranging from 10 percent, 30 percent or 50 percent of the 2-year runoff event (0.1Q₂, 0.3Q₂, or 0.5Q₂) to the 10-year runoff event (Q₁₀).
- Each PDP must avoid critical sediment yield areas identified by the optional WMAA, or implement measures that allow critical coarse sediment to be discharged to receiving waters, such that there is no net impact to the receiving water.

Method of Analysis

The hydromodification analysis is prepared utilizing continuous simulation of long term rainfall records. San Diego Hydrology Model (SDHM) Version 3.0 developed by Clear Creek Solutions Inc., is used for this purpose. The following site specific information are required to perform the simulation:

- Rainfall basin information for the project site. These information are included in the program.
- Hydrologic soil group at the project site (soil maps published by the Natural Resources Conservation Service is used)
- Pre-development and post-project slope categories (low = 0% – 5%, moderate = 5% – 15%, steep = >15%)
- Drainage area tributary to the BMP
- Fraction of Q₂ to Q₁₀ for HMP control: 0.1Q₂ to Q₁₀ for project discharging to streams with high susceptibility to erosion (default range of flows to control when a stream susceptibility study has not been prepared). These flow rates are calculated by utilizing the USGS regression method.

USGS regression equations are used to determine the low (0.1Q2yr) and high (Q10yr) flow thresholds for this site. These values are entered into the model as a “User Defined Flow Value” to calculate the flow rates in the pre-development condition.

USGS regression equations for 2 and 10 year peak flow rates are;

$$Q-2 \text{ yr (cfs)} = 3.60 (A)^{0.672} X (P)^{0.753}$$

$$Q-10 \text{ yr (cfs)} = 6.56 (A)^{0.783} X (P)^{1.07}$$

Where,

A = Drainage Area (Sq miles)

P = Mean Annual Precipitation (inches) = 13.9”

A comparison of the pre-development and mitigated flow duration curves is conducted for 100 flow levels between the lower and the upper flow thresholds. The comparison of these flow results shows compliance with the hydromodification criteria as all results are passed.

Rainfall Station

This site is located closest to the Escondido rainfall station. Therefore, continuous simulation is performed by utilizing the long term rainfall records for this station. This rainfall station has over 33 years of hourly rainfall records from 10/01/1964 to 09/30/2004.

Predevelopment Condition Scenario

Site area is divided into 3 major drainage management areas (DMAs) and Point of Compliances (POCs) for the HMP analysis purpose. POCs are located at the downstream end of these DMAs where runoff will be concentrated prior to discharging offsite. POC locations are identified by delineating the DMAs according to the current site specific topographic information. The site is currently undeveloped with majority area still in the natural condition. Therefore, the landuse type in the predevelopment condition is assumed as Natural Vegetation (NatVeg). The underlying soil is comprised of hydrologic soil type B.

Developed Condition (Mitigated) Scenario

Site area is divided into 3 major drainage management areas (DMAs) and Point of Compliances (POCs) for the HMP analysis purpose as in the predevelopment condition. The land uses such as Urban, UrbanNoIrr, Impervious, NatVeg, are assigned in the model to depict the development in the proposed condition. UrbanNoIrr is used for pervious DG surface and landscape area with steep slope.

The runoff from DMAs which comprised of impervious areas is directed to bioretention and infiltration BMPs. These BMPs are designed to control both pollutant and hydromodification impacts due to the development.

The runoff originating from self-mitigating areas does not require to route through the pollutant control BMPs but, needs to be considered for hydromodification analysis. Therefore, these DMAs are also considered in the HMP analysis.

A model comprising of multiple landuse basins is developed within SDHM within mitigated scenario. The landuse basins which are not self-mitigating are then connected to structural BMPs. Self-mitigating DMAs are modeled as separate landuse basins in the model when the runoff from these DMAs can be routed to the corresponding POC without comingling with the runoff from other DMAs. The outflows from the structural BMPs and self-mitigating DMAs are assigned with same POC number in the model to determine the cumulative outflow rates from all the DMAs contributing to the same POC.

Calculations

The pre-development 2, 5 and 10-year peak flow rates are determined by using USGS regression equations. The low flow threshold is determined by multiplying the 2-yr flow rate by a factor of 0.1. A default low flow threshold i.e., $0.1Q_2$ is used in the analysis. $0.1Q_2$ and Q_{10} -yr flow rates are manually entered in the SDHM program to compare the peak flow rates in the post-development condition.

Table 1: 2 & 10-yr Peak Flow Thresholds Calculation

POC #	Area (Ac)	Area (Sq. Miles)	Peak Flow Runoff (cfs)		
			Q-2 yr	Q-10 yr	Low Flow (0.1Q-2yr)
1	7.32	0.01144	1.2948	3.3083	0.129477
2	0.77	0.00120	0.2851	0.5673	0.028508
3	2.12	0.00331	0.5630	1.2538	0.056304

Note: Land uses for DMAs draining to POCs 2 & 3 do not change drastically from the existing condition. The drainage areas in the proposed condition to these POCs are smaller than in the existing condition. As a result, proposed condition flow rates and durations at these POCs will be smaller than in the existing condition. Therefore, HMP analysis is not required.

BMP #1: Bioretention Basin (INF-2)

The runoff from DMA #1 (2.02 AC) is directed to Bioretention BMP #1 for pollutant as well as hydromodification control. Bioretention BMP #1 is designed without an underdrain to allow full infiltration of the storm volume stored below the overflow weir elevation. This BMP is designed to infiltrate the full DCV into the native soil. 12" of surface ponding depth, 18" media layer, and 18" of gravel storage layer is provided to accommodate the full DCV.

BMPs #2 & #3: Forebay and Infiltration Basin (INF-1)

The runoff from DMA #2 (4.55 AC) is directed to an infiltration basin (BMP #3) which provides pollutant and hydromodification control. The lowest orifice in the basin is 1.3' above the basin bottom to ensure that the full DCV is infiltrated into the native soil. The runoff from DMA #2 is conveyed to a forebay (BMP #2) via proposed a storm drain system. After allowing some of the influent sediment to settle, stormwater is directed to the infiltration basin (BMP #3) through infiltration and an overflow riser. The basin is designed with a perforated top and bottom so that runoff gravity flows down to the native soil without any restriction in the flow passage. Since the full DCV is infiltrated, the BMP is considered an infiltration BMP. The orifice-controlled runoff from BMP #2 is directed to POC 1 via a proposed storm drain system.

DMA #6 is a pedestrian access to the creek which is comprised of a pervious gravel surface material. The ratio of total drainage area (including permeable area) to area of permeable area is less than 1.5: 1. Therefore, this DMA is identified as self-retaining DMA. The DCV for this DMA is captured and infiltrated directly into the native soil. HMP control of this area is offset by BMPs #1 & #3. Therefore, external flow control is not required. The runoff from this DMA is directed to POC 1.

Refer to Existing and Proposed condition HMP exhibits (Attachment 2) and DMA Exhibit (DMA #1) for DMA delineations and POC locations.

Conclusions

This study has demonstrated that the proposed HMP BMPs provided for the site are adequate to meet the current HMP criteria as long as these BMPs are constructed according to the cross sectional details, surface areas, volumes, and orifice sizes recommended within this report. See attached results obtained from SDHM and exhibits for further details.

Surface Ponding Drawdown Time

BMP #1 - Bioretention Basin (INF-2)

BMP Area (A) =		5,810	sf
BMP Parameters			
1	Native Soil Infiltration Rate	0.53	inches/hour
2	Surface ponding below outlet riser rim	12.0	inches
*3	Estimated Drawdown of surface storage ([2]/[1])	22.6	hours
		22.6 < 24 hour maximum	

BMP #2 - Forebay

Forebay Area (A) =		5,900	sf
BMP Parameters			
1	Native Soil Infiltration Rate	0.53	inches/hour
2	Surface ponding below outlet riser rim	6.0	inches
*3	Estimated Drawdown of surface storage ([2]/[1])	11.3	hours
		11.3 < 24 hour maximum	

BMP #3 - Infiltration Basin (INF-1)

Forebay Area (A) =		5,625	sf
BMP Parameters			
1	Native Soil Infiltration Rate	0.53	inches/hour
2	DCV Retention Depth	15.6	inches
*3	Estimated Drawdown of DCV ([2]/[1])	29.4	hours
		29.4 < 36 hour maximum	

**Drawdown is not required for runoff volume stored within and below soil media*

SDHM 3.0

PROJECT REPORT

General Model Information

Project Name: Bio_Vault_BMP#2Final
Site Name: SVBF Temple
Site Address:
City:
Report Date: 3/22/2017
Gage: ESCONDID
Data Start: 10/01/1964
Data End: 09/30/2004
Timestep: Hourly
Precip Scale: 1.000
Version Date: 2016/11/23

POC Thresholds

Low Flow Threshold for POC1:	10 Percent of the 2 Year
High Flow Threshold for POC1:	10 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass: No

GroundWater: No

Pervious Land Use acre

B,NatVeg,Flat 1.06

B,NatVeg,Moderate 4.3

B,NatVeg,Steep 1.96

Pervious Total 7.32

Impervious Land Use acre

Impervious Total 0

Basin Total 7.32

Element Flows To:

Surface

Interflow

Groundwater

Mitigated Land Use

DMA #2

Bypass: No

GroundWater: No

Pervious Land Use	acre
B,Urbn,Moderate	0.05
B,UrbNoIrr,Steep	0.79
B,Urbn,Flat	0.65

Pervious Total 1.49

Impervious Land Use	acre
IMPERVIOUS-FLAT	2.92

Impervious Total 2.92

Basin Total 4.41

Element Flows To:

Surface	Interflow	Groundwater
Surface orebay_INF-1	Surface orebay_INF-1	

DMA #1

Bypass: No

GroundWater: No

Pervious Land Use	acre
B,Urbn,Moderate	0.14
B,UrbNoIrr,Steep	0.93
B,Urbn,Flat	0.12

Pervious Total 1.19

Impervious Land Use	acre
IMPERVIOUS-FLAT	0.7

Impervious Total 0.7

Basin Total 1.89

Element Flows To:

Surface	Interflow	Groundwater
Surface BIO-1	Surface BIO-1	

DMA #3

Bypass: Yes

GroundWater: No

Pervious Land Use acre

B,NatVeg,Moderate 1.73

B,UrbNoIrr,Steep 0.32

Pervious Total 2.05

Impervious Land Use acre

Impervious Total 0

Basin Total 2.05

Element Flows To:

Surface

Interflow

Groundwater

Routing Elements

Predeveloped Routing

Mitigated Routing

Forebay_INF-1

Bottom Length: 135.00 ft.
Bottom Width: 43.70 ft.
Material thickness of first layer: 1.75
Material type for first layer: Amended 5 in/hr
Material thickness of second layer: 0
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Underdrain not used
Discharge Structure
Riser Height: 0.5 ft.
Riser Diameter: 30 in.
Element Flows To:
Outlet 1 Outlet 2
INF-1

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1354	0.0000	0.0000	0.0000
0.0357	0.1354	0.0020	0.0000	0.0000
0.0714	0.1354	0.0041	0.0000	0.0000
0.1071	0.1354	0.0061	0.0000	0.0000
0.1429	0.1354	0.0081	0.0000	0.0000
0.1786	0.1354	0.0102	0.0000	0.0000
0.2143	0.1354	0.0122	0.0000	0.0000
0.2500	0.1354	0.0142	0.0000	0.0000
0.2857	0.1354	0.0163	0.0000	0.0000
0.3214	0.1354	0.0183	0.0000	0.0000
0.3571	0.1354	0.0203	0.0000	0.0000
0.3929	0.1354	0.0223	0.0000	0.0000
0.4286	0.1354	0.0244	0.0000	0.0000
0.4643	0.1354	0.0264	0.0000	0.0000
0.5000	0.1354	0.0284	0.0000	0.0000
0.5357	0.1354	0.0305	0.0000	0.0000
0.5714	0.1354	0.0325	0.0000	0.0000
0.6071	0.1354	0.0345	0.0000	0.0000
0.6429	0.1354	0.0366	0.0000	0.0000
0.6786	0.1354	0.0386	0.0000	0.0000
0.7143	0.1354	0.0406	0.0000	0.0000
0.7500	0.1354	0.0427	0.0000	0.0000
0.7857	0.1354	0.0447	0.0000	0.0000
0.8214	0.1354	0.0467	0.0000	0.0000
0.8571	0.1354	0.0488	0.0000	0.0000
0.8929	0.1354	0.0508	0.0000	0.0000
0.9286	0.1354	0.0528	0.0000	0.0000
0.9643	0.1354	0.0549	0.0000	0.0000
1.0000	0.1354	0.0569	0.0000	0.0000
1.0357	0.1354	0.0589	0.0000	0.0000
1.0714	0.1354	0.0609	0.0000	0.0000
1.1071	0.1354	0.0630	0.0000	0.0000
1.1429	0.1354	0.0650	0.0000	0.0000
1.1786	0.1354	0.0670	0.0000	0.0000
1.2143	0.1354	0.0691	0.0000	0.0000

1.2500	0.1354	0.0711	0.0000	0.0000
1.2857	0.1354	0.0731	0.0000	0.0000
1.3214	0.1354	0.0752	0.0000	0.0000
1.3571	0.1354	0.0772	0.0000	0.0000
1.3929	0.1354	0.0792	0.0000	0.0000
1.4286	0.1354	0.0813	0.0000	0.0000
1.4643	0.1354	0.0833	0.0000	0.0000
1.5000	0.1354	0.0853	0.0000	0.0000
1.5357	0.1354	0.0874	0.0000	0.0000
1.5714	0.1354	0.0894	0.0000	0.0000
1.6071	0.1354	0.0914	0.0000	0.0000
1.6429	0.1354	0.0934	0.0000	0.0000
1.6786	0.1354	0.0955	0.0000	0.0000
1.7143	0.1354	0.0975	0.0000	0.0000
1.7500	0.1354	0.0995	0.0000	0.0000

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infiltr(cfs)
1.7500	0.1354	0.0995	0.0000	0.7132	0.0000
1.7857	0.1362	0.1044	0.0000	0.7132	0.0000
1.8214	0.1370	0.1093	0.0000	0.7275	0.0000
1.8571	0.1378	0.1142	0.0000	0.7417	0.0000
1.8929	0.1385	0.1191	0.0000	0.7560	0.0000
1.9286	0.1393	0.1241	0.0000	0.7703	0.0000
1.9643	0.1401	0.1291	0.0000	0.7845	0.0000
2.0000	0.1409	0.1341	0.0000	0.7988	0.0000
2.0357	0.1416	0.1391	0.0000	0.8131	0.0000
2.0714	0.1424	0.1442	0.0000	0.8273	0.0000
2.1071	0.1432	0.1493	0.0000	0.8416	0.0000
2.1429	0.1440	0.1544	0.0000	0.8558	0.0000
2.1786	0.1448	0.1596	0.0000	0.8701	0.0000
2.2143	0.1456	0.1648	0.0000	0.8844	0.0000
2.2500	0.1463	0.1700	0.0000	0.8986	0.0000
2.2857	0.1471	0.1752	0.1791	0.9129	0.0000
2.3214	0.1479	0.1805	0.5062	0.9272	0.0000
2.3571	0.1487	0.1858	0.9295	0.9414	0.0000
2.3929	0.1495	0.1911	1.4300	0.9557	0.0000
2.4286	0.1503	0.1965	1.9965	0.9700	0.0000
2.4643	0.1511	0.2018	2.6207	0.9842	0.0000
2.5000	0.1519	0.2073	3.2959	0.9985	0.0000
2.5357	0.1527	0.2127	4.0161	1.0128	0.0000
2.5714	0.1535	0.2182	4.7756	1.0270	0.0000
2.6071	0.1543	0.2237	5.5689	1.0413	0.0000
2.6429	0.1551	0.2292	6.3906	1.0555	0.0000
2.6786	0.1559	0.2347	7.2351	1.0698	0.0000
2.7143	0.1567	0.2403	8.0967	1.0841	0.0000
2.7500	0.1575	0.2459	8.9698	1.0983	0.0000
2.7857	0.1583	0.2516	9.8485	1.1126	0.0000
2.8214	0.1591	0.2572	10.727	1.1269	0.0000
2.8571	0.1599	0.2629	11.600	1.1411	0.0000
2.8929	0.1607	0.2686	12.461	1.1554	0.0000
2.9286	0.1615	0.2744	13.304	1.1697	0.0000
2.9643	0.1623	0.2802	14.125	1.1839	0.0000
3.0000	0.1631	0.2860	14.919	1.1982	0.0000
3.0357	0.1639	0.2918	15.680	1.2125	0.0000
3.0714	0.1647	0.2977	16.404	1.2267	0.0000
3.1071	0.1655	0.3036	17.087	1.2410	0.0000
3.1429	0.1663	0.3095	17.728	1.2552	0.0000

3.1786	0.1671	0.3155	18.322	1.2695	0.0000
3.2143	0.1680	0.3215	18.869	1.2838	0.0000
3.2500	0.1688	0.3275	19.369	1.2980	0.0000
3.2500	0.1688	0.3275	19.822	1.2980	0.0000

Surface orebay_INF-1

Element Flows To:

Outlet 1

INF-1

Outlet 2

Forebay_INF-1

BIO-1

Bottom Length: 139.00 ft.
Bottom Width: 41.80 ft.
Material thickness of first layer: 1.75
Material type for first layer: Amended 5 in/hr
Material thickness of second layer: 1.5
Material type for second layer: GRAVEL
Material thickness of third layer: 0
Material type for third layer: GRAVEL
Infiltration On
Infiltration rate: 0.52
Infiltration safety factor: 1
Total Volume Infiltrated (ac-ft.): 33.263
Total Volume Through Riser (ac-ft.): 0.905
Total Volume Through Facility (ac-ft.): 34.168
Percent Infiltrated: 97.35
Total Precip Applied to Facility: 4.857
Total Evap From Facility: 3.879
Underdrain not used
Discharge Structure
Riser Height: 1 ft.
Riser Diameter: 18 in.
Element Flows To:
Outlet 1 Outlet 2

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.1334	0.0000	0.0000	0.0000
0.0522	0.1334	0.0029	0.0000	0.0000
0.1044	0.1334	0.0058	0.0000	0.0000
0.1566	0.1334	0.0088	0.0000	0.0000
0.2088	0.1334	0.0117	0.0000	0.0009
0.2610	0.1334	0.0146	0.0000	0.0020
0.3132	0.1334	0.0175	0.0000	0.0038
0.3654	0.1334	0.0205	0.0000	0.0064
0.4176	0.1334	0.0234	0.0000	0.0099
0.4698	0.1334	0.0263	0.0000	0.0144
0.5220	0.1334	0.0292	0.0000	0.0198
0.5742	0.1334	0.0322	0.0000	0.0264
0.6264	0.1334	0.0351	0.0000	0.0342
0.6786	0.1334	0.0380	0.0000	0.0433
0.7308	0.1334	0.0409	0.0000	0.0536
0.7830	0.1334	0.0439	0.0000	0.0654
0.8352	0.1334	0.0468	0.0000	0.0699
0.8874	0.1334	0.0497	0.0000	0.0699
0.9396	0.1334	0.0526	0.0000	0.0699
0.9918	0.1334	0.0556	0.0000	0.0699
1.0440	0.1334	0.0585	0.0000	0.0699
1.0962	0.1334	0.0614	0.0000	0.0699
1.1484	0.1334	0.0643	0.0000	0.0699
1.2005	0.1334	0.0673	0.0000	0.0699
1.2527	0.1334	0.0702	0.0000	0.0699
1.3049	0.1334	0.0731	0.0000	0.0699
1.3571	0.1334	0.0760	0.0000	0.0699
1.4093	0.1334	0.0790	0.0000	0.0699

1.4615	0.1334	0.0819	0.0000	0.0699
1.5137	0.1334	0.0848	0.0000	0.0699
1.5659	0.1334	0.0877	0.0000	0.0699
1.6181	0.1334	0.0906	0.0000	0.0699
1.6703	0.1334	0.0936	0.0000	0.0699
1.7225	0.1334	0.0965	0.0000	0.0699
1.7747	0.1334	0.0994	0.0000	0.0699
1.8269	0.1334	0.1023	0.0000	0.0699
1.8791	0.1334	0.1052	0.0000	0.0699
1.9313	0.1334	0.1081	0.0000	0.0699
1.9835	0.1334	0.1109	0.0000	0.0699
2.0357	0.1334	0.1138	0.0000	0.0699
2.0879	0.1334	0.1167	0.0000	0.0699
2.1401	0.1334	0.1196	0.0000	0.0699
2.1923	0.1334	0.1225	0.0000	0.0699
2.2445	0.1334	0.1254	0.0000	0.0699
2.2967	0.1334	0.1283	0.0000	0.0699
2.3489	0.1334	0.1312	0.0000	0.0699
2.4011	0.1334	0.1341	0.0000	0.0699
2.4533	0.1334	0.1369	0.0000	0.0699
2.5055	0.1334	0.1398	0.0000	0.0699
2.5577	0.1334	0.1427	0.0000	0.0699
2.6099	0.1334	0.1456	0.0000	0.0699
2.6621	0.1334	0.1485	0.0000	0.0699
2.7143	0.1334	0.1514	0.0000	0.0699
2.7665	0.1334	0.1543	0.0000	0.0699
2.8187	0.1334	0.1572	0.0000	0.0699
2.8709	0.1334	0.1601	0.0000	0.0699
2.9231	0.1334	0.1630	0.0000	0.0699
2.9753	0.1334	0.1658	0.0000	0.0699
3.0275	0.1334	0.1687	0.0000	0.0699
3.0797	0.1334	0.1716	0.0000	0.0699
3.1319	0.1334	0.1745	0.0000	0.0699
3.1841	0.1334	0.1774	0.0000	0.0699
3.2363	0.1334	0.1803	0.0000	0.0699
3.2500	0.1334	0.1811	0.0000	0.0699

Landscape Swale Hydraulic Table

Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	To Amended(cfs)	Infil(cfs)
3.2500	0.1334	0.1811	0.0000	0.7089	0.0000
3.3022	0.1345	0.1880	0.0000	0.7089	0.0000
3.3544	0.1357	0.1951	0.0000	0.7294	0.0000
3.4066	0.1368	0.2022	0.0000	0.7500	0.0000
3.4588	0.1380	0.2094	0.0000	0.7705	0.0000
3.5110	0.1392	0.2166	0.0000	0.7910	0.0000
3.5632	0.1403	0.2239	0.0000	0.8116	0.0000
3.6154	0.1415	0.2313	0.0000	0.8321	0.0000
3.6676	0.1427	0.2387	0.0000	0.8526	0.0000
3.7198	0.1438	0.2462	0.0000	0.8732	0.0000
3.7720	0.1450	0.2537	0.0000	0.8937	0.0000
3.8242	0.1462	0.2613	0.0000	0.9142	0.0000
3.8764	0.1473	0.2690	0.0000	0.9347	0.0000
3.9286	0.1485	0.2767	0.0000	0.9553	0.0000
3.9808	0.1497	0.2845	0.0000	0.9758	0.0000
4.0330	0.1509	0.2923	0.0000	0.9963	0.0000
4.0852	0.1521	0.3002	0.0000	1.0169	0.0000
4.1374	0.1533	0.3082	0.0000	1.0374	0.0000
4.1896	0.1544	0.3162	0.0000	1.0579	0.0000

4.2418	0.1556	0.3243	0.0000	1.0785	0.0000
4.2940	0.1568	0.3325	0.1466	1.0990	0.0000
4.3462	0.1580	0.3407	0.4736	1.1195	0.0000
4.3984	0.1592	0.3490	0.9041	1.1401	0.0000
4.4505	0.1604	0.3573	1.4101	1.1606	0.0000
4.5027	0.1616	0.3657	1.9688	1.1811	0.0000
4.5549	0.1628	0.3742	2.5577	1.2017	0.0000
4.6071	0.1640	0.3827	3.1538	1.2222	0.0000
4.6593	0.1652	0.3913	3.7338	1.2427	0.0000
4.7115	0.1665	0.3999	4.2756	1.2633	0.0000
4.7500	0.1674	0.4064	4.7601	1.2784	0.0000

Surface BIO-1

Element Flows To:

Outlet 1

Outlet 2

BIO-1

INF-1

Width: 75 ft.
Length: 75 ft.
Depth: 6.5 ft.
Infiltration On
Infiltration rate: 0.53
Infiltration safety factor: 1
Wetted surface area On
Total Volume Infiltrated (ac-ft.): 86.432
Total Volume Through Riser (ac-ft.): 22.832
Total Volume Through Facility (ac-ft.): 109.263
Percent Infiltrated: 79.1
Total Precip Applied to Facility: 0
Total Evap From Facility: 0
Discharge Structure
Riser Height: 6 ft.
Riser Diameter: 30 in.
Orifice 1 Diameter: 1.58 in. Elevation:1.3 ft.
Orifice 2 Diameter: 3.9 in. Elevation:3.8 ft.
Orifice 3 Diameter: 4.5 in. Elevation:4.2 ft.
Element Flows To:
Outlet 1 Outlet 2

Vault Hydraulic Table

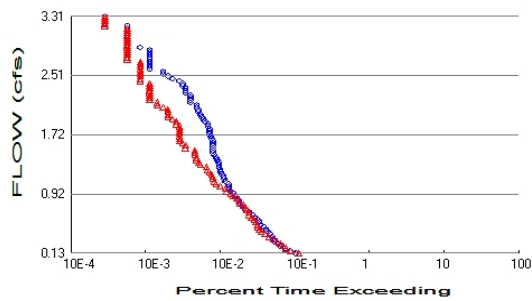
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.129	0.000	0.000	0.000
0.0722	0.129	0.009	0.000	0.069
0.1444	0.129	0.018	0.000	0.069
0.2167	0.129	0.028	0.000	0.069
0.2889	0.129	0.037	0.000	0.069
0.3611	0.129	0.046	0.000	0.069
0.4333	0.129	0.056	0.000	0.069
0.5056	0.129	0.065	0.000	0.069
0.5778	0.129	0.074	0.000	0.069
0.6500	0.129	0.083	0.000	0.069
0.7222	0.129	0.093	0.000	0.069
0.7944	0.129	0.102	0.000	0.069
0.8667	0.129	0.111	0.000	0.069
0.9389	0.129	0.121	0.000	0.069
1.0111	0.129	0.130	0.000	0.069
1.0833	0.129	0.139	0.000	0.069
1.1556	0.129	0.149	0.000	0.069
1.2278	0.129	0.158	0.000	0.069
1.3000	0.129	0.167	0.000	0.069
1.3722	0.129	0.177	0.018	0.069
1.4444	0.129	0.186	0.025	0.069
1.5167	0.129	0.195	0.031	0.069
1.5889	0.129	0.205	0.036	0.069
1.6611	0.129	0.214	0.040	0.069
1.7333	0.129	0.223	0.044	0.069
1.8056	0.129	0.233	0.048	0.069
1.8778	0.129	0.242	0.051	0.069
1.9500	0.129	0.251	0.054	0.069
2.0222	0.129	0.261	0.057	0.069
2.0944	0.129	0.270	0.060	0.069

2.1667	0.129	0.279	0.063	0.069
2.2389	0.129	0.289	0.065	0.069
2.3111	0.129	0.298	0.068	0.069
2.3833	0.129	0.307	0.070	0.069
2.4556	0.129	0.317	0.072	0.069
2.5278	0.129	0.326	0.075	0.069
2.6000	0.129	0.335	0.077	0.069
2.6722	0.129	0.345	0.079	0.069
2.7444	0.129	0.354	0.081	0.069
2.8167	0.129	0.363	0.083	0.069
2.8889	0.129	0.373	0.085	0.069
2.9611	0.129	0.382	0.087	0.069
3.0333	0.129	0.391	0.089	0.069
3.1056	0.129	0.401	0.091	0.069
3.1778	0.129	0.410	0.092	0.069
3.2500	0.129	0.419	0.094	0.069
3.3222	0.129	0.429	0.096	0.069
3.3944	0.129	0.438	0.098	0.069
3.4667	0.129	0.447	0.099	0.069
3.5389	0.129	0.457	0.101	0.069
3.6111	0.129	0.466	0.103	0.069
3.6833	0.129	0.475	0.104	0.069
3.7556	0.129	0.485	0.106	0.069
3.8278	0.129	0.494	0.176	0.069
3.9000	0.129	0.503	0.239	0.069
3.9722	0.129	0.512	0.282	0.069
4.0444	0.129	0.522	0.316	0.069
4.1167	0.129	0.531	0.346	0.069
4.1889	0.129	0.540	0.372	0.069
4.2611	0.129	0.550	0.532	0.069
4.3333	0.129	0.559	0.620	0.069
4.4056	0.129	0.568	0.689	0.069
4.4778	0.129	0.578	0.750	0.069
4.5500	0.129	0.587	0.804	0.069
4.6222	0.129	0.596	0.854	0.069
4.6944	0.129	0.606	0.901	0.069
4.7667	0.129	0.615	0.945	0.069
4.8389	0.129	0.624	0.987	0.069
4.9111	0.129	0.634	1.027	0.069
4.9833	0.129	0.643	1.065	0.069
5.0556	0.129	0.652	1.102	0.069
5.1278	0.129	0.662	1.137	0.069
5.2000	0.129	0.671	1.171	0.069
5.2722	0.129	0.680	1.204	0.069
5.3444	0.129	0.690	1.237	0.069
5.4167	0.129	0.699	1.268	0.069
5.4889	0.129	0.708	1.298	0.069
5.5611	0.129	0.718	1.328	0.069
5.6333	0.129	0.727	1.357	0.069
5.7056	0.129	0.736	1.386	0.069
5.7778	0.129	0.746	1.414	0.069
5.8500	0.129	0.755	1.441	0.069
5.9222	0.129	0.764	1.468	0.069
5.9944	0.129	0.774	1.494	0.069
6.0667	0.129	0.783	1.976	0.069
6.1389	0.129	0.792	2.916	0.069
6.2111	0.129	0.802	4.133	0.069
6.2833	0.129	0.811	5.561	0.069

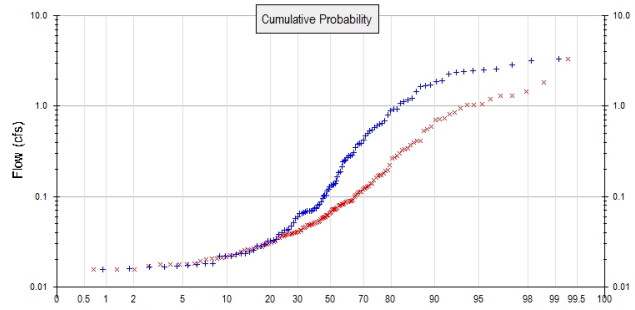
6.3556	0.129	0.820	7.152	0.069
6.4278	0.129	0.830	8.858	0.069
6.5000	0.129	0.839	10.63	0.069
6.5722	0.129	0.848	12.43	0.069
6.6444	0.000	0.000	14.21	0.000

Analysis Results

POC 1



+ Predeveloped x Mitigated



Predeveloped Landuse Totals for POC #1

Total Pervious Area: 7.32
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1

Total Pervious Area: 4.73
Total Impervious Area: 3.62

Flow Frequency Method: Weibull

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.928421
5 year	2.32462
10 year	2.555393
25 year	3.198971

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.401586
5 year	1.036773
10 year	1.305946
25 year	1.842321

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.1295	363	399	109	Pass
0.1616	307	308	100	Pass
0.1937	259	267	103	Pass
0.2258	225	246	109	Pass
0.2579	207	223	107	Pass
0.2900	186	201	108	Pass
0.3221	180	181	100	Pass
0.3542	174	156	89	Pass
0.3864	163	140	85	Pass
0.4185	153	125	81	Pass
0.4506	145	116	80	Pass
0.4827	135	111	82	Pass
0.5148	125	111	88	Pass
0.5469	117	105	89	Pass
0.5790	111	100	90	Pass
0.6111	102	92	90	Pass
0.6432	96	86	89	Pass
0.6753	86	85	98	Pass
0.7074	78	80	102	Pass
0.7396	74	77	104	Pass
0.7717	71	72	101	Pass
0.8038	64	65	101	Pass
0.8359	62	62	100	Pass
0.8680	59	59	100	Pass
0.9001	55	52	94	Pass
0.9322	53	49	92	Pass
0.9643	49	43	87	Pass
0.9964	46	41	89	Pass
1.0285	46	35	76	Pass
1.0606	45	31	68	Pass
1.0928	41	29	70	Pass
1.1249	40	28	70	Pass
1.1570	39	28	71	Pass
1.1891	37	27	72	Pass
1.2212	36	25	69	Pass
1.2533	35	24	68	Pass
1.2854	34	23	67	Pass
1.3175	34	19	55	Pass
1.3496	33	18	54	Pass
1.3817	32	17	53	Pass
1.4138	31	17	54	Pass
1.4460	29	16	55	Pass
1.4781	28	16	57	Pass
1.5102	28	16	57	Pass
1.5423	28	12	42	Pass
1.5744	28	12	42	Pass
1.6065	28	11	39	Pass
1.6386	28	10	35	Pass
1.6707	27	10	37	Pass
1.7028	26	10	38	Pass
1.7349	25	10	40	Pass
1.7671	25	10	40	Pass
1.7992	25	10	40	Pass

1.8313	24	10	41	Pass
1.8634	24	9	37	Pass
1.8955	22	9	40	Pass
1.9276	21	8	38	Pass
1.9597	20	7	35	Pass
1.9918	19	7	36	Pass
2.0239	18	7	38	Pass
2.0560	18	7	38	Pass
2.0881	17	6	35	Pass
2.1203	17	5	29	Pass
2.1524	14	5	35	Pass
2.1845	14	4	28	Pass
2.2166	14	4	28	Pass
2.2487	14	4	28	Pass
2.2808	12	4	33	Pass
2.3129	12	4	33	Pass
2.3450	12	4	33	Pass
2.3771	11	4	36	Pass
2.4092	11	4	36	Pass
2.4413	10	3	30	Pass
2.4735	8	3	37	Pass
2.5056	7	3	42	Pass
2.5377	6	3	50	Pass
2.5698	6	3	50	Pass
2.6019	4	3	75	Pass
2.6340	4	3	75	Pass
2.6661	4	3	75	Pass
2.6982	4	3	75	Pass
2.7303	4	2	50	Pass
2.7624	4	2	50	Pass
2.7946	4	2	50	Pass
2.8267	4	2	50	Pass
2.8588	4	2	50	Pass
2.8909	3	2	66	Pass
2.9230	2	2	100	Pass
2.9551	2	2	100	Pass
2.9872	2	2	100	Pass
3.0193	2	2	100	Pass
3.0514	2	2	100	Pass
3.0835	2	2	100	Pass
3.1156	2	2	100	Pass
3.1478	2	2	100	Pass
3.1799	2	1	50	Pass
3.2120	1	1	100	Pass
3.2441	1	1	100	Pass
3.2762	1	1	100	Pass
3.3083	1	1	100	Pass

Model Default Modifications

Total of 0 changes have been made.

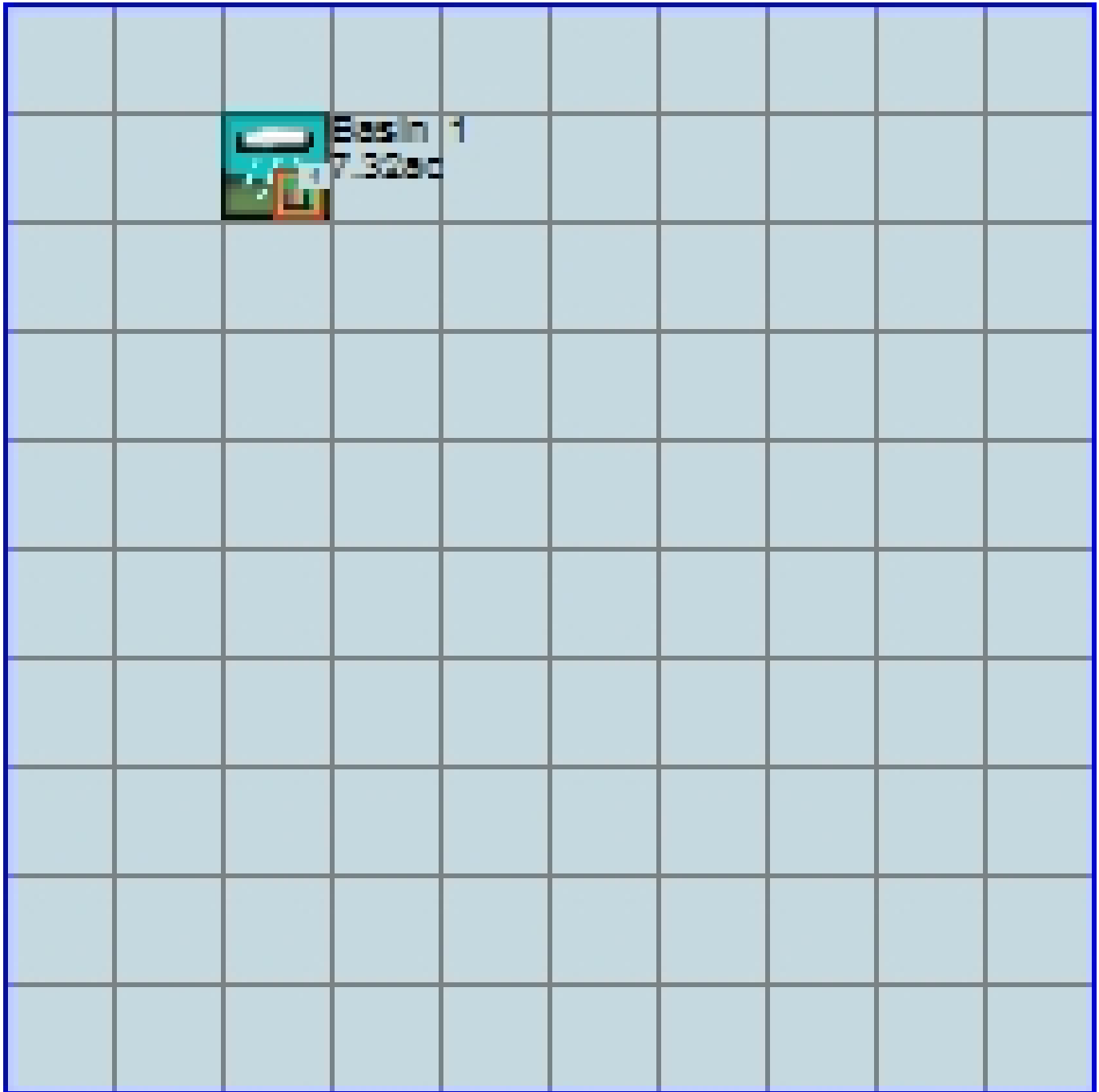
PERLND Changes

No PERLND changes have been made.

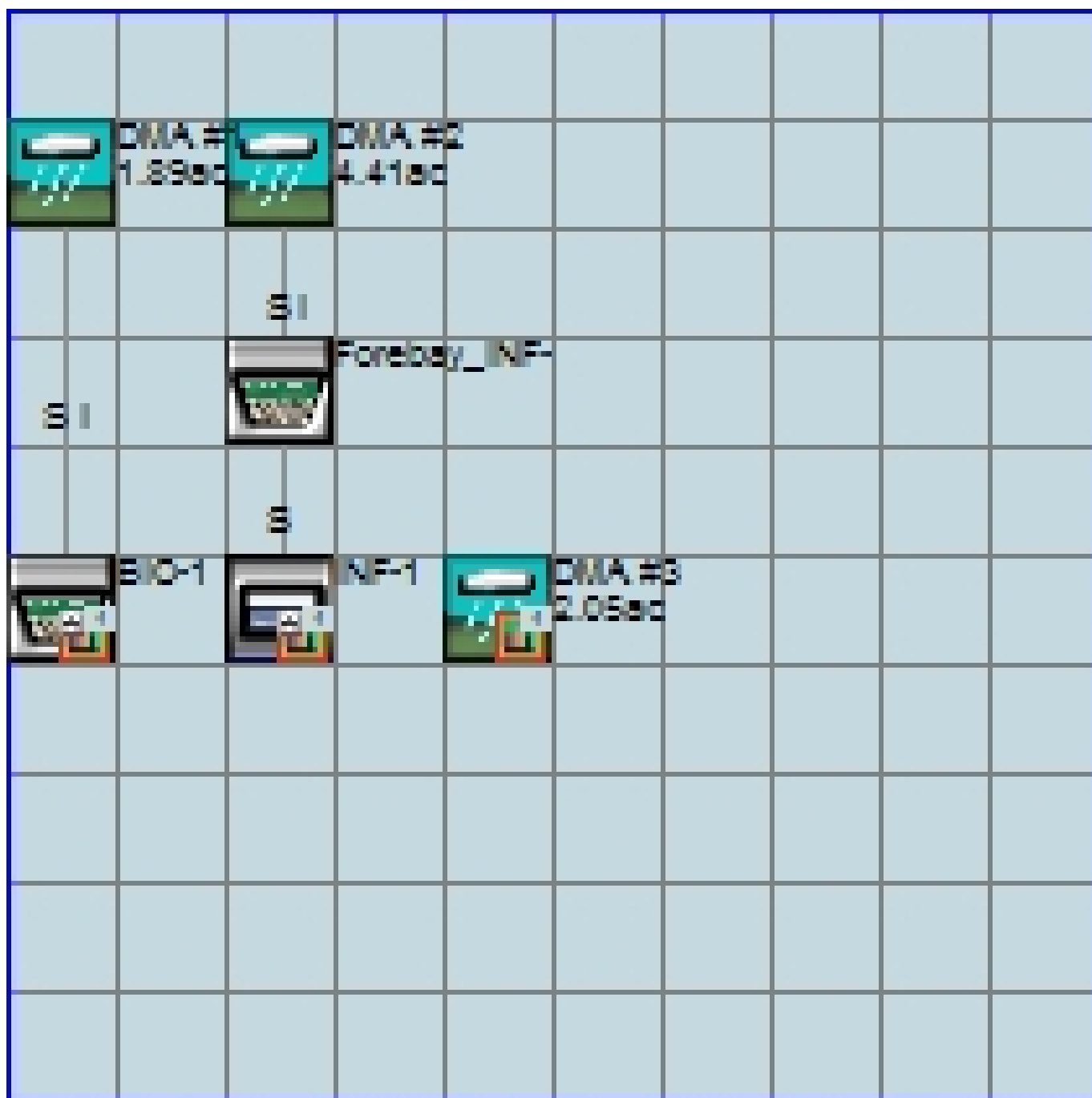
IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic



Mitigated Schematic



Predeveloped UCI File

RUN

GLOBAL

WWM4 model simulation
START 1964 10 01 END 2004 09 30
RUN INTERP OUTPUT LEVEL 3 0
RESUME 0 RUN 1 UNIT SYSTEM 1
END GLOBAL

FILES

<File>	<Un#>	<-----File Name----->	***
<-ID->			***
WDM	26	Bio_Vault_BMP#2Final.wdm	
MESSU	25	PreBio_Vault_BMP#2Final.MES	
	27	PreBio_Vault_BMP#2Final.L61	
	28	PreBio_Vault_BMP#2Final.L62	
	30	POCBio_Vault_BMP#2Final1.dat	

END FILES

OPN SEQUENCE

INGRP INDELT 00:60

PERLND 10
PERLND 11
PERLND 12
COPY 501
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

#	-	#	<-----Title----->	***	TRAN	PIVL	DIG1	FIL1	PYR	DIG2	FIL2	YRND
1			Basin 1		MAX				1	2	30	9

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES

#	-	#	NPT	NMN	***
1			1	1	
501			1	1	

END TIMESERIES

END COPY

GENER

OPCODE

OPCD ***

END OPCODE

PARM

K ***

END PARM

END GENER

PERLND

GEN-INFO

<PLS >	<-----Name----->	NBLKS	Unit-systems	Printer	***	
#	-	#	User	t-series	Engl Metr	***
				in	out	***

10			B,NatVeg,Flat	1	1	1	1	27	0
11			B,NatVeg,Moderate	1	1	1	1	27	0
12			B,NatVeg,Steep	1	1	1	1	27	0

END GEN-INFO

*** Section PWATER***

ACTIVITY

<PLS >	*****	Active	Sections	*****											
#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
10			0	0	1	0	0	0	0	0	0	0	0	0	
11			0	0	1	0	0	0	0	0	0	0	0	0	
12			0	0	1	0	0	0	0	0	0	0	0	0	

END ACTIVITY

```

PRINT-INFO
<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
10      0      0      4      0      0      0      0      0      0      0      0      0      0      1      9
11      0      0      4      0      0      0      0      0      0      0      0      0      0      1      9
12      0      0      4      0      0      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

```

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
10      0      1      1      1      0      0      0      0      1      1      0
11      0      1      1      1      0      0      0      0      1      1      0
12      0      1      1      1      0      0      0      0      1      1      0
END PWAT-PARM1

```

```

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARV AGWRC
10      0      5      0.07      200      0.05      2.5      0.915
11      0      4.7      0.055      175      0.1      2.5      0.915
12      0      4.4      0.04      150      0.15      2.5      0.915
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
10      0      0      2      2      0      0.05      0.05
11      0      0      2      2      0      0.05      0.05
12      0      0      2      2      0      0.05      0.05
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
10      0      0.6      0.2      1.5      0.7      0
11      0      0.6      0.2      1.5      0.7      0
12      0      0.6      0.2      1.5      0.7      0
END PWAT-PARM4

```

```

MON-LZETPARM
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
10      0.4      0.4      0.4      0.4      0.6      0.6      0.6      0.6      0.6      0.4      0.4      0.4
11      0.4      0.4      0.4      0.4      0.6      0.6      0.6      0.6      0.6      0.4      0.4      0.4
12      0.4      0.4      0.4      0.4      0.6      0.6      0.6      0.6      0.6      0.4      0.4      0.4
END MON-LZETPARM

```

```

MON-INTERCEP
<PLS > PWATER input info: Part 3 ***
# - # JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC ***
10      0.1      0.1      0.1      0.1      0.06      0.06      0.06      0.06      0.06      0.1      0.1      0.1
11      0.1      0.1      0.1      0.1      0.06      0.06      0.06      0.06      0.06      0.1      0.1      0.1
12      0.1      0.1      0.1      0.1      0.06      0.06      0.06      0.06      0.06      0.1      0.1      0.1
END MON-INTERCEP

```

```

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
10      0      0      0.01      0      0.4      0.01      0
11      0      0      0.01      0      0.4      0.01      0
12      0      0      0.01      0      0.4      0.01      0
END PWAT-STATE1

```

END PERLND

IMPLND

```

GEN-INFO
<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out ***

```

END GEN-INFO


```

*** Section IWATER***

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
END ACTIVITY

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
END PRINT-INFO

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
END IWAT-PARM2

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
END IWAT-PARM3

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->
<Name> #
Basin 1***
PERLND 10 1.06 COPY 501 12
PERLND 10 1.06 COPY 501 13
PERLND 11 4.3 COPY 501 12
PERLND 11 4.3 COPY 501 13
PERLND 12 1.96 COPY 501 12
PERLND 12 1.96 COPY 501 13

*****Routing*****
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><-Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
COPY 501 OUTPUT MEAN 1 1 12.1 DISPLY 1 INPUT TIMSER 1

<-Volume-> <-Grp> <-Member-><-Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
END NETWORK

RCHRES
GEN-INFO
RCHRES Name Nexits Unit Systems Printer ***
# - #<-----><----> User T-series Engl Metr LKFG ***
in out ***

END GEN-INFO
*** Section RCHRES***

ACTIVITY
<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***

```

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Mitigated UCI File

RUN

GLOBAL

WWM4 model simulation
START 1964 10 01 END 2004 09 30
RUN INTERP OUTPUT LEVEL 3 0
RESUME 0 RUN 1 UNIT SYSTEM 1
END GLOBAL

FILES

<File> <Un#> <-----File Name----->***
<-ID-> ***
WDM 26 Bio_Vault_BMP#2Final.wdm
MESSU 25 MitBio_Vault_BMP#2Final.MES
27 MitBio_Vault_BMP#2Final.L61
28 MitBio_Vault_BMP#2Final.L62
30 POCBio_Vault_BMP#2Final1.dat

END FILES

OPN SEQUENCE

INGRP INDELT 00:60

PERLND 41
PERLND 54
PERLND 40
IMPLND 1
PERLND 11
GENER 2
RCHRES 1
RCHRES 2
GENER 4
RCHRES 3
RCHRES 4
RCHRES 5
COPY 1
COPY 501
COPY 601
DISPLY 1

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INF01

- #<-----Title----->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND
1 Surface BIO-1 MAX 1 2 30 9

END DISPLY-INF01

END DISPLY

COPY

TIMESERIES

- # NPT NMN ***
1 1 1
501 1 1
601 1 1

END TIMESERIES

END COPY

GENER

OPCODE

OPCODE ***
2 24
4 24

END OPCODE

PARM

K ***
2 0.
4 0.

END PARM

END GENER

PERLND

GEN-INFO

<PLS ><-----Name----->NBLKS Unit-systems Printer ***

#	-	#	User	t-series	Engl	Metr	***
				in	out		***
41		B, Urban, Moderate	1	1	1	27	0
54		B, UrbNoIrr, Steep	1	1	1	27	0
40		B, Urban, Flat	1	1	1	27	0
11		B, NatVeg, Moderate	1	1	1	27	0

END GEN-INFO
*** Section PWATER***

ACTIVITY

#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	***
41			0	0	1	0	0	0	0	0	0	0	0	0	
54			0	0	1	0	0	0	0	0	0	0	0	0	
40			0	0	1	0	0	0	0	0	0	0	0	0	
11			0	0	1	0	0	0	0	0	0	0	0	0	

END ACTIVITY

PRINT-INFO

#	-	#	ATMP	SNOW	PWAT	SED	PST	PWG	PQAL	MSTL	PEST	NITR	PHOS	TRAC	PIVL	PYR
41			0	0	4	0	0	0	0	0	0	0	0	0	1	9
54			0	0	4	0	0	0	0	0	0	0	0	0	1	9
40			0	0	4	0	0	0	0	0	0	0	0	0	1	9
11			0	0	4	0	0	0	0	0	0	0	0	0	1	9

END PRINT-INFO

PWAT-PARM1

#	-	#	CSNO	RTOP	UZFG	VCS	VUZ	VNN	VIFW	VIRC	VLE	INFC	HWT	***
41			0	1	1	1	0	0	0	0	1	1	0	
54			0	1	1	1	0	0	0	0	1	1	0	
40			0	1	1	1	0	0	0	0	1	1	0	
11			0	1	1	1	0	0	0	0	1	1	0	

END PWAT-PARM1

PWAT-PARM2

#	-	#	***FOREST	LZSN	INFILT	LSUR	SLSUR	KVARY	AGWRC
41			0	4.7	0.055	175	0.1	2.5	0.915
54			0	4.4	0.04	150	0.15	2.5	0.915
40			0	5	0.07	200	0.05	2.5	0.915
11			0	4.7	0.055	175	0.1	2.5	0.915

END PWAT-PARM2

PWAT-PARM3

#	-	#	***PETMAX	PETMIN	INFEXP	INFILD	DEEPFR	BASETP	AGWETP
41			0	0	2	2	0	0.05	0.05
54			0	0	2	2	0	0.05	0.05
40			0	0	2	2	0	0.05	0.05
11			0	0	2	2	0	0.05	0.05

END PWAT-PARM3

PWAT-PARM4

#	-	#	CEPSC	UZSN	NSUR	INTFW	IRC	LZETP	***
41			0	0.6	0.2	1.5	0.7	0	
54			0	0.6	0.2	1.5	0.7	0	
40			0	0.6	0.2	1.5	0.7	0	
11			0	0.6	0.2	1.5	0.7	0	

END PWAT-PARM4

MON-LZETPARM

#	-	#	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	***
41			0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	
54			0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	
40			0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	
11			0.4	0.4	0.4	0.4	0.6	0.6	0.6	0.6	0.6	0.4	0.4	0.4	

END MON-LZETPARM
MON-INTERCEP

```

      <PLS >          PWATER input info: Part 3          ***
# - #   JAN   FEB   MAR   APR   MAY   JUN   JUL   AUG   SEP   OCT   NOV   DEC   ***
41      0.1   0.1   0.1   0.1  0.06  0.06  0.06  0.06  0.06  0.1   0.1   0.1
54      0.1   0.1   0.1   0.1  0.06  0.06  0.06  0.06  0.06  0.1   0.1   0.1
40      0.1   0.1   0.1   0.1  0.06  0.06  0.06  0.06  0.06  0.1   0.1   0.1
11      0.1   0.1   0.1   0.1  0.06  0.06  0.06  0.06  0.06  0.1   0.1   0.1
END MON-INTERCEP

PWAT-STATE1
  <PLS > *** Initial conditions at start of simulation
              ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - #   ***   CEPS      SURS      UZS      IFWS      LZS      AGWS      GWVS
41      0      0      0.15      0      1      0.05      0
54      0      0      0.01      0      0.4      0.01      0
40      0      0      0.15      0      1      0.05      0
11      0      0      0.01      0      0.4      0.01      0
END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-----Name----->   Unit-systems   Printer ***
    # - #                       User   t-series   Engl Metr ***
                                in    out
    1      IMPERVIOUS-FLAT      1      1      1      27      0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ***** Active Sections *****
    # - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
    1      0      0      1      0      0      0
  END ACTIVITY

  PRINT-INFO
    <ILS > ***** Print-flags ***** PIVL  PYR
    # - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
    1      0      0      4      0      0      0      1      9
  END PRINT-INFO

  IWAT-PARM1
    <PLS > IWATER variable monthly parameter value flags ***
    # - # CSNO RTOP  VRS  VNN RTLI  ***
    1      0      0      0      0      1
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >          IWATER input info: Part 2          ***
    # - #   ***   LSUR      SLSUR      NSUR      RETSC
    1      100      0.05      0.05      0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >          IWATER input info: Part 3          ***
    # - #   ***PETMAX      PETMIN
    1      0      0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # - #   ***   RETS      SURS
    1      0      0
  END IWAT-STATE1

END IMPLND

SCHEMATIC
<-Source->          <-Area-->          <-Target->      MBLK      ***
<Name>   #          <-factor->        <Name>   #      Tbl#      ***

```

```

DMA #2***
PERLND 41      0.05      RCHRES 1      2
PERLND 41      0.05      RCHRES 1      3
PERLND 54      0.79      RCHRES 1      2
PERLND 54      0.79      RCHRES 1      3
PERLND 40      0.65      RCHRES 1      2
PERLND 40      0.65      RCHRES 1      3
IMPLND 1       2.92      RCHRES 1      5
DMA #1***
PERLND 41      0.14      RCHRES 3      2
PERLND 41      0.14      RCHRES 3      3
PERLND 54      0.93      RCHRES 3      2
PERLND 54      0.93      RCHRES 3      3
PERLND 40      0.12      RCHRES 3      2
PERLND 40      0.12      RCHRES 3      3
IMPLND 1       0.7       RCHRES 3      5
DMA #3***
PERLND 11      1.73      COPY 501     12
PERLND 11      1.73      COPY 601     12
PERLND 11      1.73      COPY 501     13
PERLND 11      1.73      COPY 601     13
PERLND 54      0.32      COPY 501     12
PERLND 54      0.32      COPY 601     12
PERLND 54      0.32      COPY 501     13
PERLND 54      0.32      COPY 601     13

```

*****Routing*****

```

RCHRES 1      1      RCHRES 5      7
RCHRES 1      1      COPY 1      17
RCHRES 1      1      RCHRES 2      8
PERLND 41      0.14      COPY 1      12
PERLND 54      0.93      COPY 1      12
PERLND 40      0.12      COPY 1      12
IMPLND 1       0.7       COPY 1      15
PERLND 41      0.14      COPY 1      13
PERLND 54      0.93      COPY 1      13
PERLND 40      0.12      COPY 1      13
RCHRES 3      1      RCHRES 4      8
RCHRES 4      1      COPY 501     17
RCHRES 3      1      COPY 501     17
RCHRES 5      1      COPY 501     17
END SCHEMATIC

```

NETWORK

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
COPY 501 OUTPUT MEAN 1 1 12.1 DISPLY 1 INPUT TIMSER 1
GENER 2 OUTPUT TIMSER .0002778 RCHRES 1 EXTNL OUTDGT 1
GENER 4 OUTPUT TIMSER .0002778 RCHRES 3 EXTNL OUTDGT 1

```

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
END NETWORK

```

RCHRES

GEN-INFO

```

RCHRES      Name      Nexits      Unit Systems      Printer      ***
# - #<-----><----> User T-series Engl Metr LKFG      ***
1      Surface orebay_I-004      3      1      1      1      28      0      1
2      Forebay_INF-1      1      1      1      1      28      0      1
3      Surface BIO-1      3      1      1      1      28      0      1
4      BIO-1      2      1      1      1      28      0      1
5      INF-1      2      1      1      1      28      0      1

```

END GEN-INFO

*** Section RCHRES***

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
1      1      0      0      0      0      0      0      0      0
2      1      0      0      0      0      0      0      0      0
3      1      0      0      0      0      0      0      0      0
4      1      0      0      0      0      0      0      0      0
5      1      0      0      0      0      0      0      0      0
END ACTIVITY

PRINT-INFO
<PLS > ***** Print-flags ***** PIVL  PYR
# - # HYDR ADCA CONS HEAT SED  GQL OXRX  NUTR PLNK PHCB PIVL  PYR  *****
1      4      0      0      0      0      0      0      0      0      1      9
2      4      0      0      0      0      0      0      0      0      1      9
3      4      0      0      0      0      0      0      0      0      1      9
4      4      0      0      0      0      0      0      0      0      1      9
5      4      0      0      0      0      0      0      0      0      1      9
END PRINT-INFO

HYDR-PARM1
RCHRES  Flags for each HYDR Section
# - # VC A1 A2 A3 ODFVFG for each *** ODGTFG for each  FUNCT for each
      FG FG FG FG possible exit *** possible exit
      * * * * * * * * * *
1      0  1  0  0      4  5  6  0  0      0  1  0  0  0      2  1  2  2  2
2      0  1  0  0      4  0  0  0  0      0  0  0  0  0      2  2  2  2  2
3      0  1  0  0      4  5  6  0  0      0  1  0  0  0      2  1  2  2  2
4      0  1  0  0      4  5  0  0  0      0  0  0  0  0      2  2  2  2  2
5      0  1  0  0      4  5  0  0  0      0  0  0  0  0      2  2  2  2  2
END HYDR-PARM1

HYDR-PARM2
# - # FTABNO      LEN      DELTH      STCOR      KS      DB50      ***
<-----><-----><-----><-----><-----><-----><----->
1      1      0.01      0.0      0.0      0.5      0.0
2      2      0.03      0.0      0.0      0.5      0.0
3      3      0.01      0.0      0.0      0.5      0.0
4      4      0.03      0.0      0.0      0.5      0.0
5      5      0.01      0.0      0.0      0.5      0.0
END HYDR-PARM2

HYDR-INIT
RCHRES  Initial conditions for each HYDR section
# - # *** VOL      Initial value of COLIND      Initial value of OUTDGT
      *** ac-ft      for each possible exit      for each possible exit
<-----><----->      <-----><-----><-----><-----><-----> *** <-----><-----><-----><-----><----->
1      0      4.0  5.0  6.0  0.0  0.0      0.0  0.0  0.0  0.0  0.0
2      0      4.0  0.0  0.0  0.0  0.0      0.0  0.0  0.0  0.0  0.0
3      0      4.0  5.0  6.0  0.0  0.0      0.0  0.0  0.0  0.0  0.0
4      0      4.0  5.0  0.0  0.0  0.0      0.0  0.0  0.0  0.0  0.0
5      0      4.0  5.0  0.0  0.0  0.0      0.0  0.0  0.0  0.0  0.0
END HYDR-INIT
END RCHRES

SPEC-ACTIONS
*** User-Defined Variable Quantity Lines
***
***      <----->
*** kwd  varnam  optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
<****> <-----> <-----> <-> <-----><-----><-----><-----><-----> <-><-> <-><-> <-> ***
UVQUAN  vol2    RCHRES  2  VOL      4
UVQUAN  v2m2    GLOBAL      WORKSP  1      3
UVQUAN  vpo2    GLOBAL      WORKSP  2      3
UVQUAN  v2d2    GENER  2  K      1      3
*** User-Defined Variable Quantity Lines
***
***      <----->
*** kwd  varnam  optyp  opn  vari  s1 s2 s3 tp multiply  lc ls ac as agfn ***
<****> <-----> <-----> <-> <-----><-----><-----><-----><-----> <-><-> <-><-> <-> ***
UVQUAN  vol4    RCHRES  4  VOL      4
UVQUAN  v2m4    GLOBAL      WORKSP  3      3

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UVQUAN vpo4    GLOBAL    WORKSP  4          3
UVQUAN v2d4    GENER    4 K      1          3
*** User-Defined Target Variable Names
***          addr or
***          <----->
*** kwd      varnam ct   vari  s1 s2 s3  frac oper
<****> <-----><-> <-----><-><-><-> <----> <-->
UVNAME v2m2    1 WORKSP  1          1.0 QUAN
UVNAME vpo2    1 WORKSP  2          1.0 QUAN
UVNAME v2d2    1 K      1          1.0 QUAN
*** User-Defined Target Variable Names
***          addr or
***          <----->
*** kwd      varnam ct   vari  s1 s2 s3  frac oper
<****> <-----><-> <-----><-><-><-> <----> <-->
UVNAME v2m4    1 WORKSP  3          1.0 QUAN
UVNAME vpo4    1 WORKSP  4          1.0 QUAN
UVNAME v2d4    1 K      1          1.0 QUAN
*** opt foplop dcdts  yr mo dy hr mn d t  vnam  s1 s2 s3 ac quantity  tc  ts rp
<****><-><-----><-><-><-> <> <> <> <><><> <-----><-><-><-><-><-><-><-> <> <-><->
GENER 2          v2m2          = 4035.
*** Compute remaining available pore space
GENER 2          vpo2          = v2m2
GENER 2          vpo2          -= vol2
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo2 < 0.0) THEN
GENER 2          vpo2          = 0.0
END IF
*** Infiltration volume
GENER 2          v2d2          = vpo2
*** opt foplop dcdts  yr mo dy hr mn d t  vnam  s1 s2 s3 ac quantity  tc  ts rp
<****><-><-----><-><-><-> <> <> <> <><><> <-----><-><-><-><-><-><-><-> <> <-><->
GENER 4          v2m4          = 7460.
*** Compute remaining available pore space
GENER 4          vpo4          = v2m4
GENER 4          vpo4          -= vol4
*** Check to see if VPORA goes negative; if so set VPORA = 0.0
IF (vpo4 < 0.0) THEN
GENER 4          vpo4          = 0.0
END IF
*** Infiltration volume
GENER 4          v2d4          = vpo4
END SPEC-ACTIONS
FTABLES
FTABLE 2
50 4
Depth Area Volume Outflow1 Velocity Travel Time***
(ft) (acres) (acre-ft) (cfs) (ft/sec) (Minutes)***
0.000000 0.135434 0.000000 0.000000
0.035714 0.135434 0.002032 0.000000
0.071429 0.135434 0.004063 0.000000
0.107143 0.135434 0.006095 0.000000
0.142857 0.135434 0.008126 0.000000
0.178571 0.135434 0.010158 0.000000
0.214286 0.135434 0.012189 0.000000
0.250000 0.135434 0.014221 0.000000
0.285714 0.135434 0.016252 0.000000
0.321429 0.135434 0.018284 0.000000
0.357143 0.135434 0.020315 0.000000
0.392857 0.135434 0.022347 0.000000
0.428571 0.135434 0.024378 0.000000
0.464286 0.135434 0.026410 0.000000
0.500000 0.135434 0.028441 0.000000
0.535714 0.135434 0.030473 0.000000
0.571429 0.135434 0.032504 0.000000
0.607143 0.135434 0.034536 0.000000
0.642857 0.135434 0.036567 0.000000
0.678571 0.135434 0.038599 0.000000
0.714286 0.135434 0.040630 0.000000
0.750000 0.135434 0.042662 0.000000

```


0.785714	0.135434	0.044693	0.000000
0.821429	0.135434	0.046725	0.000000
0.857143	0.135434	0.048756	0.000000
0.892857	0.135434	0.050788	0.000000
0.928571	0.135434	0.052819	0.000000
0.964286	0.135434	0.054851	0.000000
1.000000	0.135434	0.056882	0.000000
1.035714	0.135434	0.058914	0.000000
1.071429	0.135434	0.060945	0.000000
1.107143	0.135434	0.062977	0.000000
1.142857	0.135434	0.065008	0.000000
1.178571	0.135434	0.067040	0.000000
1.214286	0.135434	0.069071	0.000000
1.250000	0.135434	0.071103	0.000000
1.285714	0.135434	0.073134	0.000000
1.321429	0.135434	0.075166	0.000000
1.357143	0.135434	0.077197	0.000000
1.392857	0.135434	0.079229	0.000000
1.428571	0.135434	0.081260	0.000000
1.464286	0.135434	0.083292	0.000000
1.500000	0.135434	0.085323	0.000000
1.535714	0.135434	0.087355	0.000000
1.571429	0.135434	0.089386	0.000000
1.607143	0.135434	0.091418	0.000000
1.642857	0.135434	0.093449	0.000000
1.678571	0.135434	0.095481	0.000000
1.714286	0.135434	0.097512	0.000000
1.750000	0.135434	0.209042	0.000000

END FTABLE 2

FTABLE 1

44 6

Time***	Depth (ft) (Minutes)***	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	outflow 3 (cfs)	Velocity (ft/sec)	Travel
0.000000	0.135434	0.000000	0.000000	0.000000	0.000000	0.000000		
0.035714	0.136206	0.004851	0.000000	0.713207	0.000000			
0.071429	0.136979	0.009729	0.000000	0.727471	0.000000			
0.107143	0.137753	0.014635	0.000000	0.741735	0.000000			
0.142857	0.138529	0.019569	0.000000	0.755999	0.000000			
0.178571	0.139305	0.024530	0.000000	0.770263	0.000000			
0.214286	0.140082	0.029519	0.000000	0.784527	0.000000			
0.250000	0.140861	0.034536	0.000000	0.798791	0.000000			
0.285714	0.141640	0.039580	0.000000	0.813056	0.000000			
0.321429	0.142421	0.044653	0.000000	0.827320	0.000000			
0.357143	0.143203	0.049753	0.000000	0.841584	0.000000			
0.392857	0.143985	0.054882	0.000000	0.855848	0.000000			
0.428571	0.144769	0.060038	0.000000	0.870112	0.000000			
0.464286	0.145554	0.065222	0.000000	0.884376	0.000000			
0.500000	0.146340	0.070435	0.000000	0.898640	0.000000			
0.535714	0.147126	0.075675	0.179084	0.912904	0.000000			
0.571429	0.147914	0.080944	0.506220	0.927169	0.000000			
0.607143	0.148703	0.086241	0.929454	0.941433	0.000000			
0.642857	0.149493	0.091566	1.429978	0.955697	0.000000			
0.678571	0.150284	0.096919	1.996469	0.969961	0.000000			
0.714286	0.151077	0.102300	2.620689	0.984225	0.000000			
0.750000	0.151870	0.107710	3.295889	0.998489	0.000000			
0.785714	0.152664	0.113148	4.016068	1.012753	0.000000			
0.821429	0.153459	0.118615	4.775583	1.027018	0.000000			
0.857143	0.154256	0.124109	5.568926	1.041282	0.000000			
0.892857	0.155053	0.129633	6.390605	1.055546	0.000000			
0.928571	0.155852	0.135185	7.235071	1.069810	0.000000			
0.964286	0.156651	0.140765	8.096695	1.084074	0.000000			
1.000000	0.157452	0.146374	8.969763	1.098338	0.000000			
1.035714	0.158253	0.152012	9.848496	1.112602	0.000000			
1.071429	0.159056	0.157678	10.72708	1.126866	0.000000			
1.107143	0.159860	0.163373	11.59973	1.141131	0.000000			
1.142857	0.160665	0.169096	12.46070	1.155395	0.000000			
1.178571	0.161471	0.174849	13.30440	1.169659	0.000000			
1.214286	0.162277	0.180630	14.12545	1.183923	0.000000			

1.250000	0.163085	0.186440	14.91876	1.198187	0.000000
1.285714	0.163894	0.192279	15.67959	1.212451	0.000000
1.321429	0.164704	0.198147	16.40368	1.226715	0.000000
1.357143	0.165516	0.204044	17.08735	1.240980	0.000000
1.392857	0.166328	0.209969	17.72755	1.255244	0.000000
1.428571	0.167141	0.215924	18.32203	1.269508	0.000000
1.464286	0.167955	0.221908	18.86940	1.283772	0.000000
1.500000	0.168771	0.227921	19.36929	1.298036	0.000000
1.500000	0.168771	0.227921	19.82244	1.298036	0.000000

END FTABLE 1

FTABLE 4

64 5

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.133384	0.000000	0.000000	0.000000		
0.052198	0.133384	0.002924	0.000000	0.000000		
0.104396	0.133384	0.005848	0.000000	0.000000		
0.156593	0.133384	0.008773	0.000000	0.000000		
0.208791	0.133384	0.011697	0.000000	0.000883		
0.260989	0.133384	0.014621	0.000000	0.002021		
0.313187	0.133384	0.017545	0.000000	0.003834		
0.365385	0.133384	0.020469	0.000000	0.006431		
0.417582	0.133384	0.023393	0.000000	0.009909		
0.469780	0.133384	0.026318	0.000000	0.014353		
0.521978	0.133384	0.029242	0.000000	0.019841		
0.574176	0.133384	0.032166	0.000000	0.026447		
0.626374	0.133384	0.035090	0.000000	0.034239		
0.678571	0.133384	0.038014	0.000000	0.043281		
0.730769	0.133384	0.040939	0.000000	0.053635		
0.782967	0.133384	0.043863	0.000000	0.065359		
0.835165	0.133384	0.046787	0.000000	0.069938		
0.887363	0.133384	0.049711	0.000000	0.069938		
0.939560	0.133384	0.052635	0.000000	0.069938		
0.991758	0.133384	0.055559	0.000000	0.069938		
1.043956	0.133384	0.058484	0.000000	0.069938		
1.096154	0.133384	0.061408	0.000000	0.069938		
1.148352	0.133384	0.064332	0.000000	0.069938		
1.200549	0.133384	0.067256	0.000000	0.069938		
1.252747	0.133384	0.070180	0.000000	0.069938		
1.304945	0.133384	0.073105	0.000000	0.069938		
1.357143	0.133384	0.076029	0.000000	0.069938		
1.409341	0.133384	0.078953	0.000000	0.069938		
1.461538	0.133384	0.081877	0.000000	0.069938		
1.513736	0.133384	0.084801	0.000000	0.069938		
1.565934	0.133384	0.087726	0.000000	0.069938		
1.618132	0.133384	0.090650	0.000000	0.069938		
1.670330	0.133384	0.093574	0.000000	0.069938		
1.722527	0.133384	0.096498	0.000000	0.069938		
1.774725	0.133384	0.099387	0.000000	0.069938		
1.826923	0.133384	0.102277	0.000000	0.069938		
1.879121	0.133384	0.105166	0.000000	0.069938		
1.931319	0.133384	0.108056	0.000000	0.069938		
1.983516	0.133384	0.110945	0.000000	0.069938		
2.035714	0.133384	0.113834	0.000000	0.069938		
2.087912	0.133384	0.116724	0.000000	0.069938		
2.140110	0.133384	0.119613	0.000000	0.069938		
2.192308	0.133384	0.122502	0.000000	0.069938		
2.244505	0.133384	0.125392	0.000000	0.069938		
2.296703	0.133384	0.128281	0.000000	0.069938		
2.348901	0.133384	0.131171	0.000000	0.069938		
2.401099	0.133384	0.134060	0.000000	0.069938		
2.453297	0.133384	0.136949	0.000000	0.069938		
2.505495	0.133384	0.139839	0.000000	0.069938		
2.557692	0.133384	0.142728	0.000000	0.069938		
2.609890	0.133384	0.145617	0.000000	0.069938		
2.662088	0.133384	0.148507	0.000000	0.069938		
2.714286	0.133384	0.151396	0.000000	0.069938		
2.766484	0.133384	0.154286	0.000000	0.069938		
2.818681	0.133384	0.157175	0.000000	0.069938		
2.870879	0.133384	0.160064	0.000000	0.069938		

2.923077	0.133384	0.162954	0.000000	0.069938
2.975275	0.133384	0.165843	0.000000	0.069938
3.027473	0.133384	0.168732	0.000000	0.069938
3.079670	0.133384	0.171622	0.000000	0.069938
3.131868	0.133384	0.174511	0.000000	0.069938
3.184066	0.133384	0.177401	0.000000	0.069938
3.236264	0.133384	0.180290	0.000000	0.069938
3.250000	0.133384	0.380206	0.000000	0.069938

END FTABLE 4

FTABLE 3

30 6

Time***	Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	outflow 3 (cfs)	Velocity (ft/sec)	Travel (Minutes)***
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0.000000	0.133384	0.000000	0.000000	0.000000	0.000000	0.000000		
0.052198	0.134535	0.006992	0.000000	0.000000	0.708895	0.000000		
0.104396	0.135688	0.014045	0.000000	0.000000	0.729427	0.000000		
0.156593	0.136843	0.021158	0.000000	0.000000	0.749959	0.000000		
0.208791	0.138000	0.028331	0.000000	0.000000	0.770491	0.000000		
0.260989	0.139160	0.035564	0.000000	0.000000	0.791023	0.000000		
0.313187	0.140322	0.042859	0.000000	0.000000	0.811555	0.000000		
0.365385	0.141487	0.050213	0.000000	0.000000	0.832087	0.000000		
0.417582	0.142653	0.057629	0.000000	0.000000	0.852619	0.000000		
0.469780	0.143822	0.065106	0.000000	0.000000	0.873151	0.000000		
0.521978	0.144993	0.072644	0.000000	0.000000	0.893683	0.000000		
0.574176	0.146166	0.080243	0.000000	0.000000	0.914215	0.000000		
0.626374	0.147342	0.087903	0.000000	0.000000	0.934747	0.000000		
0.678571	0.148520	0.095624	0.000000	0.000000	0.955279	0.000000		
0.730769	0.149700	0.103408	0.000000	0.000000	0.975811	0.000000		
0.782967	0.150882	0.111252	0.000000	0.000000	0.996343	0.000000		
0.835165	0.152066	0.119159	0.000000	0.000000	1.016875	0.000000		
0.887363	0.153253	0.127128	0.000000	0.000000	1.037407	0.000000		
0.939560	0.154442	0.135158	0.000000	0.000000	1.057939	0.000000		
0.991758	0.155634	0.143251	0.000000	0.000000	1.078471	0.000000		
1.043956	0.156827	0.151406	0.146622	1.099003	0.000000			
1.096154	0.158023	0.159623	0.473573	1.119535	0.000000			
1.148352	0.159221	0.167903	0.904125	1.140067	0.000000			
1.200549	0.160421	0.176245	1.410104	1.160599	0.000000			
1.252747	0.161624	0.184650	1.968788	1.181131	0.000000			
1.304945	0.162829	0.193118	2.557728	1.201663	0.000000			
1.357143	0.164036	0.201649	3.153809	1.222195	0.000000			
1.409341	0.165245	0.210242	3.733794	1.242727	0.000000			
1.461538	0.166457	0.218899	4.275612	1.263259	0.000000			
1.500000	0.167351	0.225319	4.760149	1.278388	0.000000			

END FTABLE 3

FTABLE 5

92 5

	Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Outflow2 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
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0.000000	0.129132	0.000000	0.000000	0.000000	0.000000		
0.072222	0.129132	0.009326	0.000000	0.000000	0.069010		
0.144444	0.129132	0.018652	0.000000	0.000000	0.069010		
0.216667	0.129132	0.027979	0.000000	0.000000	0.069010		
0.288889	0.129132	0.037305	0.000000	0.000000	0.069010		
0.361111	0.129132	0.046631	0.000000	0.000000	0.069010		
0.433333	0.129132	0.055957	0.000000	0.000000	0.069010		
0.505556	0.129132	0.065284	0.000000	0.000000	0.069010		
0.577778	0.129132	0.074610	0.000000	0.000000	0.069010		
0.650000	0.129132	0.083936	0.000000	0.000000	0.069010		
0.722222	0.129132	0.093262	0.000000	0.000000	0.069010		
0.794444	0.129132	0.102588	0.000000	0.000000	0.069010		
0.866667	0.129132	0.111915	0.000000	0.000000	0.069010		
0.938889	0.129132	0.121241	0.000000	0.000000	0.069010		
1.011111	0.129132	0.130567	0.000000	0.000000	0.069010		
1.083333	0.129132	0.139893	0.000000	0.000000	0.069010		
1.155556	0.129132	0.149219	0.000000	0.000000	0.069010		
1.227778	0.129132	0.158546	0.000000	0.000000	0.069010		
1.300000	0.129132	0.167872	0.000000	0.000000	0.069010		
1.372222	0.129132	0.177198	0.018206	0.069010			

1.444444	0.129132	0.186524	0.025747	0.069010
1.516667	0.129132	0.195851	0.031533	0.069010
1.588889	0.129132	0.205177	0.036411	0.069010
1.661111	0.129132	0.214503	0.040709	0.069010
1.733333	0.129132	0.223829	0.044595	0.069010
1.805556	0.129132	0.233155	0.048168	0.069010
1.877778	0.129132	0.242482	0.051494	0.069010
1.950000	0.129132	0.251808	0.054617	0.069010
2.022222	0.129132	0.261134	0.057572	0.069010
2.094444	0.129132	0.270460	0.060382	0.069010
2.166667	0.129132	0.279787	0.063067	0.069010
2.238889	0.129132	0.289113	0.065642	0.069010
2.311111	0.129132	0.298439	0.068120	0.069010
2.383333	0.129132	0.307765	0.070511	0.069010
2.455556	0.129132	0.317091	0.072823	0.069010
2.527778	0.129132	0.326418	0.075064	0.069010
2.600000	0.129132	0.335744	0.077240	0.069010
2.672222	0.129132	0.345070	0.079357	0.069010
2.744444	0.129132	0.354396	0.081419	0.069010
2.816667	0.129132	0.363722	0.083429	0.069010
2.888889	0.129132	0.373049	0.085392	0.069010
2.961111	0.129132	0.382375	0.087312	0.069010
3.033333	0.129132	0.391701	0.089190	0.069010
3.105556	0.129132	0.401027	0.091029	0.069010
3.177778	0.129132	0.410354	0.092831	0.069010
3.250000	0.129132	0.419680	0.094600	0.069010
3.322222	0.129132	0.429006	0.096336	0.069010
3.394444	0.129132	0.438332	0.098041	0.069010
3.466667	0.129132	0.447658	0.099717	0.069010
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3.972222	0.129132	0.512942	0.110831	0.069010
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6.283333	0.129132	0.811381	0.172090	0.069010
6.355556	0.129132	0.820707	0.174344	0.069010
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END FTABLES

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WDM	1	EVAP	ENGL	1		PERLND	1	999	EXTNL	PETINP	
WDM	1	EVAP	ENGL	1		IMPLND	1	999	EXTNL	PETINP	
WDM	22	IRRG	ENGL	0.7	SAME	PERLND	41		EXTNL	SURLI	
WDM	22	IRRG	ENGL	0.7	SAME	PERLND	40		EXTNL	SURLI	
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END EXT SOURCES

EXT TARGETS

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RCHRES	4	HYDR	0	2 1	WDM	1004	FLOW	ENGL	REPL	
RCHRES	4	HYDR	STAGE	1 1	WDM	1005	STAG	ENGL	REPL	
RCHRES	3	HYDR	STAGE	1 1	WDM	1006	STAG	ENGL	REPL	
RCHRES	3	HYDR	0	1 1	WDM	1007	FLOW	ENGL	REPL	
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COPY	501	OUTPUT	MEAN	1 1	WDM	801	FLOW	ENGL	REPL	
COPY	601	OUTPUT	MEAN	1 1	WDM	901	FLOW	ENGL	REPL	
RCHRES	5	HYDR	RO	1 1	WDM	1000	FLOW	ENGL	REPL	
RCHRES	5	HYDR	0	1 1	WDM	1008	FLOW	ENGL	REPL	
RCHRES	5	HYDR	0	2 1	WDM	1009	FLOW	ENGL	REPL	
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MASS-LINK	3							
PERLND	PWATER	IFW0	0.083333	RCHRES	INFLOW	IVOL		
END MASS-LINK	3							
MASS-LINK	5							
IMPLND	IWATER	SURO	0.083333	RCHRES	INFLOW	IVOL		
END MASS-LINK	5							
MASS-LINK	7							
RCHRES	OFLOW	OVOL	1	RCHRES	INFLOW	IVOL		
END MASS-LINK	7							
MASS-LINK	8							
RCHRES	OFLOW	OVOL	2	RCHRES	INFLOW	IVOL		
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MASS-LINK	13							
PERLND	PWATER	IFW0	0.083333	COPY	INPUT	MEAN		

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END MASS-LINK    13

MASS-LINK        15
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END MASS-LINK    15

MASS-LINK        17
RCHRES          OFLOW  OVOL    1          COPY    INPUT    MEAN
END MASS-LINK    17

END MASS-LINK

END RUN

```

Predeveloped HSPF Message File

Mitigated HSPF Message File

Disclaimer

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Local (360)943-0304

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ATTACHMENT 2b:
Hydromodification Management Exhibit



LEGEND

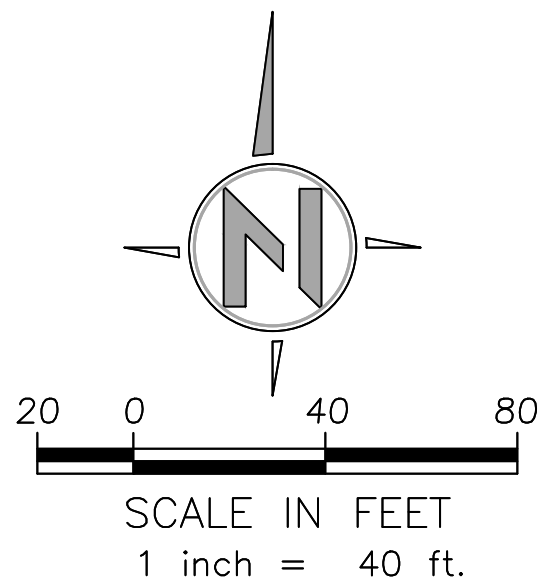
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- NEW CONCRETE PAVEMENT
- FLOW DIRECTION
- BIORETENTION BASIN
- ASPHALT PAVEMENT
- FLOODPLAIN EXTENTS
- SOIL TYPE BOUNDARY
- BASIN & AREA (AC)
- CRITICAL COURSE SEDIMENT YIELD AREA

LAND USE INFORMATION FOR SDIM ANALYSIS

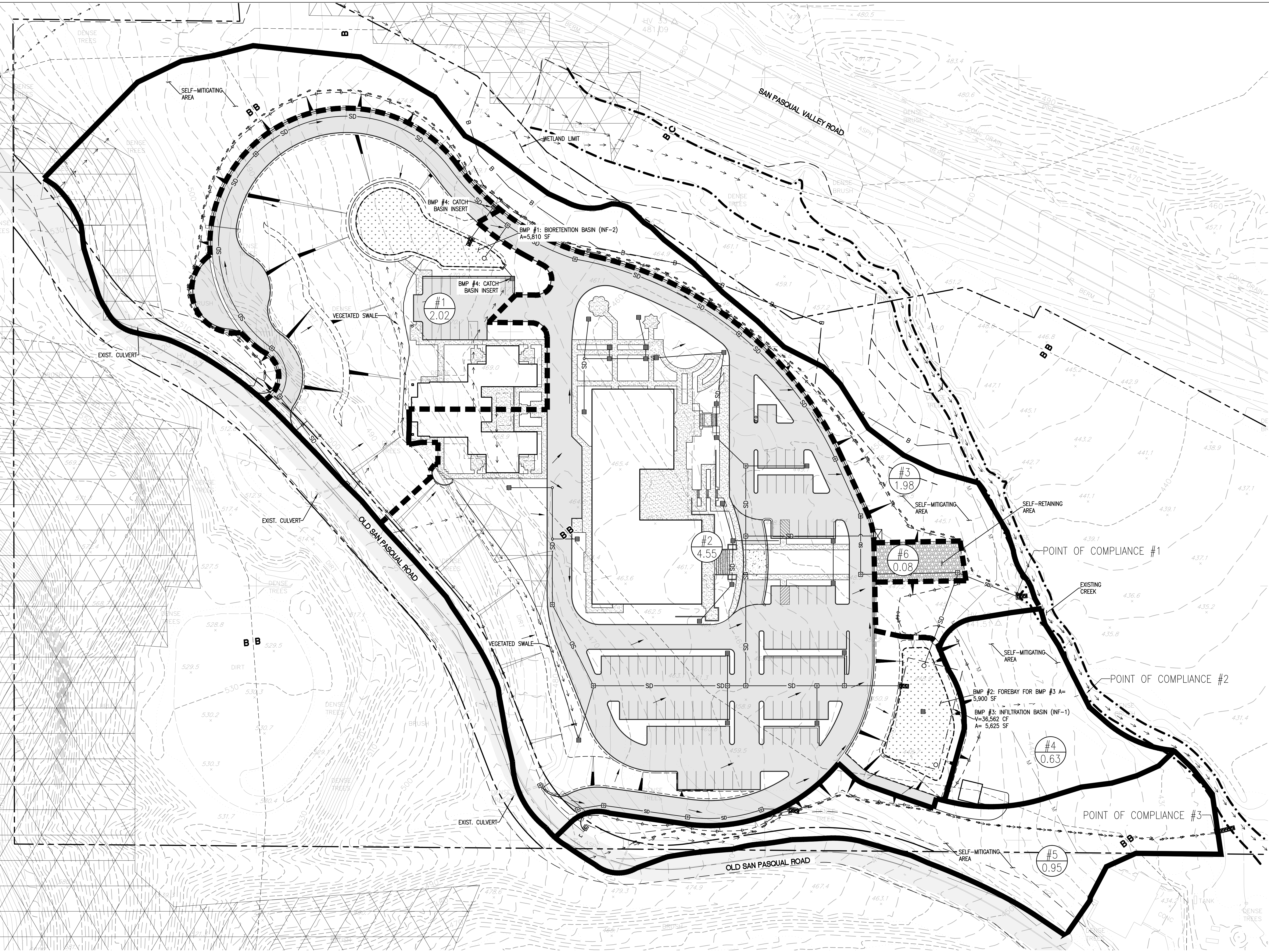
EXISTING CONDITION

BASIN #1	
PERVIOUS LANDUSE	AREA (AC)
B.NatVeg.Flat	1.06
B.NatVeg.Moderate	4.3
B.NatVeg.Steep	1.96
Total	7.32

IMPERVIOUS LANDUSE	AREA (AC)
Impervious-Flat	0
Impervious-Moderate	0
Impervious-Steep	0



EXISTING CONDITIONS
HYDROMODIFICATION EXHIBIT
SVBF TEMPLE
MARCH 2017



LEGEND

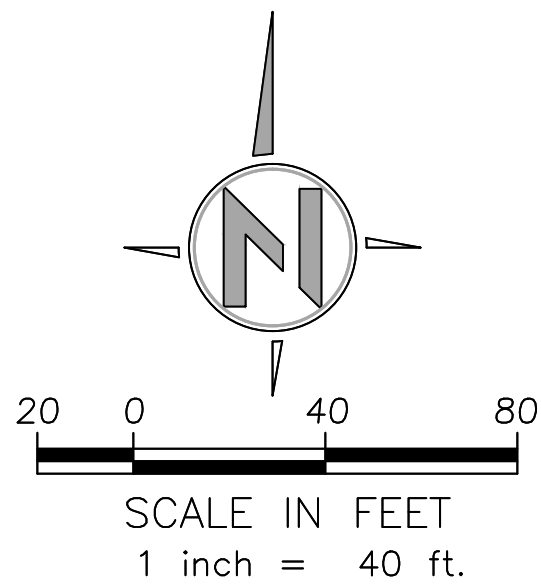
- DMA BOUNDARY
- NEW CONCRETE PAVEMENT
- FLOW DIRECTION
- BIORETENTION BASIN
- ASPHALT PAVEMENT
- GRAVEL (SELF-RETAINING)
- FLOODPLAIN EXTENTS
- SOIL TYPE BOUNDARY
- BASIN & AREA (AC)
- CRITICAL COURSE
- SEDIMENT YIELD AREA
- CONCRETE BROW DITCH (0-75)

LAND USE INFORMATION FOR SDHMA ANALYSIS

DMA 1		DMA 2	
PERVIOUS LANDUSE	AREA (AC)	PERVIOUS LANDUSE	AREA (AC)
B,Urban,FLAT	0.25	Impervious-Flat	0.7
B,Urban,Moderate	0.14	Impervious-Moderate	0
B,Urban,Steep	0.93	Impervious-Steep	0
DMA Total	2.02		

DMA 2		DMA 3	
PERVIOUS LANDUSE	AREA (AC)	PERVIOUS LANDUSE	AREA (AC)
B,Urban,FLAT	0.79	Impervious-Flat	0
B,Urban,Moderate	0.05	Impervious-Moderate	0
B,Urban,Steep	0	Impervious-Steep	0
B,Urban,Noir,Steep	0.79		
DMA Total	4.55		

DMA 3		Total Area	
PERVIOUS LANDUSE	AREA (AC)		
B,Urban,FLAT	0		
B,Urban,Moderate	0		
B,Urban,Steep	0.32		
B,NatVeg,FLAT	0		
B,NatVeg,Moderate	1.73		
B,NatVeg,Steep	0		
DMA Total	2.05		
Total Area	8.62		



PROPOSED CONDITIONS
HYDROMODIFICATION EXHIBIT
SVBF TEMPLE
MARCH 2017

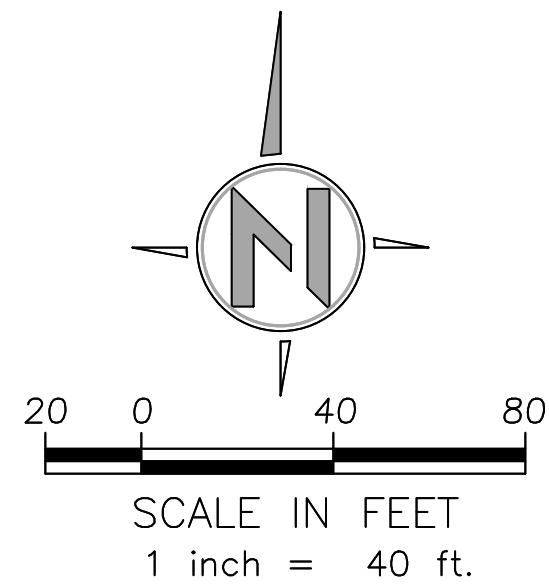
ATTACHMENT 2c:
Management of Critical Coarse Sediment Yield Areas



LEGEND

- SITE BOUNDARY
- NEW CONCRETE PAVEMENT
- BIORETENTION BASIN
- ASPHALT PAVEMENT
- SOIL TYPE BOUNDARY
- CRITICAL COARSE SEDIMENT YIELD AREA (CCSYA)

NOTE:
SITE AREA: 839450 SF
CCSYA ON SITE: 88758 SF
CCSYA ENCROACHED: 3730 SF
PERCENT OF ON-SITE CCSYAS AREAS ENCROACHED: 4.20%



ATTACHMENT 2d:
Geomorphic Assessment of Receiving Channels

NOT APPLICABLE

**ATTACHMENT 2e:
Vector Control Plan**

NOT APPLICABLE

ATTACHMENT 3**Structural BMP Maintenance Information**

This is the cover sheet for Attachment 3.

Indicate which Items are Included behind this cover sheet:

Attachment Sequence	Contents	Checklist
Attachment 3a	Structural BMP Maintenance Plan (Required)	☒ Included See Structural BMP Maintenance Information Checklist on the back of this Attachment cover sheet.
Attachment 3b	Draft Stormwater Maintenance Notification / Agreement (when applicable)	☐ Included ☒ Not Applicable

Use this checklist to ensure the required information has been included in the Structural BMP Maintenance Information Attachment:

Attachment 3a must identify:

- ☒ Specific maintenance indicators and actions for proposed structural BMP(s). This must be based on Section 7.7 of the BMP Design Manual and enhanced to reflect actual proposed components of the structural BMP(s)
- ☒ How to access the structural BMP(s) to inspect and perform maintenance
- ☒ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☒ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☒ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☒ Recommended equipment to perform maintenance
- ☒ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management

Attachment 3b: For all Structural BMPs, Attachment 3b must include a draft maintenance agreement in the County's standard format depending on the Category (PDP applicant to contact County staff to obtain the current maintenance agreement forms). Refer to Section 7.3 in the BMP Design Manual for a description of the different categories.

ATTACHMENT 3a:
Structural BMP Maintenance Plan

POST-
CONSTRUCTION
PERMANENT BMPs

PROPOSED OPERATION AND MAINTENANCE PROCEDURE DETAILS (LID/SITE DESIGN AND SOURCE CONTROL BMPs)					
O&M RESPONSIBLE PARTY DESIGNEE : SVBF Inc.					
	ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
<u>LID/SITE DESIGN:</u> - LANDSCAPE/PLANTER AREA	REFUSE/TRASH PICK-UP, FERTILIZING	TRASH, TALL GRASS, WEEDS, DEAD OR POORLY GROWING LANDSCAPE	VISUAL	BIWEEKLY	REMOVE TRASH & DEAD VEGETATION, REMOVE WEEDS, AND APPLY FERTILIZER
<u>SOURCE CONTROLS:</u>					
- SIDEWALK SWEEPING	SWEEPING	DIRT ACCUMULATION	VISUAL	MONTHLY	SWEEP PAVED AREAS REGULARLY TO COLLECT LOOSE DUST PARTICLES. WIPE UP SPILLS WITH RAGS AND OTHER ABSORBENT MATERIAL IMMEDIATELY, DO NOT HOSE DOWN THE AREA TO A STORM DRAIN
- STORM DRAIN SYSTEM SIGNAGE	RESIGNAGE/RESTENCILING	ILLEGIBLE SIGNAGE/STENCILING	VISUAL	AS REQUIRED	PROVIDE EMPLOYEE TRAINING, INSPECT/REPAIR STORM DRAIN INLET SIGNAGE/STENCILING FOR LEGIBILITY
- NON-STORM WATER DISCHARGES	PREVENT NON-STORM WATER DISCHARGES	NON-STORM WATER DISCHARGE/RELEASE	VISUAL	AS REQUIRED	PROVIDE EMPLOYEE TRAINING MAINTAIN LEGIBILITY OF STORM DRAIN INLET ISOLATE PROBLEM AREAS AND PLUG ILLEGAL DISCHARGE POINTS . ON PAVED AREAS, CLEAN UP SPILLS WITH AS LITTLE WATER AS POSSIBLE. FOR SMALL SPILLS, USE ABSORBENT MATERIALS RATHER THAN HOSING DOWN SPILL AREAS

PROPOSED OPERATION AND MAINTENANCE PROCEDURE DETAILS (TREATMENT CONTROL BMPs)

O&M RESPONSIBLE PARTY DESIGNEE : SVBF Inc.

	ROUTINE ACTION	MAINTENANCE INDICATOR	FIELD MEASUREMENT	MEASUREMENT FREQUENCY	MAINTENANCE ACTIVITY
TC BMP: BIORETENTION BASIN	INSPECT FOR STANDING WATER AND DRAINAGE PROBLEMS	WHEN WATER STANDS BETWEEN STORM AND REMAINS ON THE SURFACE MORE THAN 48 HRS AFTER A STORM	VISUAL	BIANNUALLY	CHECK FOR CLOGGED OR SLOW-DRAINING FILTER MEDIA, A CRUST FORMED ON THE TOP LAYER, OR OTHER CAUSES OF INSUFFICIENT FILTERING TIME AND RESTORE PROPER FILTRATION CHARACTERISTICS. REMOVE SEDIMENT OR TRASH BLOCKAGE, OR ADD UNDERDRAIN IF NECESSARY
	INSPECT FOR VEGETATION	DEAD, DISEASED AND/OR OVERGROWN VEGETATION	VISUAL	BIANNUALLY	REMOVE AND REPLACE THE DEAD & DISEASED PLANTS WITH HEALTHY PLANTS. TRIM AND PURNE EXCESS VEGETATION
	INSPECT FOR MULCH	MULCH IS MISSING OR PATCHY IN APPEARANCE	VISUAL	BIANNUALLY	RE-MULCH ANY VOID AREAS, MAKE SURE MULCH IS EVEN IN APPEARANCE AT A DEPTH OF 3 INCHES. ADD FRESH MULCH LAYER EVERY 6 MONTHS. ONCE EVERY 2 TO 3 YEARS REMOVE OLD MULCH LAYER BEFORE APPLYING NEW ONE.
INFILTRATION BASIN	REFER TO MANUFACTURER'S MAINTENANCE GUIDELINES FOR DETAILS				
CATCH BASIN INSERTS	REFER TO MANUFACTURER'S MAINTENANCE GUIDELINES FOR DETAILS				

ATTACHMENT 4

**County of San Diego PDP Structural BMP Verification for
Permitted Land Development Projects**

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County of San Diego BMP Design Manual Verification Form	
Project Summary Information	
Project Name	SVBF Temple
Record ID (e.g., grading/improvement plan number)	
Project Address	Old San Pasqual Road Escondido, CA 92025
Assessor's Parcel Number(s) (APN(s))	241-080-47
Project Watershed (Complete Hydrologic Unit, Area, and Subarea Name with Numeric Identifier)	San Dieguito Watershed, Las Lomas Muertas Subarea, HSA 905.32
Responsible Party for Construction Phase	
Developer's Name	TBD
Address	
Email Address	
Phone Number	
Engineer of Work	
Engineer's Phone Number	
Responsible Party for Ongoing Maintenance	
Owner's Name(s)*	SBVF Inc
Address	5 Yates Drive East Brunswick, NJ 08816
Email Address	
Phone Number	(732) 238 1119
*Note: If a corporation or LLC, provide information for principal partner or Agent for Service of Process. If an HOA, provide information for the Board or property manager at time of project closeout.	

Note: If this is a partial verification of Structural BMPs, provide a list and map denoting Structural BMPs that have already been submitted, those for this submission, and those anticipated in future submissions.

County of San Diego BMP Design Manual Verification Form Page 3 of 4

Checklist for Applicant to submit to PDCI:

- ☐ Copy of the final accepted SWQMP and any accepted addendum.
- ☐ Copy of the most current plan showing the Stormwater Structural BMP Table, plans/cross-section sheets of the Structural BMPs and the location of each verified as-built Structural BMP.
- ☐ Photograph of each Structural BMP.
- ☐ Photograph(s) of each Structural BMP during the construction process to illustrate proper construction.
- ☐ Copy of the approved Structural BMP maintenance agreement and associated security

By signing below, I certify that the Structural BMP(s) for this project have been constructed and all BMPs are in substantial conformance with the approved plans and applicable regulations. I understand the County reserves the right to inspect the above BMPs to verify compliance with the approved plans and Watershed Protection Ordinance (WPO). Should it be determined that the BMPs were not constructed to plan or code, corrective actions may be necessary before permits can be closed.

Please sign your name and seal.

Professional Engineer's Printed Name:

Carl M. Fiorica

Professional Engineer's Signed Name:

Date: _____

ATTACHMENT 5**Copy of Plan Sheets Showing Permanent Storm Water BMPs,
Source Control, and Site Design**

This is the cover sheet for Attachment 5.

Use this checklist to ensure the required information has been included on the plans:

The plans must identify:

- ☐ Structural BMP(s) with ID numbers matching Step 6 Summary of PDP Structural BMPs
- ☐ The grading and drainage design shown on the plans must be consistent with the delineation of DMAs shown on the DMA exhibit
- ☐ Details and specifications for construction of structural BMP(s)
- ☐ Signage indicating the location and boundary of structural BMP(s) as required by County staff
- ☐ How to access the structural BMP(s) to inspect and perform maintenance
- ☐ Features that are provided to facilitate inspection (e.g., observation ports, cleanouts, silt posts, or other features that allow the inspector to view necessary components of the structural BMP and compare to maintenance thresholds)
- ☐ Manufacturer and part number for proprietary parts of structural BMP(s) when applicable
- ☐ Maintenance thresholds specific to the structural BMP(s), with a location-specific frame of reference (e.g., level of accumulated materials that triggers removal of the materials, to be identified based on viewing marks on silt posts or measured with a survey rod with respect to a fixed benchmark within the BMP)
- ☐ Recommended equipment to perform maintenance
- ☐ When applicable, necessary special training or certification requirements for inspection and maintenance personnel such as confined space entry or hazardous waste management
- ☐ Include landscaping plan sheets showing vegetation requirements for vegetated structural BMP(s)
- ☐ All BMPs must be fully dimensioned on the plans
- ☐ When proprietary BMPs are used, site-specific cross section with outflow, inflow, and model number must be provided. Photocopies of general brochures are not acceptable.
- ☐ Include all source control and site design measures described in Steps 4 and 5 of the SWQMP. Can be included as a separate exhibit as necessary.

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ATTACHMENT 6

Copy of Project's Drainage Report

This is the cover sheet for Attachment 6.

If hardcopy or CD is not attached, the following information should be provided:

Title:

Prepared By:

Date:

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CEQA DRAINAGE STUDY

for

SVBF TEMPLE MAJOR USE PERMIT
OLD SAN PASQUAL ROAD,
ESCONDIDO, CA 92025

Project No. # PDS2015-MUP-15-011

APN: 241-080-47

Prepared By:



9449 Balboa Avenue, Suite 270
San Diego, CA 92123
BWE Job #: 12478u

Date: December, 2015
Rev. Date: June 2016
Rev. Date: November 2016
Rev. Date: March 2017

DECLARATION OF RESPONSIBLE CHARGE

I, HEREBY DECLARE THAT I AM THE CIVIL 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 DESIGN.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWING AND SPECIFICATIONS BY THE COUNTY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

CARL M. FIORICA
R.C.E. # 64715
EXP. 06/30/2017

DATE:

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2. Background.....	page 1
3. Existing Conditions.....	page 1
4. Proposed Improvements.....	page 2
5. Soil Characteristics.....	page 2
6. Methodology.....	page 3
7. Calculations	page 4
7.a. Impervious and Pervious Areas	
7.b. Runoff Coefficient	
7.c. Peak Flow Rates	
7.d. 100-yr Floodplain Analysis	
8. Downstream Drainage Impact Analysis	page 7
9. Conclusions.....	page 8
10. References	page 9

Attachments

Site Vicinity Map.....	Attachment A
Site Imagery Map	
Existing Conditions Runoff Coefficient Calculations.....	Attachment B
Existing Condition Hydrology Calculations	
Existing Condition Hydrology Map	
Proposed Conditions Runoff Coefficient Calculations.....	Attachment C
Proposed Condition Hydrology/Hydraulic Calculations	
Proposed Condition Hydrology Map	
Excerpts from Hydrology Manual.....	Attachment D
FEMA Flood Plain Map.....	Attachment E

1. Purpose

The purpose of this drainage study is to analyze the existing and proposed conditions drainage patterns, and peak flow rates for the proposed SVBF Temple site in the City of Escondido, County of San Diego. This study will also provide recommendations to mitigate stormwater runoff in order for the project to match or decrease the pre-development peak flow rates in the proposed condition.

To determine the impacts of the proposed development on the existing drainage patterns, the pre- and post-peak flow rates are analyzed and compared for the 100-year storm event using the Rational Method. This report has been prepared in accordance with the requirements of the County of San Diego Hydrology Manual (2003).

2. Background

The 10 acres project site (study area) is located in the City of Escondido, California. The site is bounded by the San Pasqual Valley Road on the north, Old San Pasqual on the south, existing undeveloped lands on the east & west.

(See Attachment A for Vicinity & Imagery Maps)

The Federal Emergency Management Agency (FEMA) categorizes the site as Zone X, where Zone X is area determined to be outside of 500-year floodplain (FIRM Panel 1082 of 2375). Attachment E illustrates the FEMA floodplain mapping within the vicinity of the project site. The proposed development is located outside of the existing 100 year flood plain limits.

3. Existing Conditions

The existing site is currently undeveloped. The site topography is relatively steep on the west and flatter on the east side. The site slopes from the west to the southeast direction. The runoff originating from the site discharges towards southeast into an existing unnamed creek. This creek originates from offsite upstream drainage area and runs across the subject property along the northeasterly direction. This creek is a tributary to the Cloverdale & Santa Ysabel Creek which ultimately discharge to Pacific Ocean via San Dieguito River. There are 5 existing storm drain culverts across Old San Pasqual Road which discharge into the subject property. The runoff from these culverts ultimately discharges to the existing creek situated at the southeast side of the proposed development. These culverts are identified as culverts 1, 2, 3, 4 & 5 and graphically shown on the hydrology exhibits. The runoff from the culvert no. 5 does not contribute to the site therefore, not considered in the hydrology analysis.

The hydrology of the drainage area within the project boundary can be generally analyzed at 3 discharge points which are shown graphically in the existing condition hydrology map. These analysis points are identified as analysis/exit points 1, 2, & 3.

The hydrology of the offsite drainage areas is analyzed separately and the peak flow rates are added to the onsite peak flow rates to determine the combined peak flow rates through these exit points. The runoff from culverts 1, & 2 is added to the onsite peak flow

rate at exit point 3 whereas, the runoff from culverts 3, & 4 is added to the onsite peak flow rate at exit point 1. The exit point 2 only include onsite drainage area.

(See Attachment B for Existing Condition Hydrology Map)

4. Proposed Improvements

The proposed development works include but are not limited to the construction of a new SVBF Hindu Temple with a multi-purpose hall and kitchen/dining facility, priest residences, driveways, parking lot, and other associated improvement. The associated improvement work will include landscaping, drainage and dry & wet utilities construction.

The on-site drainage pattern is changed slightly. The existing discharge locations 1, 2, & 3 are maintained in the proposed condition. The hydrology of the site in the proposed condition can be generally analyzed at 3 drainage exit points as in the existing condition. These analysis points are identified as analysis/exit points 1, 2, & 3.

The hydrology of the offsite drainage areas is analyzed separately and the peak flow rates are added to the onsite peak flow rates to determine the combined peak flow rates through these exit points. The runoff from culverts 1, & 2 is added to the onsite peak flow rate at exit point 3 whereas, the runoff from culverts 3, & 4 is added to the onsite peak flow rate at exit point 1. The exit point 2 only include onsite drainage area. The runoff originating from the existing culverts 1 & 2 is routed through a storm drain pipe & swale to exit point 3. Similarly, the runoff originating from culverts 3, & 4 is rerouted/conveyed through a storm drain system and discharged into the existing creek via exit point 1. The runoff originating from the site is routed through onsite detention/retention facilities prior to discharging offsite. The runoff originating from offsite drainage areas is bypassed the onsite detention/retention facilities therefore, no control is required.

The proposed development is limited to the outside of the 100-yr floodplain limits of the existing creek. No structures are proposed within the 100-yr flood limits.

(See Attachment C for Proposed Condition Hydrology Map)

5. Soil Characteristics

Site is comprised of hydrologic soil groups B per the County of San Diego GIS website (see appendix D for soil map obtained from the County). Therefore, hydrologic calculations are performed by assuming soil type “B” for this site.

6. Methodology

Rational Method:

A rational method is utilized to perform hydrologic calculations in this study;

Rational Equation: $Q = C * I * A$

Where;

Q = Peak discharge, cfs

C = Rational method runoff coefficient

I = Rainfall intensity, inch/hour

A = Drainage area, acre

A computer model CivilD is used to automate the hydrology analysis process. This computer version of the rational method analysis allows user to develop a node-link model of the watershed. CivilD computer program has the capability of performing calculations utilizing mathematical functions. These functions are assigned code numbers, which appear in the printed results. The code numbers and their corresponding functions are described below;

Sub area Hydrologic Processes;

Code 1 - INITIAL subarea input, top of stream

Code 2 - STREET flow through subarea, includes subarea runoff

Code 3 - ADDITION of runoff from subarea to stream

Code 4 - STREET INLET + parallel street & pipe flow + area

Code 5 - PIPEFLOW travel time (program estimated pipe size)**

Code 6 - PIPEFLOW travel time (user specified pipe size)

Code 7 - IMPROVED channel travel time (open or box)**

Code 8 - IRREGULAR channel travel time**

Code 9 - USER specified entry of data at a point

Code 10 - CONFLUENCE at downstream point in current stream

Code 11 - CONFLUENCE of mainstreams

**NOTE: These options do not include subarea runoff

**NOTE: (#) - Required pipe size determined by the hydrology program

7. Calculations

7.a. Impervious and Pervious Areas

The impervious and pervious areas are calculated for both the existing and proposed site conditions. The site is designed to increase the impervious area by 3.58 Ac (=35.5% increase) as shown in Table 7-1. See Attachment B & C for pervious and impervious area calculation in the existing & proposed conditions respectively.

Table 7-1 Summary of Areas (Onsite only)

	Area (Acres)			Percent Impervious Area	Percent Pervious Area
	Total	Impervious (Ai)	Pervious (Ap)		
Existing Condition	10.19	0.11	10.08	1.1%	98.9%
Proposed Condition	10.19	3.69	6.50	36.2%	63.8%
Percentage Change	0.0%		-35.5%		

The impervious area within the offsite drainage areas remains the same in the proposed condition. Therefore, not included in the above comparison.

7.b. Runoff Coefficient

The runoff coefficients for the site are manually calculated by using the equation from Section 3.1.2 of the County of San Diego Hydrology Manual:

$$C = 0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$$

Where,

$C_p = 0.25$, Pervious Coefficient Runoff Value for the soil type B (per Table 3-1 of the County of San Diego Hydrology Manual for Undisturbed Natural Terrain/Permanent Open Space, and 0% Impervious). (See Attachment D for details).

The equivalent land use type is determined for the site based on the runoff coefficients calculated by using above equation. See existing & proposed conditions runoff coefficient calculations in appendices B & C respectively.

7.c. Peak Flow Rates

The rational method is used to perform the hydrologic analysis.

The existing and proposed conditions peak flow rates due to the 100 year storm event are calculated and summarized in Table 7-2 for comparison purpose. The detailed calculations/results for existing and proposed conditions are located in Appendices B and C respectively. Onsite and offsite hydrology analysis is

performed separately. The offsite peak flow rate is added to the onsite flow rate to determine the combined flow rate at each analysis/exit point.

Table7-2 Existing and Proposed Conditions Peak Flow Rates Comparison

Case 1: Onsite peak flow rate comparison

Onsite Only	Drainage Area (acres)		100 Yr Flow (cfs)			% Change from Existing Condition
	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition (Unmitigated)	Proposed Condition (Mitigated)	
Exit Point 1	7.30	8.61	10.30	24.00	7.30	-29.13
Exit Point 2	0.77	0.63	1.20	1.16	1.12	-6.67
Exit Point 3	2.12	0.95	3.32	1.67	1.67	-49.70
Total	10.19	10.19	14.82	26.83	10.09	-31.92

The onsite peak flow rate generated from the 100-year storm event is anticipated to increase by 12.01 cfs (=26.83-14.82) in the proposed condition. The increase in peak flow rate is mainly due to the addition of impervious area such as buildings, driveway, and parking in the proposed condition.

The peak flow rate in the proposed condition is attenuated by routing the flow through proposed bioretention and vault facilities. The peak flow rate reduction from the existing peak flow rate due to the routing is 4.73 cfs. As a result, the peak flow rate is reduced to 10.09 cfs (-31.92%) in the mitigated condition which is smaller than the existing condition peak flow rate of 14.82 cfs. Two bioretention basins are utilized for detention analysis. Bioretention basin 2 also includes an underground vault with volume equal to 28,600 cf and 5.2' of total depth.

Case 2: Combined onsite and offsite comparison peak flow rate comparison

Combined (Onsite & Offsite)	Drainage Area (acres)		100 Yr Flow (cfs)			% Change from Existing Condition
	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition (Unmitigated)	Proposed Condition (Mitigated)	
Exit Point 1	13.56	14.87	23.08	36.78	20.08	-13.00
Exit Point 2	0.77	0.63	1.20	1.12	1.12	-6.67
Exit Point 3	4.73	3.56	8.84	7.19	7.19	-18.67
Total	19.06	19.06	33.12	45.09	28.39	-14.28

The combined (onsite & offsite) peak flow rate generated from the 100-year storm event is anticipated to increase by 8.78 cfs (=41.90-33.12) in the proposed condition. The increase in peak flow rate is mainly due to the addition of impervious area such as building and parking in the proposed condition. The net increase in peak flow rate from the site is same for both cases discussed above. The peak flow rate in the proposed condition is attenuated by routing the flow through proposed detention/retention facilities. The peak flow rate reduction due to the detention basin routing is 11.90 cfs. As a result, the peak flow rate is reduced to 30.0 cfs (-9.4%) in the mitigated condition which is smaller than the existing condition peak flow rate of 33.12 cfs. Two bioretention basins are utilized for detention analysis similar to case 1 above.

In the existing condition, culverts 1 & 2 contribute runoff to exit point 3 whereas, culverts 3 & 4 contribute runoff to exit point 1. The peak 100-yr flow rates for these culverts are approximated for the storm drain sizing purposes. The drainage area, culvert number, and peak flow rate for each culvert is summarized below. The existing drainage pattern is maintained in the proposed condition. Culverts 1 & 2 continue to contribute runoff to exit point 3 and culverts 3 & 4 contribute to exit point 1. Exit point 2 does not include any offsite drainage area.

	Culvert #	Area (ac)	Q-100
Exit Point 1	3	4.17	8.15
	4	2.09	4.63
		6.26	12.78
Exit Point 2			
Exit Point 3	1	0.1	0.22
	2	2.51	5.3
		2.61	5.52

7.d. 100-year Floodplain Analysis

The 100-year floodplain is defined as the area that will be inundated by 100-year flood flows, which are flows that statistically have a 1 percent chance of being equal or exceeded in any given year. The 100-year floodway is a regulatory corridor representing the portion of a watercourse reserved for conveying 100-year flows without increasing the 100-year water surface elevations more than a foot. Since the proposed development is located outside the 100-year floodplain limit only the floodplain limit analysis is performed. USGS StreamStats Web Application is utilized to determine the peak 100-yr flow rate for the analysis. Peak 100-yr flow rates of 90.4 and 105.0 cfs are determined at the upstream and downstream end of the project site respectively by utilizing this tool. This means site is generating approximately 14.6 cfs in the existing condition. But, the analysis is performed by utilizing the proposed condition peak flow rate of 41.9 cfs. The peak flow rate from the site is determined to be 41.9 cfs in the proposed condition. As a result, a total peak flow rate at the downstream end of the site is determined to be 132.3 cfs. Since this method is approximate, the peak flow rate

is multiplied by 1.5 to account for the factor of safety in the analysis. Further, analysis will be required to fine tune the results in the final engineering.

No grading work has been proposed adjacent to the existing stream. As a result, the stream cross sections within the proximities of the creek remain unchanged in the existing and proposed conditions. Therefore, peak flow rate in the proposed condition is utilized to determine the floodplain limits. There are no FEMA established 100 year floodplain limits within the property limit.

Hydraulic analysis of the existing creek is performed by using the US Army Corps of Engineers' HEC-RAS model. This is the standard engineering model for hydraulic analyses of riverine systems and is accepted by FEMA and local agencies. Analysis is performed by entering three required components in the HEC-RAS analysis--the geometry data, flow data, and plan data. The Geometry data, for instance, consists of a description of the size, shape, and connectivity of stream cross-sections. Likewise, the Flow data contains discharge rates. Finally, Plan data contains information pertinent to the run specifications of the model, including a description of the flow regime.

The normal depth method flow regime is assigned for the analysis. The roughness coefficients are assigned based on the cover conditions. The Manning's n of 0.02 is assigned for main channel, left & right banks. Encroachments are added to restrict the effective flow limits and to model effective flow areas.

See Attachment C for results.

8. Downstream Drainage Impact Analysis

The onsite drainage pattern will change minimally due to the proposed development. But, the runoff will continue to flow in the same general direction towards existing unnamed natural creek located northeast side of the site. The peak flow rates at all three drainage exit points 1, 2, & 3 are reduced from the existing condition. Therefore, an adverse drainage impact is not anticipated due to this development.

9. Conclusions

Storm water runoff from the site is collected and conveyed by a system of downspouts, inlets, planters, and storm drain pipes. The proposed development mitigates the storm water quantity impacts to the maximum extent practicable through the use of best management practices. Bioretention as well as underground vault are proposed to attenuate the peak flow rates in the proposed condition. The runoff from all offsite drainage basins (D, E, & F) is proposed to be bypassed the onsite structural BMPs. The new storm drain system is proposed to bypass and convey the runoff from existing culverts situated across the Old San Pasqual Road to the outfall locations. The runoff originating from existing culverts will continue to flow in the original direction.

The critical coarse sediment yield areas are present within the offsite tributary drainage areas. The runoff originating from these areas is bypassed the proposed onsite BMPs to prevent reduction of sediment supply to downstream natural systems. Therefore, substantial changes in erosion and sedimentation/siltation will not occur due to the development. An energy dissipater is designed at each outfall locations to reduce the velocity of flow to a non-erosive velocity.

The existing drainage pattern change slightly without altering the existing outfall locations. The mitigated peak flow rate due to the 100-yr frequency storm is anticipated to be reduced from the existing condition at all three drainage exit points. The majority site runoff is directed to the bioretention basins for peak flow routing and mitigation. The reduced runoff rate from these basins is directed to the existing creek situated easterly side of the site via an exit point 1. As a result, the flooding on- or offsite is not anticipated due to this development. Since the runoff from the site is reduced in the proposed condition the capacity of the existing receiving creek will not be exceeded. The same is verified by analyzing the floodplain limits of the creek due to 100-yr peak flow rate. The inundation limits are determined to outside the proposed development footprint.

Two bioretention basins are proposed to mitigate the drainage impacts due to the development. Bioretention 2 is coupled with an underground vault for peak flow rate control. The new storm drain system is designed to convey the runoff due to 100-yr storm frequency. The sizing of the drainage system will be finalized in the final engineering.

FEMA or County floodplain maps do not have floodplain limits determined for the existing unnamed creek situated adjacent to the site. Therefore, a site specific floodplain analysis is performed to determine the inundation limits due to 100-yr frequency storm event. The inundation limits are determined by analyzing the entire upstream drainage basin tributary to this creek. It is determined that the proposed development is located outside the 100-year inundation limits of the existing creek. The proposed development will not place any habitable or inhabitable structures within the 100-yr inundation limits of the existing creek.

Failure of levee or dams are not anticipated because such structures do not present onsite or offsite. Therefore, significant risks of loss of structures and lives are not anticipated

due to this development. The peak flow rate, inundation limits, and the velocity of the existing creek are not altered/affected due to the development.

10. References

- County of San Diego, Hydrology Manual (2003).

ATTACHMENT A:

Site Vicinity Map
Site Imagery Map



Site-Imagery



PROJECT
BOUNDARY

PROJECT
LOCATION

ATTACHMENT B:

Existing Conditions Runoff Coefficient Calculations
Existing Condition Hydrology Calculations

Existing Conditions Hydrology Map

ONSITE DRAINAGE BASINS A, B, & C

Runoff Coefficient Calculation (Existing Condition)

Project: SVBF Temple

Soil Type: B per Soil Map in Attachment D

C = $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Cp= 0.25 (per table 3-1, County of San Diego Hydrology Manual, Soil Class B)

Onsite Basins #	Area (Acres)		%imp	*Composite Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
A	7.30	0.03	0.4	0.25	Undisturbed Natural
B	0.77	0.00	0.0	0.25	Undisturbed Natural
C	2.12	0.08	3.8	0.27	Undisturbed Natural
Total	10.19				

Offsite Basins #	Area (Acres)		%imp	*Composite Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
D	2.61	0.20	7.7	0.30	Undisturbed Natural
E	4.17	0.12	2.9	0.27	Undisturbed Natural
F	2.09	0.24	11.5	0.32	LDR, 1.0 DU/AC or LESS
Total	8.87				

Notes:

*The composite runoff coefficient (C) is calculated for the site by using the following equation: $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$; where $C_p = 0.25$ per Table 3-1 of the County of San Diego Hydrology Manual. The composite runoff coefficients are used in the CivilD software for all downstream basins.

**Closest land use type selected from Table 3-1 of the hydrology manual to assign for initial basin. The composite C value cannot be entered as input for initial basin analysis. Coefficient for basin F is 0.32 (LDR, 1.0 DU/AC or LESS) whereas, all other basins have value closer to 0.25 (Undisturbed Natural).

12478ex100yr1.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
EXIT POINT 1
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 82.000(Ft.)
Highest elevation = 534.000(Ft.)
Lowest elevation = 506.000(Ft.)
Elevation difference = 28.000(Ft.) Slope = 34.146 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 34.15 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 4.72 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (34.146^{(1/3)})] = 4.72$
Calculated TC of 4.716 minutes is less than 5 minutes,
resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) = 8.958(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.314(CFS)
Total initial stream area = 0.140(Ac.)

```

+++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

```

```

-----
Estimated mean flow rate at midpoint of channel =      2.669(CFS)
Depth of flow =    0.124(Ft.), Average velocity =    3.463(Ft/s)
***** Irregular Channel Data *****

```

```

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2             10.00              0.00
      3             20.00              0.20
Manning's 'N' friction factor =    0.020

```

```

-----
Sub-Channel flow =    2.669(CFS)
'      '      flow top width =    12.415(Ft.)
'      '      velocity=    3.463(Ft/s)
'      '      area =    0.771(Sq.Ft)
'      '      Froude number =    2.450

```

```

Upstream point elevation =    506.000(Ft.)
Downstream point elevation =    464.000(Ft.)
Flow length =    475.000(Ft.)
Travel time =    2.29 min.
Time of concentration =    7.00 min.
Depth of flow =    0.124(Ft.)
Average velocity =    3.463(Ft/s)
Total irregular channel flow =    2.669(CFS)
Irregular channel normal depth above invert elev. =    0.124(Ft.)
Average velocity of channel(s) =    3.463(Ft/s)
Adding area flow to channel
Rainfall intensity (I) =    7.209(In/Hr) for a    100.0 year storm
User specified 'C' value of 0.250 given for subarea
Rainfall intensity =    7.209(In/Hr) for a    100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.250  CA =    0.685
Subarea runoff =    4.625(CFS) for    2.600(Ac.)
Total runoff =    4.938(CFS)  Total area =    2.740(Ac.)
Depth of flow =    0.156(Ft.), Average velocity =    4.039(Ft/s)

```

```

+++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

```

```

-----
Estimated mean flow rate at midpoint of channel =    7.642(CFS)
Depth of flow =    0.080(Ft.), Average velocity =    2.996(Ft/s)
***** Irregular Channel Data *****

```

```

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2              5.00              0.00
      3             35.00              0.00
      4             40.00              0.20
Manning's 'N' friction factor =    0.020

```

```

-----
Sub-Channel flow =    7.642(CFS)
'      '      flow top width =    33.986(Ft.)
'      '      velocity=    2.996(Ft/s)

```



```

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'      '      area =      2.551(Sq.Ft)
'      '      Froude number =      1.927

Upstream point elevation = 464.000(Ft.)
Downstream point elevation = 434.000(Ft.)
Flow length = 584.000(Ft.)
Travel time = 3.25 min.
Time of concentration = 10.25 min.
Depth of flow = 0.080(Ft.)
Average velocity = 2.996(Ft/s)
Total irregular channel flow = 7.642(CFS)
Irregular channel normal depth above invert elev. = 0.080(Ft.)
Average velocity of channel(s) = 2.996(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 5.638(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.250 given for subarea
Rainfall intensity = 5.638(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.250 CA = 1.825
Subarea runoff = 5.351(CFS) for 4.560(Ac.)
Total runoff = 10.289(CFS) Total area = 7.300(Ac.)
Depth of flow = 0.095(Ft.), Average velocity = 3.345(Ft/s)
End of computations, total study area = 7.300 (Ac.)

```

12478ex100yr2.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
EXIT POINT 2
SVBF TEMPLE
ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 272.000(Ft.)
Highest elevation = 456.000(Ft.)
Lowest elevation = 432.000(Ft.)
Elevation difference = 24.000(Ft.) Slope = 8.824 %
Top of Initial Area Slope adjusted by User to 8.000 %
Bottom of Initial Area Slope adjusted by User to 8.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 8.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 7.65 minutes
 $TC = [1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5} / (\% \text{ slope}^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (8.000^{(1/3)})] = 7.65$
The initial area total distance of 272.00 (Ft.) entered leaves a
remaining distance of 172.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 1.09 minutes
for a distance of 172.00 (Ft.) and a slope of 8.00 %
with an elevation difference of 13.76(Ft.) from the end of the top area

12478ex100yr2.out

$Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{.385} * 60(\text{min/hr})$
 = 1.087 Minutes
 $Tt = [(11.9 * 0.0326^3) / (13.76)]^{.385} = 1.09$
 Total initial area $Ti = 7.65$ minutes from Figure 3-3 formula plus
 1.09 minutes from the Figure 3-4 formula = 8.74 minutes
 Rainfall intensity (I) = 6.250(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area ($Q=KCIA$) is $C = 0.250$
 Subarea runoff = 1.203(CFS)
 Total initial stream area = 0.770(Ac.)
 End of computations, total study area = 0.770 (Ac.)

12478ex100yr3.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
EXIT POINT 3
SVBF TEMPLE
ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 77.000(Ft.)
Highest elevation = 486.000(Ft.)
Lowest elevation = 474.000(Ft.)
Elevation difference = 12.000(Ft.) Slope = 15.584 %
Top of Initial Area Slope adjusted by User to 15.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 15.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 6.20 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (15.000^{(1/3)})] = 6.20$
Rainfall intensity (I) = 7.794(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.234(CFS)
Total initial stream area = 0.120(Ac.)

```

12478ex100yr3.out
+++++
Process from Point/Station      301.000 to Point/Station      302.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      1.805(CFS)
Depth of flow =      0.111(Ft.), Average velocity =      2.932(Ft/s)
***** Irregular Channel Data *****

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2             10.00              0.00
      3             20.00              0.20
Manning's 'N' friction factor =      0.020

-----
Sub-Channel flow =      1.805(CFS)
'      '      flow top width =      11.097(Ft.)
'      '      velocity=      2.932(Ft/s)
'      '      area =      0.616(Sq.Ft)
'      '      Froude number =      2.194

Upstream point elevation =      474.000(Ft.)
Downstream point elevation =      428.000(Ft.)
Flow length =      625.000(Ft.)
Travel time =      3.55 min.
Time of concentration =      9.76 min.
Depth of flow =      0.111(Ft.)
Average velocity =      2.932(Ft/s)
Total irregular channel flow =      1.805(CFS)
Irregular channel normal depth above invert elev. =      0.111(Ft.)
Average velocity of channel(s) =      2.932(Ft/s)
Adding area flow to channel
Rainfall intensity (I) =      5.820(In/Hr) for a      100.0 year storm
User specified 'C' value of 0.270 given for subarea
Rainfall intensity =      5.820(In/Hr) for a      100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.269 CA =      0.570
Subarea runoff =      3.084(CFS) for      2.000(Ac.)
Total runoff =      3.318(CFS) Total area =      2.120(Ac.)
Depth of flow =      0.139(Ft.), Average velocity =      3.414(Ft/s)
End of computations, total study area =      2.120 (Ac.)

```

OFFSITE DRAINAGE BASINS D, E, & F

12478ex100yrD.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN D
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 500.000 to Point/Station 501.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 234.000(Ft.)
Highest elevation = 658.200(Ft.)
Lowest elevation = 592.000(Ft.)
Elevation difference = 66.200(Ft.) Slope = 28.291 %
Top of Initial Area Slope adjusted by User to 28.000 %
Bottom of Initial Area Slope adjusted by User to 28.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 28.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 5.04 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (28.000^{(1/3)})] = 5.04$
The initial area total distance of 234.00 (Ft.) entered leaves a
remaining distance of 134.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.55 minutes
for a distance of 134.00 (Ft.) and a slope of 28.00 %

12478ex100yrD.out

with an elevation difference of 37.52(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.554 Minutes
 $Tt = [(11.9 * 0.0254^3) / (37.52)]^{\wedge}.385 = 0.55$
 Total initial area $Ti = 5.04$ minutes from Figure 3-3 formula plus
 0.55 minutes from the Figure 3-4 formula = 5.59 minutes
 Rainfall intensity (I) = 8.334(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.250$
 Subarea runoff = 1.750(CFS)
 Total initial stream area = 0.840(Ac.)

+++++
 Process from Point/Station 501.000 to Point/Station 502.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

 Estimated mean flow rate at midpoint of channel = 2.594(CFS)
 Depth of flow = 0.265(Ft.), Average velocity = 7.362(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	5.00	0.00
3	10.00	1.00

 Manning's 'N' friction factor = 0.025

Sub-Channel flow = 2.594(CFS)

'	'	flow top width = 2.655(Ft.)
'	'	velocity = 7.362(Ft/s)
'	'	area = 0.352(Sq.Ft)
'	'	Froude number = 3.561

Upstream point elevation = 592.000(Ft.)
 Downstream point elevation = 482.000(Ft.)
 Flow length = 473.000(Ft.)
 Travel time = 1.07 min.
 Time of concentration = 6.66 min.
 Depth of flow = 0.265(Ft.)
 Average velocity = 7.362(Ft/s)
 Total irregular channel flow = 2.594(CFS)
 Irregular channel normal depth above invert elev. = 0.265(Ft.)
 Average velocity of channel(s) = 7.362(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.300 given for subarea
 Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.275$ $CA = 0.453$
 Subarea runoff = 1.622(CFS) for 0.810(Ac.)
 Total runoff = 3.372(CFS) Total area = 1.650(Ac.)
 Depth of flow = 0.293(Ft.), Average velocity = 7.861(Ft/s)

+++++
 Process from Point/Station 502.000 to Point/Station 502.000
 **** SUBAREA FLOW ADDITION ****

 Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.300 given for subarea
 Time of concentration = 6.66 min.
 Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

```

12478ex100yrD.out
(Q=KCIA) is C = 0.282 CA = 0.651
Subarea runoff = 1.474(CFS) for 0.660(Ac.)
Total runoff = 4.846(CFS) Total area = 2.310(Ac.)

++++
Process from Point/Station 502.000 to Point/Station 502.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.300 given for subarea
Time of concentration = 6.66 min.
Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.283 CA = 0.711
Subarea runoff = 0.447(CFS) for 0.200(Ac.)
Total runoff = 5.292(CFS) Total area = 2.510(Ac.)

++++
Process from Point/Station 502.000 to Point/Station 502.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.300 given for subarea
Time of concentration = 6.66 min.
Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.284 CA = 0.741
Subarea runoff = 0.223(CFS) for 0.100(Ac.)
Total runoff = 5.516(CFS) Total area = 2.610(Ac.)
End of computations, total study area = 2.610 (Ac.)

```

12478ex100yrE.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN E
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 600.000 to Point/Station 601.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 381.000(Ft.)
Highest elevation = 658.000(Ft.)
Lowest elevation = 532.000(Ft.)
Elevation difference = 126.000(Ft.) Slope = 33.071 %
Top of Initial Area Slope adjusted by User to 33.000 %
Bottom of Initial Area Slope adjusted by User to 33.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 33.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 4.77 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (33.000^{(1/3)})] = 4.77$
The initial area total distance of 381.00 (Ft.) entered leaves a
remaining distance of 281.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.92 minutes
for a distance of 281.00 (Ft.) and a slope of 33.00 %

12478ex100yrE.out

with an elevation difference of 92.73(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.919 Minutes
 $Tt = [(11.9 * 0.0532^3) / (92.73)]^{\wedge}.385 = 0.92$
 Total initial area $Ti = 4.77$ minutes from Figure 3-3 formula plus
 0.92 minutes from the Figure 3-4 formula = 5.69 minutes
 Rainfall intensity (I) = 8.242(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.250$
 Subarea runoff = 1.834(CFS)
 Total initial stream area = 0.890(Ac.)

+++++
 Process from Point/Station 601.000 to Point/Station 602.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.693(CFS)
 Depth of flow = 0.247(Ft.), Average velocity = 4.403(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	5.00	0.00
3	10.00	0.50

 Manning's 'N' friction factor = 0.025

Sub-Channel flow = 2.693(CFS)

'	'	flow top width =	4.946(Ft.)
'	'	velocity =	4.403(Ft/s)
'	'	area =	0.612(Sq.Ft)
'	'	Froude number =	2.206

Upstream point elevation = 532.000(Ft.)
 Downstream point elevation = 506.000(Ft.)
 Flow length = 290.000(Ft.)
 Travel time = 1.10 min.
 Time of concentration = 6.79 min.
 Depth of flow = 0.247(Ft.)
 Average velocity = 4.403(Ft/s)
 Total irregular channel flow = 2.693(CFS)
 Irregular channel normal depth above invert elev. = 0.247(Ft.)
 Average velocity of channel(s) = 4.403(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.260$ $CA = 0.474$
 Subarea runoff = 1.650(CFS) for 0.930(Ac.)
 Total runoff = 3.484(CFS) Total area = 1.820(Ac.)
 Depth of flow = 0.272(Ft.), Average velocity = 4.696(Ft/s)

+++++
 Process from Point/Station 602.000 to Point/Station 602.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Time of concentration = 6.79 min.
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

12478ex100yrE.out
 (Q=KCIA) is C = 0.261 CA = 0.506
 Subarea runoff = 0.238(CFS) for 0.120(Ac.)
 Total runoff = 3.722(CFS) Total area = 1.940(Ac.)

++++
 Process from Point/Station 602.000 to Point/Station 602.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Time of concentration = 6.79 min.
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.266 CA = 1.108
 Subarea runoff = 4.429(CFS) for 2.230(Ac.)
 Total runoff = 8.151(CFS) Total area = 4.170(Ac.)
 End of computations, total study area = 4.170 (Ac.)

12478ex100yrF.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN F
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 700.000 to Point/Station 701.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL]
(1.0 DU/A or Less)
Impervious value, Ai = 0.100
Sub-Area C Value = 0.320
Initial subarea total flow distance = 271.000(Ft.)
Highest elevation = 584.000(Ft.)
Lowest elevation = 537.300(Ft.)
Elevation difference = 46.700(Ft.) Slope = 17.232 %
Top of Initial Area Slope adjusted by User to 17.000 %
Bottom of Initial Area Slope adjusted by User to 17.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 17.00 %, in a development type of
1.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration = 5.46 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.3200) * (100.000^{.5}) / (17.000^{(1/3)})] = 5.46$
The initial area total distance of 271.00 (Ft.) entered leaves a
remaining distance of 171.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.81 minutes
for a distance of 171.00 (Ft.) and a slope of 17.00 %

12478ex100yrF.out

with an elevation difference of 29.07(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.810 Minutes
 $Tt = [(11.9 * 0.0324^3) / (29.07)]^{\wedge}.385 = 0.81$
 Total initial area $Ti = 5.46$ minutes from Figure 3-3 formula plus
 0.81 minutes from the Figure 3-4 formula = 6.27 minutes
 Rainfall intensity (I) = 7.741(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.320$
 Subarea runoff = 1.982(CFS)
 Total initial stream area = 0.800(Ac.)

+++++
 Process from Point/Station 701.000 to Point/Station 702.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

 Estimated mean flow rate at midpoint of channel = 3.061(CFS)
 Depth of flow = 0.283(Ft.), Average velocity = 3.822(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	5.00	0.00
3	10.00	0.50

 Manning's 'N' friction factor = 0.025

Sub-Channel flow = 3.061(CFS)
 ' ' flow top width = 5.660(Ft.)
 ' ' velocity = 3.822(Ft/s)
 ' ' area = 0.801(Sq.Ft)
 ' ' Froude number = 1.791

Upstream point elevation = 537.300(Ft.)
 Downstream point elevation = 522.000(Ft.)
 Flow length = 271.000(Ft.)
 Travel time = 1.18 min.
 Time of concentration = 7.45 min.
 Depth of flow = 0.283(Ft.)
 Average velocity = 3.822(Ft/s)
 Total irregular channel flow = 3.061(CFS)
 Irregular channel normal depth above invert elev. = 0.283(Ft.)
 Average velocity of channel(s) = 3.822(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 6.925(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.320 given for subarea
 Rainfall intensity = 6.925(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.320$ $CA = 0.589$
 Subarea runoff = 2.096(CFS) for 1.040(Ac.)
 Total runoff = 4.078(CFS) Total area = 1.840(Ac.)
 Depth of flow = 0.315(Ft.), Average velocity = 4.106(Ft/s)

+++++
 Process from Point/Station 702.000 to Point/Station 702.000
 **** SUBAREA FLOW ADDITION ****

 Rainfall intensity (I) = 6.925(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.320 given for subarea
 Time of concentration = 7.45 min.
 Rainfall intensity = 6.925(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

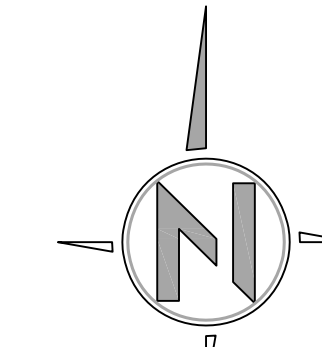
12478ex100yrF.out
 (Q=KCIA) is C = 0.320 CA = 0.669
 Subarea runoff = 0.554(CFS) for 0.250(Ac.)
 Total runoff = 4.632(CFS) Total area = 2.090(Ac.)
 End of computations, total study area = 2.090 (Ac.)



LEGEND

- HYDROLOGY NODE
- SUB BASIN BOUNDARY
- EXISTING STORM DRAIN
- EXISTING CONTOUR
- FLOW DIRECTION
- FLOW PATH
- SPOT ELEVATION
- NODE/CONTOUR ELEVATION
- FLOW LENGTH
- ANALYSIS/EXIT POINT
- SOIL TYPE BOUNDARY
- SUB-BASIN MARKER & AREA (AC)
- EXIST. ASPHALT PAVEMENT

NOTES:
1. OFFSITE BASINS ARE ANALYZED AT THE EXISTING CULVERT LOCATIONS
2. Q GIVEN CORRESPOND TO 100-YR FREQUENCY STORM
3. ONSITE HYDROLOGY ANALYSIS IS SEPARATED FROM OFFSITE ANALYSIS. Q TOTAL (QT) AT THE OUTFALL TO EXISTING CREEK IS OBTAINED BY DIRECTLY ADDING THE ONSITE AND OFFSITE FLOWS.
4. SITE IS COMPRISED OF SOIL TYPE B
5. Vp = FLOW VELOCITY AT THE PIPE OUTLET



25 0 50 100
SCALE IN FEET
1 inch = 50 ft.

HYDROLOGY MAP FOR
SVBF TEMPLE
EXISTING CONDITION
REV. DATE: NOV., 2016

ATTACHMENT C:

Proposed Conditions Runoff Coefficient Calculations
Proposed Condition Hydrology/Hydraulic Calculations

Proposed Conditions Hydrology Map

Runoff Coefficient Calculation (Proposed Condition)

Project: SVBF Temple

Soil Type: B per Soil Map in Attachment D

C = $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Cp= 0.25 (per table 3-1, County of San Diego Hydrology Manual, Soil Class B)

Basin #	Area (Acres)		%imp	*Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
A	8.61	3.650	42	0.53	Medium Density 10.9 DU/A or Less (C=0.54)
B	0.63	0.000	0	0.25	Undisturbed Natural (C=0.25)
C	0.95	0.043	5	0.28	Undisturbed Natural (C=0.25)
Total	10.19				

Notes:

*The composite runoff coefficient (C) is calculated for the site by using the following equation: $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$; where $C_p = 0.25$ per Table 3-1 of the County of San Diego Hydrology Manual. The composite runoff coefficients are used in the CivilD software for all downstream basins.

**Closest land use type selected from Table 3-1 of the hydrology manual to assign for initial basin. The composite C value cannot be entered as input for initial basin analysis. Coefficient for basin A is closer to 0.54 (MDR, 10.9 DU/AC or LESS) whereas, basin B & C have values closer to 0.25 (Undisturbed Natural).

Runoff coefficients for offsite drainage areas (D, E, & F) remain the same in the proposed condition. Please refer to appendix B for calculations

ONSITE DRAINAGE BASINS A, B, & C

12478PR100yr1.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/17/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 1
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL]
(10.9 DU/A or Less)
Impervious value, Ai = 0.450
Sub-Area C Value = 0.540
Initial subarea total flow distance = 66.000(Ft.)
Highest elevation = 467.420(Ft.)
Lowest elevation = 466.100(Ft.)
Elevation difference = 1.320(Ft.) Slope = 2.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 80.00 (Ft)
for the top area slope value of 2.00 %, in a development type of
10.9 DU/A or Less
In Accordance With Table 3-2
Initial Area Time of Concentration = 6.90 minutes
(for slope value of 2.00 %)
Rainfall intensity (I) = 7.278(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
Subarea runoff = 0.747(CFS)
Total initial stream area = 0.190(Ac.)

+++++
Page 1

12478PR100yr1.out
 Process from Point/Station 101.000 to Point/Station 102.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.410(CFS)
 Depth of flow = 0.263(Ft.), Average velocity = 3.492(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :
 Point number 'X' coordinate 'Y' coordinate
 1 0.00 0.50
 2 5.00 0.00
 3 10.00 0.50
 Manning's 'N' friction factor = 0.016

Sub-Channel flow = 2.410(CFS)
 flow top width = 5.254(Ft.)
 velocity = 3.492(Ft/s)
 area = 0.690(Sq.Ft)
 Froude number = 1.698

Upstream point elevation = 466.100(Ft.)
 Downstream point elevation = 464.800(Ft.)
 Flow length = 61.000(Ft.)
 Travel time = 0.29 min.
 Time of concentration = 7.19 min.
 Depth of flow = 0.263(Ft.)
 Average velocity = 3.492(Ft/s)
 Total irregular channel flow = 2.410(CFS)
 Irregular channel normal depth above invert elev. = 0.263(Ft.)
 Average velocity of channel(s) = 3.492(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.086(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Rainfall intensity = 7.086(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.567
 Subarea runoff = 3.271(CFS) for 0.860(Ac.)
 Total runoff = 4.018(CFS) Total area = 1.050(Ac.)
 Depth of flow = 0.318(Ft.), Average velocity = 3.968(Ft/s)

+++++
 Process from Point/Station 102.000 to Point/Station 103.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 464.800(Ft.)
 Downstream point/station elevation = 462.000(Ft.)
 Pipe length = 12.00(Ft.) Slope = 0.2333 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.018(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 4.018(CFS)
 Normal flow depth in pipe = 4.51(In.)
 Flow top width inside pipe = 9.00(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.11(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 7.20 min.

+++++
 Process from Point/Station 103.000 to Point/Station 103.000
 **** SUBAREA FLOW ADDITION ****

12478PR100yr1.out
Rainfall intensity (I) = 7.079(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 7.20 min.
Rainfall intensity = 7.079(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 0.886
Subarea runoff = 2.251(CFS) for 0.590(Ac.)
Total runoff = 6.269(CFS) Total area = 1.640(Ac.)

+++++
Process from Point/Station 103.000 to Point/Station 103.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.079(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 7.20 min.
Rainfall intensity = 7.079(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.091
Subarea runoff = 1.453(CFS) for 0.380(Ac.)
Total runoff = 7.722(CFS) Total area = 2.020(Ac.)

+++++
Process from Point/Station 103.000 to Point/Station 104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 461.000(Ft.)
Downstream point/station elevation = 460.860(Ft.)
Pipe length = 35.50(Ft.) Slope = 0.0039 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.722(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 7.722(CFS)
Normal flow depth in pipe = 13.90(In.)
Flow top width inside pipe = 19.87(In.)
Critical Depth = 12.35(In.)
Pipe flow velocity = 4.57(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 7.33 min.

+++++
Process from Point/Station 104.000 to Point/Station 105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 460.860(Ft.)
Downstream point/station elevation = 458.360(Ft.)
Pipe length = 250.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.722(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.722(CFS)
Normal flow depth in pipe = 11.47(In.)
Flow top width inside pipe = 17.31(In.)
Critical Depth = 12.92(In.)
Pipe flow velocity = 6.50(Ft/s)
Travel time through pipe = 0.64 min.
Time of concentration (TC) = 7.97 min.

+++++
Process from Point/Station 105.000 to Point/Station 106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 458.360(Ft.)
 Downstream point/station elevation = 455.000(Ft.)
 Pipe length = 214.00(Ft.) Slope = 0.0157 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 11.72(In.)
 Flow top width inside pipe = 12.40(In.)
 Critical Depth = 13.21(In.)
 Pipe flow velocity = 7.51(Ft/s)
 Travel time through pipe = 0.48 min.
 Time of concentration (TC) = 8.45 min.

++++++
 Process from Point/Station 106.000 to Point/Station 107.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 455.000(Ft.)
 Downstream point/station elevation = 454.450(Ft.)
 Pipe length = 53.00(Ft.) Slope = 0.0104 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 11.32(In.)
 Flow top width inside pipe = 17.39(In.)
 Critical Depth = 12.92(In.)
 Pipe flow velocity = 6.59(Ft/s)
 Travel time through pipe = 0.13 min.
 Time of concentration (TC) = 8.58 min.

++++++
 Process from Point/Station 107.000 to Point/Station 108.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 454.450(Ft.)
 Downstream point/station elevation = 440.000(Ft.)
 Pipe length = 91.50(Ft.) Slope = 0.1579 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 6.32(In.)
 Flow top width inside pipe = 11.98(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.41(Ft/s)
 Travel time through pipe = 0.08 min.
 Time of concentration (TC) = 8.66 min.

++++++
 Process from Point/Station 108.000 to Point/Station 108.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 2.020(Ac.)
 Runoff from this stream = 7.722(CFS)
 Time of concentration = 8.66 min.
 Rainfall intensity = 6.283(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 110.000 to Point/Station 111.000
 **** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 [MEDIUM DENSITY RESIDENTIAL]
 (10.9 DU/A or Less)
 Impervious value, Ai = 0.450
 Sub-Area C Value = 0.540
 Initial subarea total flow distance = 62.000(Ft.)
 Highest elevation = 467.420(Ft.)
 Lowest elevation = 466.180(Ft.)
 Elevation difference = 1.240(Ft.) Slope = 2.000 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 80.00 (Ft)
 for the top area slope value of 2.00 %, in a development type of
 10.9 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration = 7.16 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{1.5} / (\% slope^{1/3})]$
 $TC = [1.8 * (1.1 - 0.5400) * (80.000^{1.5}) / (2.000^{1/3})] = 7.16$
 Rainfall intensity (I) = 7.109(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
 Subarea runoff = 1.113(CFS)
 Total initial stream area = 0.290(Ac.)

 Process from Point/Station 111.000 to Point/Station 111.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.109(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 7.16 min.
 Rainfall intensity = 7.109(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.302
 Subarea runoff = 1.036(CFS) for 0.270(Ac.)
 Total runoff = 2.150(CFS) Total area = 0.560(Ac.)

 Process from Point/Station 111.000 to Point/Station 112.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 463.000(Ft.)
 Downstream point/station elevation = 461.480(Ft.)
 Pipe length = 152.00(Ft.) Slope = 0.0100 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.150(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 2.150(CFS)
 Normal flow depth in pipe = 6.73(In.)
 Flow top width inside pipe = 11.91(In.)
 Critical Depth = 7.52(In.)
 Pipe flow velocity = 4.75(Ft/s)
 Travel time through pipe = 0.53 min.
 Time of concentration (TC) = 7.69 min.

 Process from Point/Station 112.000 to Point/Station 113.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 461.480(Ft.)
 Downstream point/station elevation = 459.000(Ft.)
 Pipe length = 84.00(Ft.) Slope = 0.0295 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.150(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 2.150(CFS)
 Normal flow depth in pipe = 5.85(In.)
 Flow top width inside pipe = 8.59(In.)
 Critical Depth = 7.92(In.)
 Pipe flow velocity = 7.07(Ft/s)
 Travel time through pipe = 0.20 min.
 Time of concentration (TC) = 7.89 min.

 Process from Point/Station 113.000 to Point/Station 113.000
 ***** SUBAREA FLOW ADDITION *****

Rainfall intensity (I) = 6.676(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 7.89 min.
 Rainfall intensity = 6.676(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.637
 Subarea runoff = 2.104(CFS) for 0.620(Ac.)
 Total runoff = 4.254(CFS) Total area = 1.180(Ac.)

 Process from Point/Station 113.000 to Point/Station 114.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 459.000(Ft.)
 Downstream point/station elevation = 453.200(Ft.)
 Pipe length = 127.00(Ft.) Slope = 0.0457 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.254(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 4.254(CFS)
 Normal flow depth in pipe = 6.41(In.)
 Flow top width inside pipe = 11.97(In.)
 Critical Depth = 10.42(In.)
 Pipe flow velocity = 9.96(Ft/s)
 Travel time through pipe = 0.21 min.
 Time of concentration (TC) = 8.10 min.

 Process from Point/Station 114.000 to Point/Station 114.000
 ***** SUBAREA FLOW ADDITION *****

Rainfall intensity (I) = 6.563(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 8.10 min.
 Rainfall intensity = 6.563(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.864
 Subarea runoff = 1.416(CFS) for 0.420(Ac.)
 Total runoff = 5.670(CFS) Total area = 1.600(Ac.)

 Process from Point/Station 114.000 to Point/Station 114.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
 Stream flow area = 1.600(Ac.)
 Runoff from this stream = 5.670(CFS)
 Time of concentration = 8.10 min.
 Rainfall intensity = 6.563(In/Hr)

 Process from Point/Station 120.000 to Point/Station 121.000
 **** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 [MEDIUM DENSITY RESIDENTIAL]
 (10.9 DU/A or Less)
 Impervious value, Ai = 0.450
 Sub-Area C Value = 0.540
 Initial subarea total flow distance = 85.000(Ft.)
 Highest elevation = 465.000(Ft.)
 Lowest elevation = 462.500(Ft.)
 Elevation difference = 2.500(Ft.) Slope = 2.941 %
 Top of Initial Area Slope adjusted by User to 3.000 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 90.00 (Ft)
 for the top area slope value of 3.00 %, in a development type of
 10.9 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration = 6.63 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{1.5} / (\% slope^{1/3})]$
 $TC = [1.8 * (1.1 - 0.5400) * (90.000^{1.5}) / (3.000^{1/3})] = 6.63$
 Rainfall intensity (I) = 7.467(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
 Subarea runoff = 0.968(CFS)
 Total initial stream area = 0.240(Ac.)

 Process from Point/Station 121.000 to Point/Station 122.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.199(CFS)
 Depth of flow = 0.126(Ft.), Average velocity = 1.522(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	0.12	0.00
3	40.00	0.40

 Manning's 'N' friction factor = 0.016

Sub-Channel flow = 1.199(CFS)
 flow top width = 12.551(Ft.)
 velocity = 1.522(Ft/s)
 area = 0.788(Sq.Ft)
 Froude number = 1.070

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Upstream point elevation = 462.500(Ft.)
 Downstream point elevation = 458.500(Ft.)
 Flow length = 368.000(Ft.)
 Travel time = 4.03 min.
 Time of concentration = 10.66 min.
 Depth of flow = 0.126(Ft.)
 Average velocity = 1.522(Ft/s)
 Total irregular channel flow = 1.199(CFS)
 Irregular channel normal depth above invert elev. = 0.126(Ft.)
 Average velocity of channel(s) = 1.522(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 5.497(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Rainfall intensity = 5.497(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.248
 Subarea runoff = 0.398(CFS) for 0.220(Ac.)
 Total runoff = 1.365(CFS) Total area = 0.460(Ac.)
 Depth of flow = 0.132(Ft.), Average velocity = 1.572(Ft/s)

+++++
 Process from Point/Station 122.000 to Point/Station 123.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 455.000(Ft.)
 Downstream point/station elevation = 454.600(Ft.)
 Pipe length = 36.00(Ft.) Slope = 0.0111 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 1.365(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 1.365(CFS)
 Normal flow depth in pipe = 5.99(In.)
 Flow top width inside pipe = 8.49(In.)
 Critical Depth = 6.46(In.)
 Pipe flow velocity = 4.37(Ft/s)
 Travel time through pipe = 0.14 min.
 Time of concentration (TC) = 10.80 min.

+++++
 Process from Point/Station 123.000 to Point/Station 123.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.452(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 10.80 min.
 Rainfall intensity = 5.452(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.632
 Subarea runoff = 2.079(CFS) for 0.710(Ac.)
 Total runoff = 3.444(CFS) Total area = 1.170(Ac.)

+++++
 Process from Point/Station 123.000 to Point/Station 123.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.452(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 10.80 min.
 Rainfall intensity = 5.452(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

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(Q=KCIA) is C = 0.540 CA = 0.724
Subarea runoff = 0.500(CFS) for 0.170(Ac.)
Total runoff = 3.945(CFS) Total area = 1.340(Ac.)

++++
Process from Point/Station 123.000 to Point/Station 124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 454.600(Ft.)
Downstream point/station elevation = 453.780(Ft.)
Pipe length = 82.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.945(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.945(CFS)
Normal flow depth in pipe = 8.47(In.)
Flow top width inside pipe = 14.87(In.)
Critical Depth = 9.64(In.)
Pipe flow velocity = 5.52(Ft/s)
Travel time through pipe = 0.25 min.
Time of concentration (TC) = 11.05 min.

++++
Process from Point/Station 124.000 to Point/Station 124.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.373(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 11.05 min.
Rainfall intensity = 5.373(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.091
Subarea runoff = 1.916(CFS) for 0.680(Ac.)
Total runoff = 5.861(CFS) Total area = 2.020(Ac.)

++++
Process from Point/Station 124.000 to Point/Station 124.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.373(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 11.05 min.
Rainfall intensity = 5.373(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.264
Subarea runoff = 0.928(CFS) for 0.320(Ac.)
Total runoff = 6.789(CFS) Total area = 2.340(Ac.)

++++
Process from Point/Station 124.000 to Point/Station 114.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 453.780(Ft.)
Downstream point/station elevation = 452.350(Ft.)
Pipe length = 143.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.789(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.789(CFS)
Normal flow depth in pipe = 10.54(In.)
Flow top width inside pipe = 17.74(In.)

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 Critical Depth = 12.11(In.)
 Pipe flow velocity = 6.32(Ft/s)
 Travel time through pipe = 0.38 min.
 Time of concentration (TC) = 11.42 min.

+++++
 Process from Point/Station 114.000 to Point/Station 114.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 2.340(Ac.)
 Runoff from this stream = 6.789(CFS)
 Time of concentration = 11.42 min.
 Rainfall intensity = 5.258(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	5.670	8.10	6.563
2	6.789	11.42	5.258
Qmax(1) =			
	1.000 *	1.000 *	5.670) +
	1.000 *	0.709 *	6.789) + = 10.484
Qmax(2) =			
	0.801 *	1.000 *	5.670) +
	1.000 *	1.000 *	6.789) + = 11.331

Total of 2 streams to confluence:
 Flow rates before confluence point:
 5.670 6.789
 Maximum flow rates at confluence using above data:
 10.484 11.331
 Area of streams before confluence:
 1.600 2.340
 Results of confluence:
 Total flow rate = 11.331(CFS)
 Time of concentration = 11.423 min.
 Effective stream area after confluence = 3.940(Ac.)

+++++
 Process from Point/Station 114.000 to Point/Station 115.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 452.350(Ft.)
 Downstream point/station elevation = 450.220(Ft.)
 Pipe length = 66.00(Ft.) Slope = 0.0323 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 11.331(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 11.331(CFS)
 Normal flow depth in pipe = 11.98(In.)
 Flow top width inside pipe = 12.04(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 10.78(Ft/s)
 Travel time through pipe = 0.10 min.
 Time of concentration (TC) = 11.52 min.

+++++
 Process from Point/Station 115.000 to Point/Station 115.000
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**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.228(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 11.52 min.
 Rainfall intensity = 5.228(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 2.322
 Subarea runoff = 0.807(CFS) for 0.360(Ac.)
 Total runoff = 12.138(CFS) Total area = 4.300(Ac.)

++++++
 Process from Point/Station 115.000 to Point/Station 116.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 450.220(Ft.)
 Downstream point/station elevation = 448.000(Ft.)
 Pipe length = 74.00(Ft.) Slope = 0.0300 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 12.138(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 12.138(CFS)
 Normal flow depth in pipe = 10.76(In.)
 Flow top width inside pipe = 17.65(In.)
 Critical Depth = 15.83(In.)
 Pipe flow velocity = 11.03(Ft/s)
 Travel time through pipe = 0.11 min.
 Time of concentration (TC) = 11.64 min.

++++++
 Process from Point/Station 116.000 to Point/Station 116.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.195(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 11.64 min.
 Rainfall intensity = 5.195(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 2.479
 Subarea runoff = 0.738(CFS) for 0.290(Ac.)
 Total runoff = 12.876(CFS) Total area = 4.590(Ac.)

++++++
 Process from Point/Station 116.000 to Point/Station 108.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 441.000(Ft.)
 Downstream point/station elevation = 440.000(Ft.)
 Pipe length = 67.00(Ft.) Slope = 0.0149 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 12.876(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 12.876(CFS)
 Normal flow depth in pipe = 12.52(In.)
 Flow top width inside pipe = 20.61(In.)
 Critical Depth = 16.03(In.)
 Pipe flow velocity = 8.61(Ft/s)
 Travel time through pipe = 0.13 min.
 Time of concentration (TC) = 11.77 min.

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Process from Point/Station 108.000 to Point/Station 108.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 4.590(Ac.)
 Runoff from this stream = 12.876(CFS)
 Time of concentration = 11.77 min.
 Rainfall intensity = 5.158(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	7.722	8.66	6.283
2	12.876	11.77	5.158

Qmax(1) =

$$1.000 * 1.000 * 7.722 + 1.000 * 0.736 * 12.876 = 17.204$$

Qmax(2) =

$$0.821 * 1.000 * 7.722 + 1.000 * 1.000 * 12.876 = 19.215$$

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 7.722 12.876
 Maximum flow rates at confluence using above data:
 17.204 19.215
 Area of streams before confluence:
 2.020 4.590

Results of confluence:
 Total flow rate = 19.215(CFS)
 Time of concentration = 11.766 min.
 Effective stream area after confluence = 6.610(Ac.)

 Process from Point/Station 108.000 to Point/Station 109.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 440.000(Ft.)
 Downstream point/station elevation = 435.000(Ft.)
 Pipe length = 61.00(Ft.) Slope = 0.0820 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 19.215(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 19.215(CFS)
 Normal flow depth in pipe = 10.45(In.)
 Flow top width inside pipe = 17.76(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.05(Ft/s)
 Travel time through pipe = 0.06 min.
 Time of concentration (TC) = 11.82 min.

 Process from Point/Station 109.000 to Point/Station 109.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.142(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea

```

                                12478PR100yr1.out
Time of concentration =      11.82 min.
Rainfall intensity =      5.142(In/Hr) for a  100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540  CA =      4.649
Subarea runoff =      4.693(CFS) for      2.000(Ac.)
Total runoff =      23.908(CFS)  Total area =      8.610(Ac.)
End of computations, total study area =      8.610 (Ac.)

```

12478pr100yr2.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/16/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 2
SVBF TEMPLE
ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 135.000(Ft.)
Highest elevation = 450.000(Ft.)
Lowest elevation = 432.000(Ft.)
Elevation difference = 18.000(Ft.) Slope = 13.333 %
Top of Initial Area Slope adjusted by User to 13.000 %
Bottom of Initial Area Slope adjusted by User to 13.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 13.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 6.51 minutes
 $TC = [1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5} / (\% \text{ slope}^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (13.000^{(1/3)})] = 6.51$
The initial area total distance of 135.00 (Ft.) entered leaves a
remaining distance of 35.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.26 minutes
for a distance of 35.00 (Ft.) and a slope of 13.00 %
with an elevation difference of 4.55(Ft.) from the end of the top area

12478pr100yr2.out

$Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{.385} * 60(\text{min/hr})$
 = 0.265 Minutes
 $Tt = [(11.9 * 0.0066^3) / (4.55)]^{.385} = 0.26$
 Total initial area $Ti = 6.51$ minutes from Figure 3-3 formula plus
 0.26 minutes from the Figure 3-4 formula = 6.77 minutes
 Rainfall intensity (I) = 7.366(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area ($Q=KCIA$) is $C = 0.250$
 Subarea runoff = 1.160(CFS)
 Total initial stream area = 0.630(Ac.)
 End of computations, total study area = 0.630 (Ac.)

12478PR100yr3.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/17/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 3
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 86.000(Ft.)
Highest elevation = 480.000(Ft.)
Lowest elevation = 472.000(Ft.)
Elevation difference = 8.000(Ft.) Slope = 9.302 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 9.30 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 7.27 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (9.302^{(1/3)})] = 7.27$
Rainfall intensity (I) = 7.033(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.176(CFS)
Total initial stream area = 0.100(Ac.)

 Process from Point/Station 301.000 to Point/Station 302.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.404(CFS)
 Depth of flow = 0.253(Ft.), Average velocity = 6.319(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	1.00	0.00
3	2.00	1.00

Manning's 'N' friction factor = 0.013

 Sub-Channel flow = 0.404(CFS)
 ' ' flow top width = 0.506(Ft.)
 ' ' velocity = 6.319(Ft/s)
 ' ' area = 0.064(Sq.Ft)
 ' ' Froude number = 3.131

Upstream point elevation = 472.000(Ft.)
 Downstream point elevation = 450.000(Ft.)
 Flow length = 288.000(Ft.)
 Travel time = 0.76 min.
 Time of concentration = 8.03 min.
 Depth of flow = 0.253(Ft.)
 Average velocity = 6.319(Ft/s)
 Total irregular channel flow = 0.404(CFS)
 Irregular channel normal depth above invert elev. = 0.253(Ft.)
 Average velocity of channel(s) = 6.319(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 6.597(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.280 given for subarea
 Rainfall intensity = 6.597(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.272 CA = 0.098
 Subarea runoff = 0.469(CFS) for 0.260(Ac.)
 Total runoff = 0.645(CFS) Total area = 0.360(Ac.)
 Depth of flow = 0.301(Ft.), Average velocity = 7.101(Ft/s)

 Process from Point/Station 302.000 to Point/Station 303.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.174(CFS)
 Depth of flow = 0.371(Ft.), Average velocity = 8.533(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	1.00	0.00
3	2.00	1.00

Manning's 'N' friction factor = 0.013

 Sub-Channel flow = 1.174(CFS)
 ' ' flow top width = 0.742(Ft.)
 ' ' velocity = 8.533(Ft/s)
 ' ' area = 0.138(Sq.Ft)
 ' ' Froude number = 3.492

12478PR100yr3.out
Upstream point elevation = 450.000(Ft.)
Downstream point elevation = 428.000(Ft.)
Flow length = 263.000(Ft.)
Travel time = 0.51 min.
Time of concentration = 8.55 min.
Depth of flow = 0.371(Ft.)
Average velocity = 8.533(Ft/s)
Total irregular channel flow = 1.174(CFS)
Irregular channel normal depth above invert elev. = 0.371(Ft.)
Average velocity of channel(s) = 8.533(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 6.339(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.280 given for subarea
Rainfall intensity = 6.339(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.277 CA = 0.263
Subarea runoff = 1.022(CFS) for 0.590(Ac.)
Total runoff = 1.667(CFS) Total area = 0.950(Ac.)
Depth of flow = 0.423(Ft.), Average velocity = 9.315(Ft/s)
End of computations, total study area = 0.950 (Ac.)

DRAINAGE AREAS AND COEFFICIENT OF RUNOFF
FOR OFFSITE BASINS DO NOT CHANGE IN THE
PROPOSED CONDITION
(REFER TO APPENDIX B FOR OFFSITE
HYDROLOGY ANALYSIS)

HYDRAULIC ANALYSIS

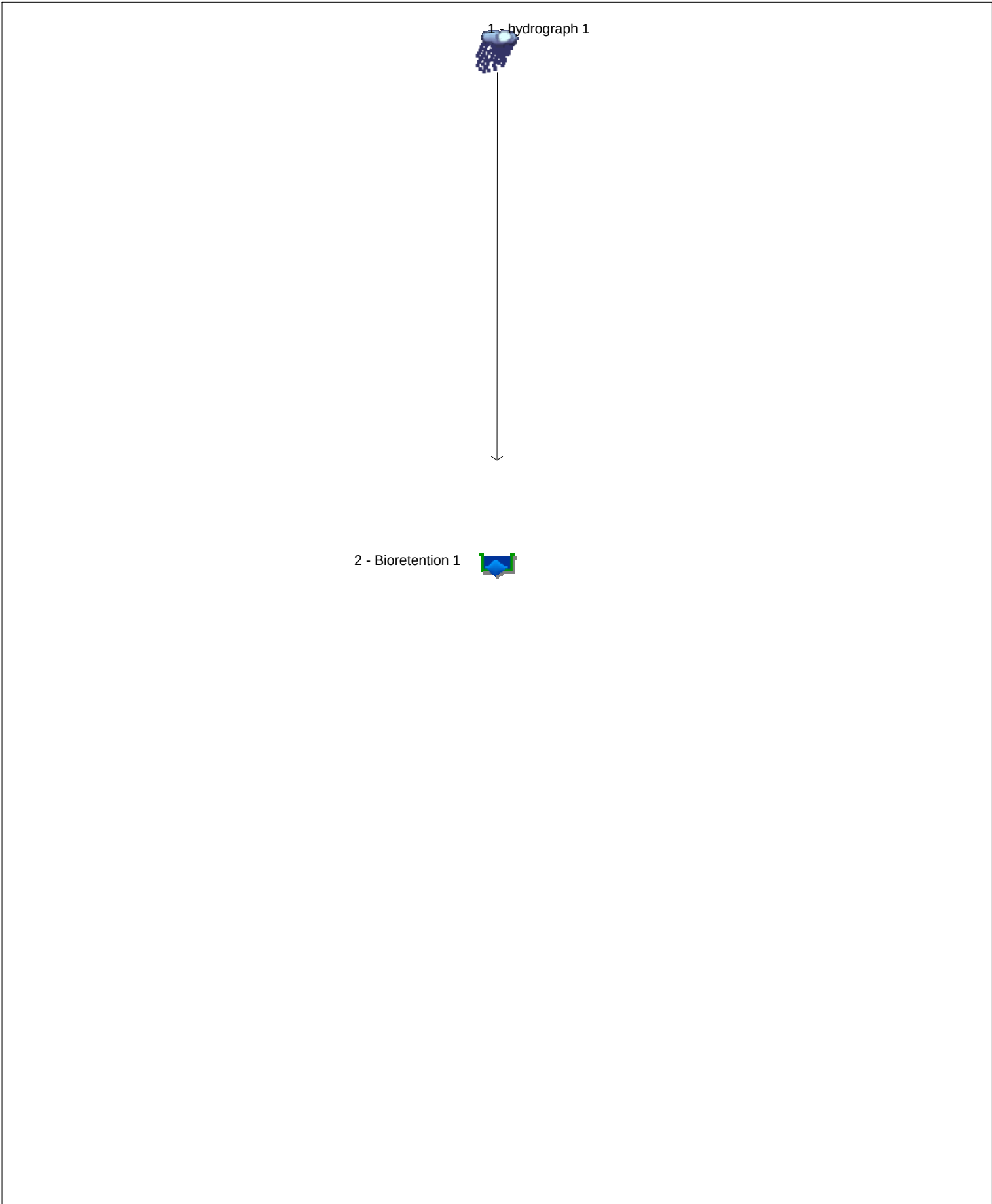
RUN DATE 3/17/2017
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 3.4 INCHES
BASIN AREA 2.02 ACRES
RUNOFF COEFFICIENT 0.54
PEAK DISCHARGE 7.7 CFS

Detention Basin -1 Analysis (BMP #1)

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 7	DISCHARGE (CFS) = 0.2
TIME (MIN) = 14	DISCHARGE (CFS) = 0.2
TIME (MIN) = 21	DISCHARGE (CFS) = 0.2
TIME (MIN) = 28	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 42	DISCHARGE (CFS) = 0.2
TIME (MIN) = 49	DISCHARGE (CFS) = 0.3
TIME (MIN) = 56	DISCHARGE (CFS) = 0.3
TIME (MIN) = 63	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 77	DISCHARGE (CFS) = 0.3
TIME (MIN) = 84	DISCHARGE (CFS) = 0.3
TIME (MIN) = 91	DISCHARGE (CFS) = 0.3
TIME (MIN) = 98	DISCHARGE (CFS) = 0.3
TIME (MIN) = 105	DISCHARGE (CFS) = 0.3
TIME (MIN) = 112	DISCHARGE (CFS) = 0.3
TIME (MIN) = 119	DISCHARGE (CFS) = 0.3
TIME (MIN) = 126	DISCHARGE (CFS) = 0.3
TIME (MIN) = 133	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 147	DISCHARGE (CFS) = 0.4
TIME (MIN) = 154	DISCHARGE (CFS) = 0.4
TIME (MIN) = 161	DISCHARGE (CFS) = 0.4
TIME (MIN) = 168	DISCHARGE (CFS) = 0.5
TIME (MIN) = 175	DISCHARGE (CFS) = 0.5
TIME (MIN) = 182	DISCHARGE (CFS) = 0.5
TIME (MIN) = 189	DISCHARGE (CFS) = 0.6
TIME (MIN) = 196	DISCHARGE (CFS) = 0.6
TIME (MIN) = 203	DISCHARGE (CFS) = 0.7
TIME (MIN) = 210	DISCHARGE (CFS) = 0.8
TIME (MIN) = 217	DISCHARGE (CFS) = 0.9
TIME (MIN) = 224	DISCHARGE (CFS) = 1.1
TIME (MIN) = 231	DISCHARGE (CFS) = 1.6
TIME (MIN) = 238	DISCHARGE (CFS) = 2.4
TIME (MIN) = 245	DISCHARGE (CFS) = 7.7
TIME (MIN) = 252	DISCHARGE (CFS) = 1.2
TIME (MIN) = 259	DISCHARGE (CFS) = 0.8
TIME (MIN) = 266	DISCHARGE (CFS) = 0.7
TIME (MIN) = 273	DISCHARGE (CFS) = 0.5
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 287	DISCHARGE (CFS) = 0.4
TIME (MIN) = 294	DISCHARGE (CFS) = 0.4
TIME (MIN) = 301	DISCHARGE (CFS) = 0.4
TIME (MIN) = 308	DISCHARGE (CFS) = 0.3
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 322	DISCHARGE (CFS) = 0.3
TIME (MIN) = 329	DISCHARGE (CFS) = 0.3
TIME (MIN) = 336	DISCHARGE (CFS) = 0.3
TIME (MIN) = 343	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 357	DISCHARGE (CFS) = 0.2
TIME (MIN) = 364	DISCHARGE (CFS) = 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

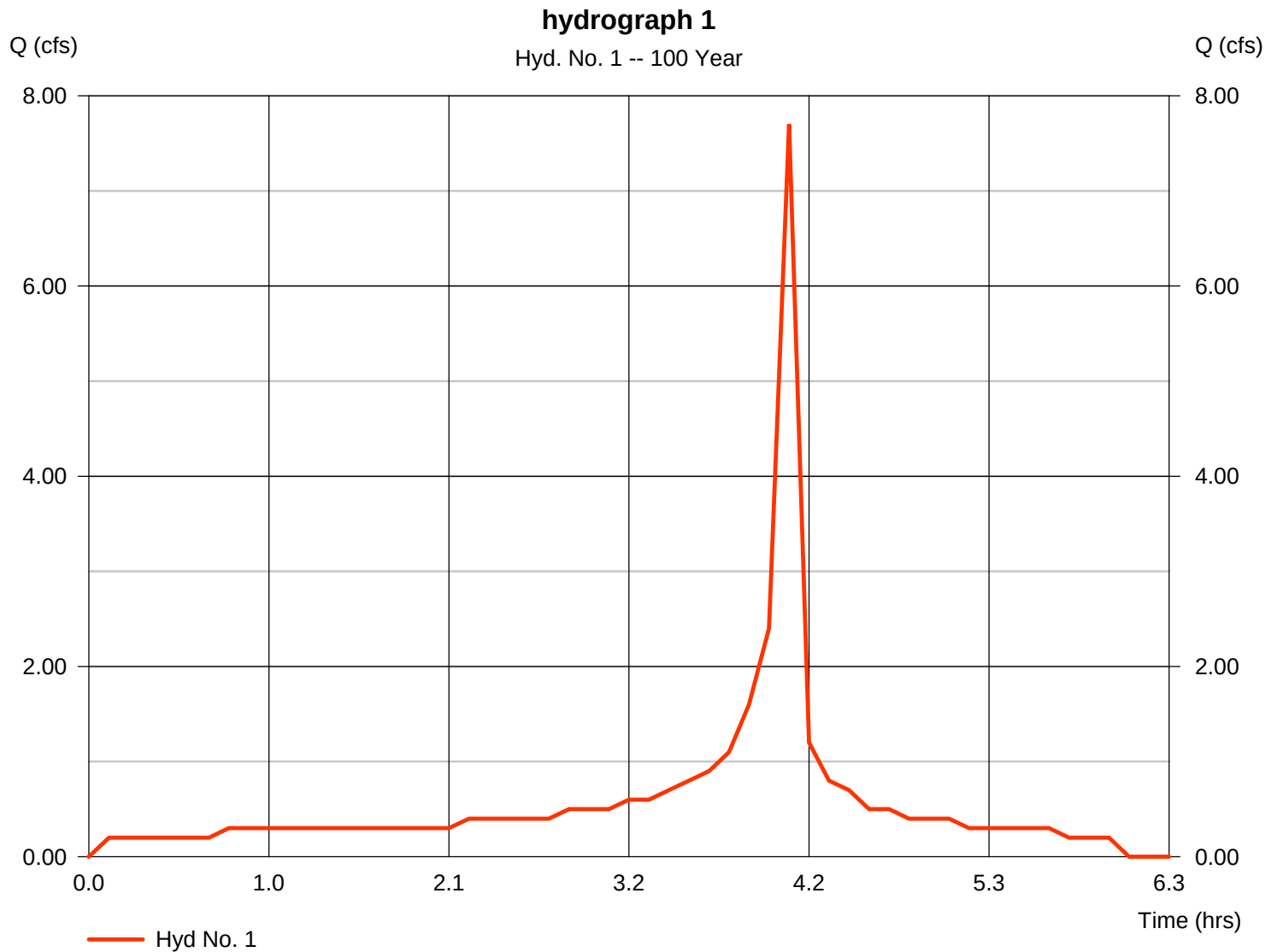
Friday, 03 / 17 / 2017

Hyd. No. 1

hydrograph 1

Hydrograph type = Manual
 Storm frequency = 100 yrs
 Time interval = 7 min

Peak discharge = 7.700 cfs
 Time to peak = 4.08 hrs
 Hyd. volume = 13,314 cuft



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

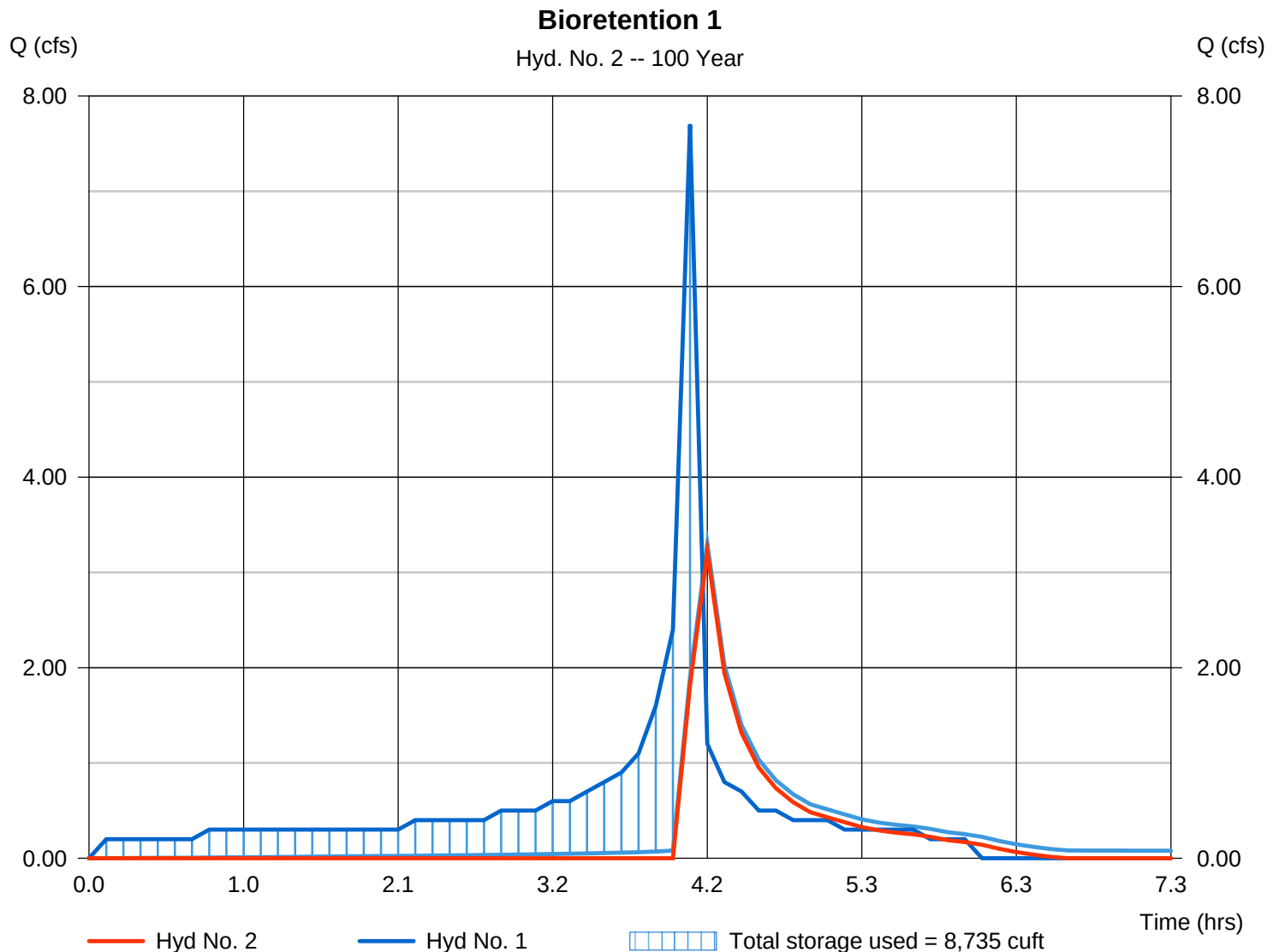
Friday, 03 / 17 / 2017

Hyd. No. 2

Bioretention 1

Hydrograph type	= Reservoir	Peak discharge	= 3.215 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.20 hrs
Time interval	= 7 min	Hyd. volume	= 5,853 cuft
Inflow hyd. No.	= 1 - hydrograph 1	Max. Elevation	= 463.41 ft
Reservoir name	= Detention Basin 1	Max. Storage	= 8,735 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

4

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 1 - Detention Basin 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 462.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	462.00	5,790	0	0
1.00	463.00	6,787	6,289	6,289
1.50	463.50	7,290	3,519	9,808

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	3.00	8.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 461.00	462.50	27.00	0.00
Length (ft)	= 63.00	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	0.30	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.71	Inactive	Inactive	Inactive
Crest El. (ft)	= 463.00	463.34	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	462.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	6,289	463.00	2.67 ic	0.00	0.00	---	0.00	0.00	---	---	0.082	---	0.082
1.50	9,808	463.50	4.94 ic	0.00	0.00	---	4.94 s	0.00	---	---	0.088	---	5.024

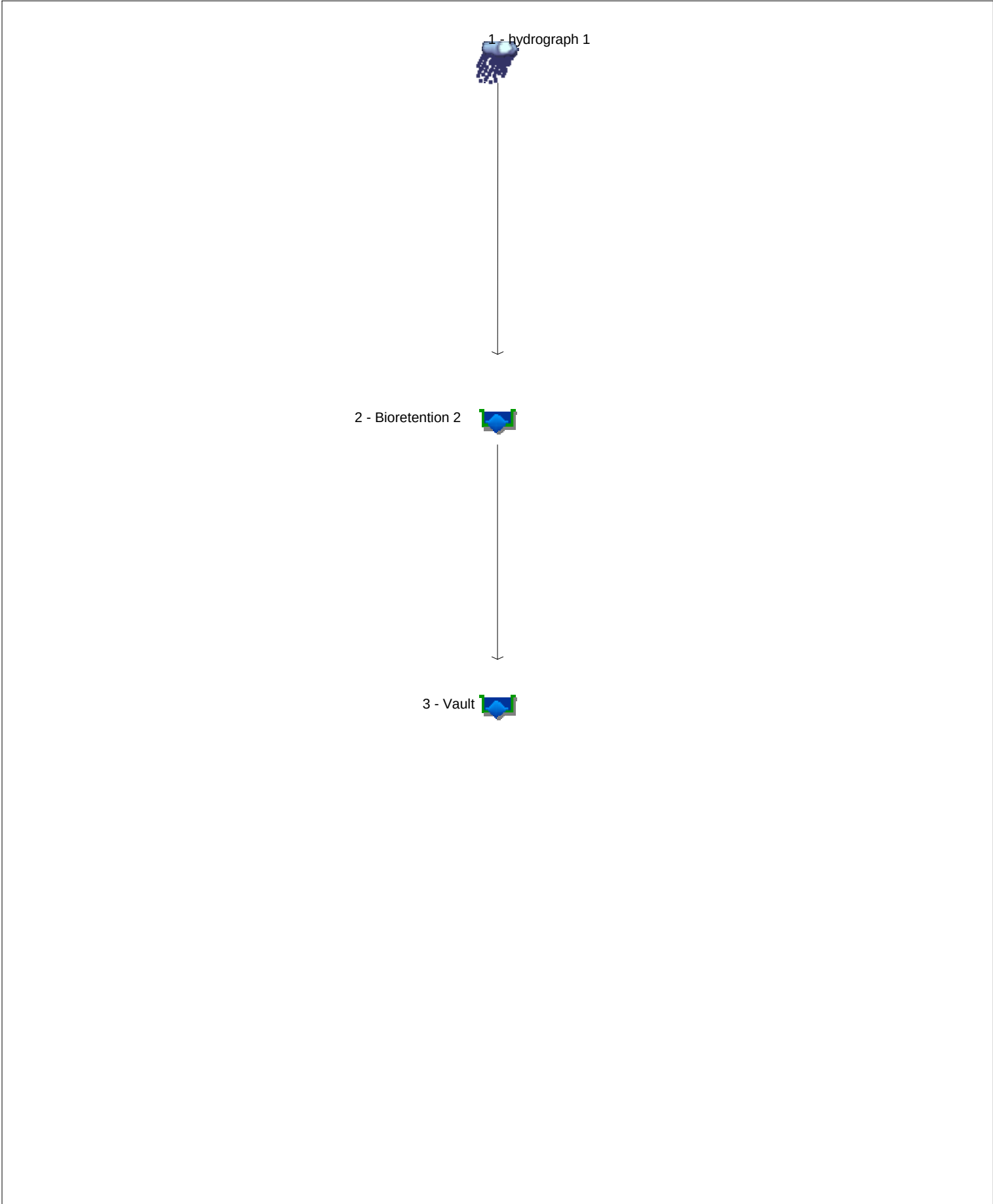
RUN DATE 3/17/2017
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 3.4 INCHES
BASIN AREA 4.59 ACRES
RUNOFF COEFFICIENT 0.54
PEAK DISCHARGE 12.87 CFS

Detention Basin -2 Analysis (BMPs 2 & 3)

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 11	DISCHARGE (CFS) = 0.5
TIME (MIN) = 22	DISCHARGE (CFS) = 0.5
TIME (MIN) = 33	DISCHARGE (CFS) = 0.5
TIME (MIN) = 44	DISCHARGE (CFS) = 0.5
TIME (MIN) = 55	DISCHARGE (CFS) = 0.6
TIME (MIN) = 66	DISCHARGE (CFS) = 0.6
TIME (MIN) = 77	DISCHARGE (CFS) = 0.6
TIME (MIN) = 88	DISCHARGE (CFS) = 0.6
TIME (MIN) = 99	DISCHARGE (CFS) = 0.7
TIME (MIN) = 110	DISCHARGE (CFS) = 0.7
TIME (MIN) = 121	DISCHARGE (CFS) = 0.7
TIME (MIN) = 132	DISCHARGE (CFS) = 0.8
TIME (MIN) = 143	DISCHARGE (CFS) = 0.8
TIME (MIN) = 154	DISCHARGE (CFS) = 0.9
TIME (MIN) = 165	DISCHARGE (CFS) = 1
TIME (MIN) = 176	DISCHARGE (CFS) = 1
TIME (MIN) = 187	DISCHARGE (CFS) = 1.2
TIME (MIN) = 198	DISCHARGE (CFS) = 1.3
TIME (MIN) = 209	DISCHARGE (CFS) = 1.6
TIME (MIN) = 220	DISCHARGE (CFS) = 1.8
TIME (MIN) = 231	DISCHARGE (CFS) = 2.6
TIME (MIN) = 242	DISCHARGE (CFS) = 4.2
TIME (MIN) = 253	DISCHARGE (CFS) = 12.87
TIME (MIN) = 264	DISCHARGE (CFS) = 2.1
TIME (MIN) = 275	DISCHARGE (CFS) = 1.4
TIME (MIN) = 286	DISCHARGE (CFS) = 1.1
TIME (MIN) = 297	DISCHARGE (CFS) = 0.9
TIME (MIN) = 308	DISCHARGE (CFS) = 0.8
TIME (MIN) = 319	DISCHARGE (CFS) = 0.7
TIME (MIN) = 330	DISCHARGE (CFS) = 0.7
TIME (MIN) = 341	DISCHARGE (CFS) = 0.6
TIME (MIN) = 352	DISCHARGE (CFS) = 0.6
TIME (MIN) = 363	DISCHARGE (CFS) = 0.5
TIME (MIN) = 374	DISCHARGE (CFS) = 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4



Hydrograph Report

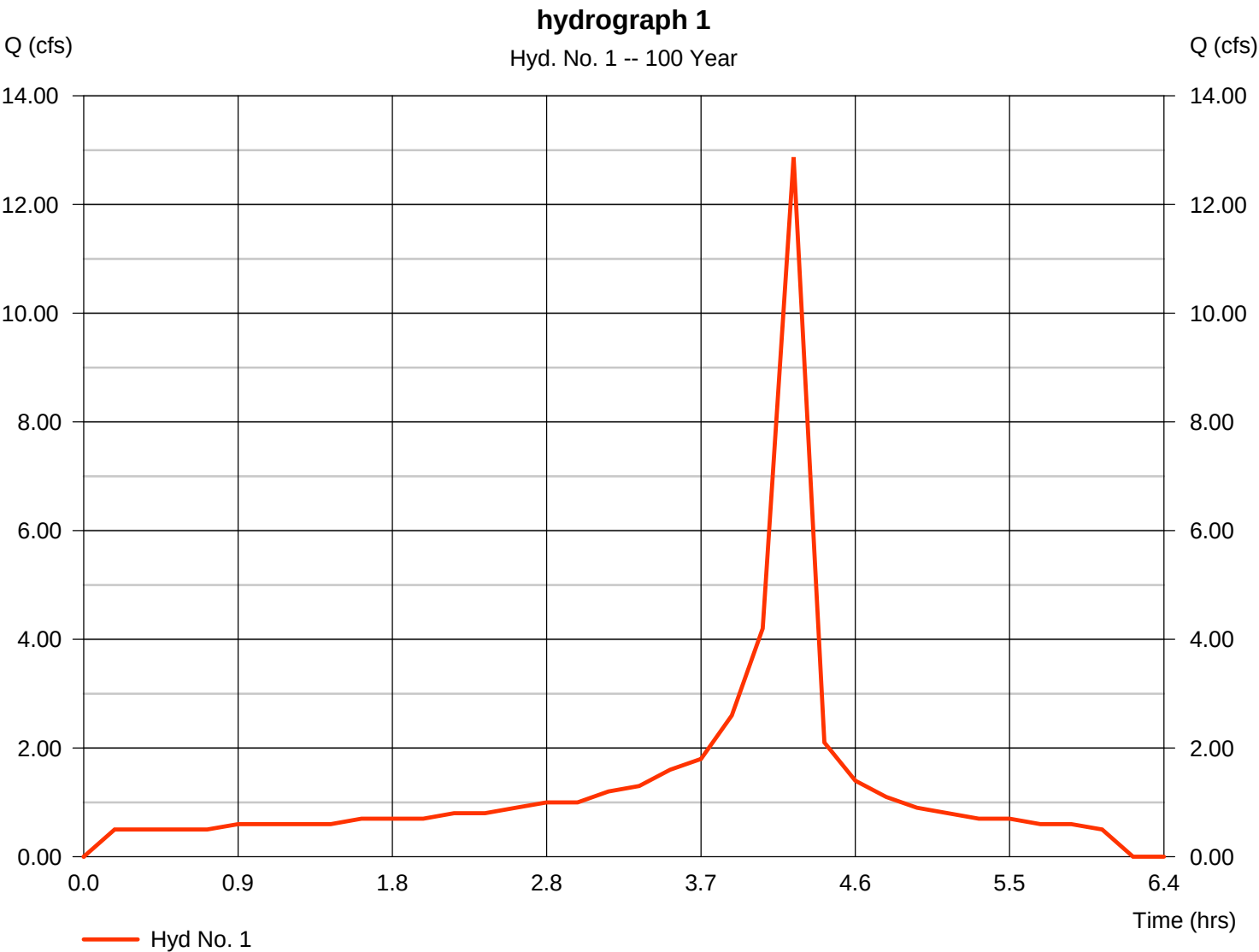
Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Hyd. No. 1

hydrograph 1

Hydrograph type	= Manual	Peak discharge	= 12.87 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.22 hrs
Time interval	= 11 min	Hyd. volume	= 30,340 cuft



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

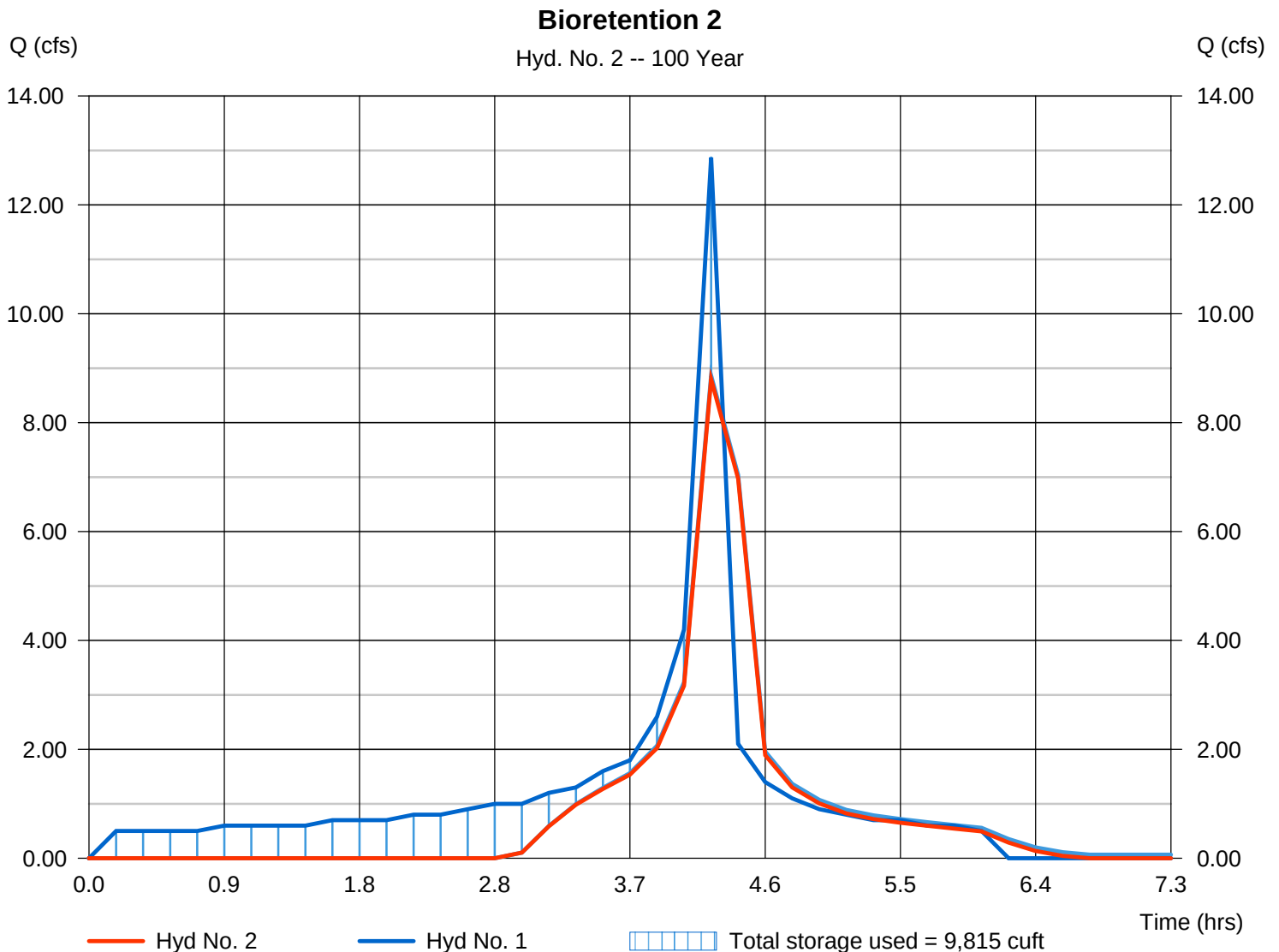
Friday, 03 / 17 / 2017

Hyd. No. 2

Bioretention 2

Hydrograph type	= Reservoir	Peak discharge	= 8.797 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.22 hrs
Time interval	= 11 min	Hyd. volume	= 22,398 cuft
Inflow hyd. No.	= 1 - hydrograph 1	Max. Elevation	= 450.70 ft
Reservoir name	= Bioretention 2	Max. Storage	= 9,815 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

4

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 1 - Bioretention 2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	5,900	0	0
1.00	450.00	6,860	6,380	6,380
1.50	450.70	7,940	3,700	10,080

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	Inactive	Inactive	Inactive
Span (in)	= 30.00	1.70	8.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 449.00	449.00	27.00	0.00
Length (ft)	= 63.00	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	0.30	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.85	Inactive	Inactive	Inactive
Crest El. (ft)	= 450.00	442.20	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)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	449.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	6,380	450.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.083	---	0.083
1.50	10,080	450.70	11.96 ic	0.00	0.00	---	11.95 s	0.00	---	---	0.096	---	12.04

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

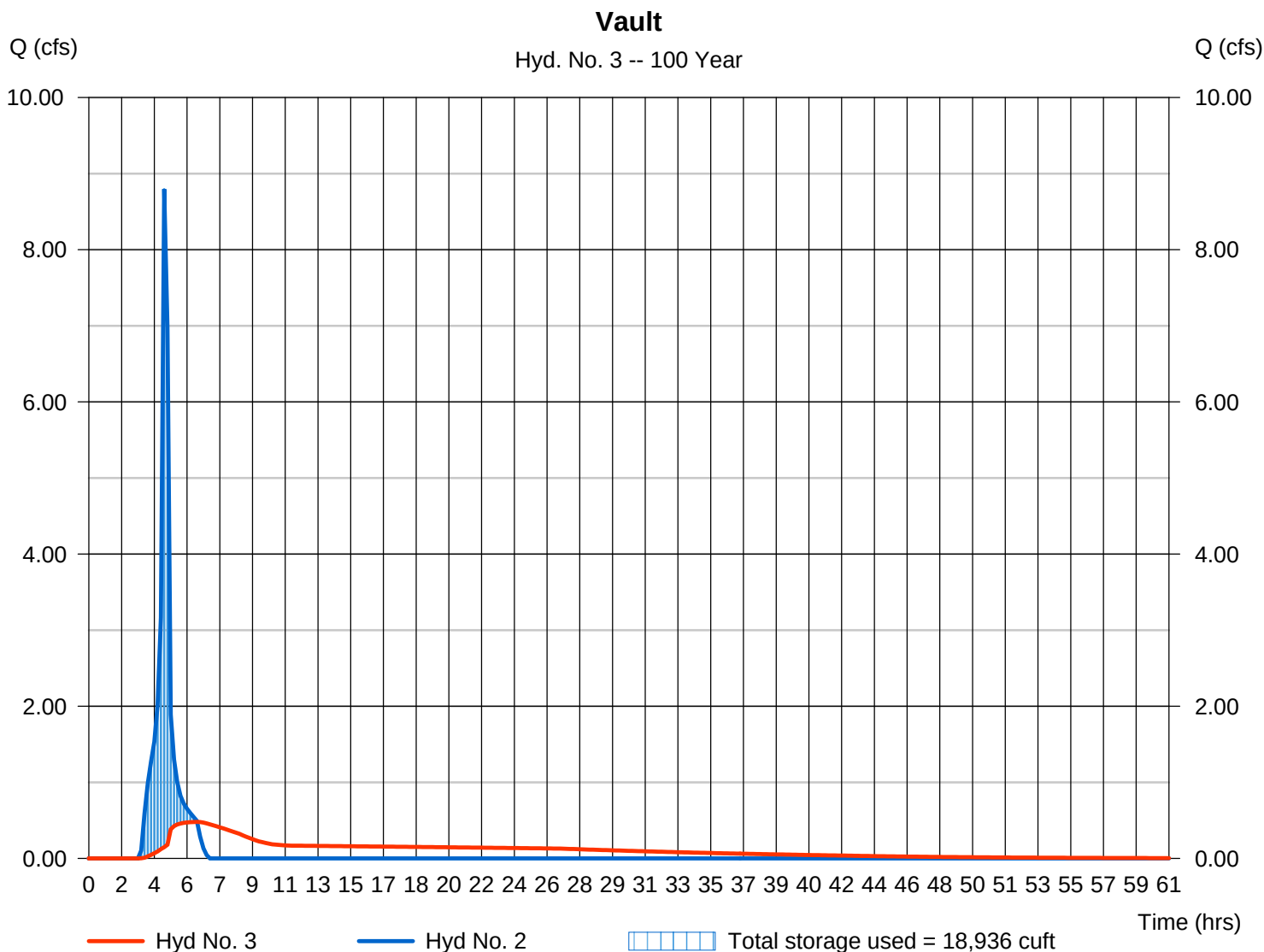
Friday, 03 / 17 / 2017

Hyd. No. 3

Vault

Hydrograph type	= Reservoir	Peak discharge	= 0.479 cfs
Storm frequency	= 100 yrs	Time to peak	= 6.05 hrs
Time interval	= 11 min	Hyd. volume	= 22,369 cuft
Inflow hyd. No.	= 2 - Bioretention 2	Max. Elevation	= 443.46 ft
Reservoir name	= Vault 1	Max. Storage	= 18,936 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

6

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 2 - Vault 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 440.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	440.00	5,475	0	0
1.00	441.00	5,475	5,475	5,475
2.00	442.00	5,475	5,475	10,950
3.00	443.00	5,475	5,475	16,425
4.00	444.00	5,475	5,475	21,900
5.00	445.00	5,475	5,475	27,375
5.20	445.20	5,475	1,095	28,470

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.59	5.10	Inactive
Span (in)	= 24.00	1.59	5.10	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 440.00	440.00	442.50	0.00
Length (ft)	= 60.00	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	0.30	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.85	Inactive	Inactive	Inactive
Crest El. (ft)	= 445.00	442.20	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)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	440.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	5,475	441.00	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	0.066	---	0.129
2.00	10,950	442.00	0.09 ic	0.09 ic	0.00	---	0.00	0.00	---	---	0.066	---	0.157
3.00	16,425	443.00	0.29 ic	0.11 ic	0.18 ic	---	0.00	0.00	---	---	0.066	---	0.360
4.00	21,900	444.00	0.52 ic	0.13 ic	0.39 ic	---	0.00	0.00	---	---	0.066	---	0.581
5.00	27,375	445.00	0.69 ic	0.14 ic	0.52 ic	---	0.00	0.00	---	---	0.066	---	0.726
5.20	28,470	445.20	3.03 ic	0.14 ic	0.54 ic	---	2.34	0.00	---	---	0.066	---	3.083

Channel Report

Offsite Culvert 1

Circular

Diameter (ft) = 1.00

Invert Elev (ft) = 10.00

Slope (%) = 3.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.22

Highlighted

Depth (ft) = 0.13

Q (cfs) = 0.220

Area (sqft) = 0.06

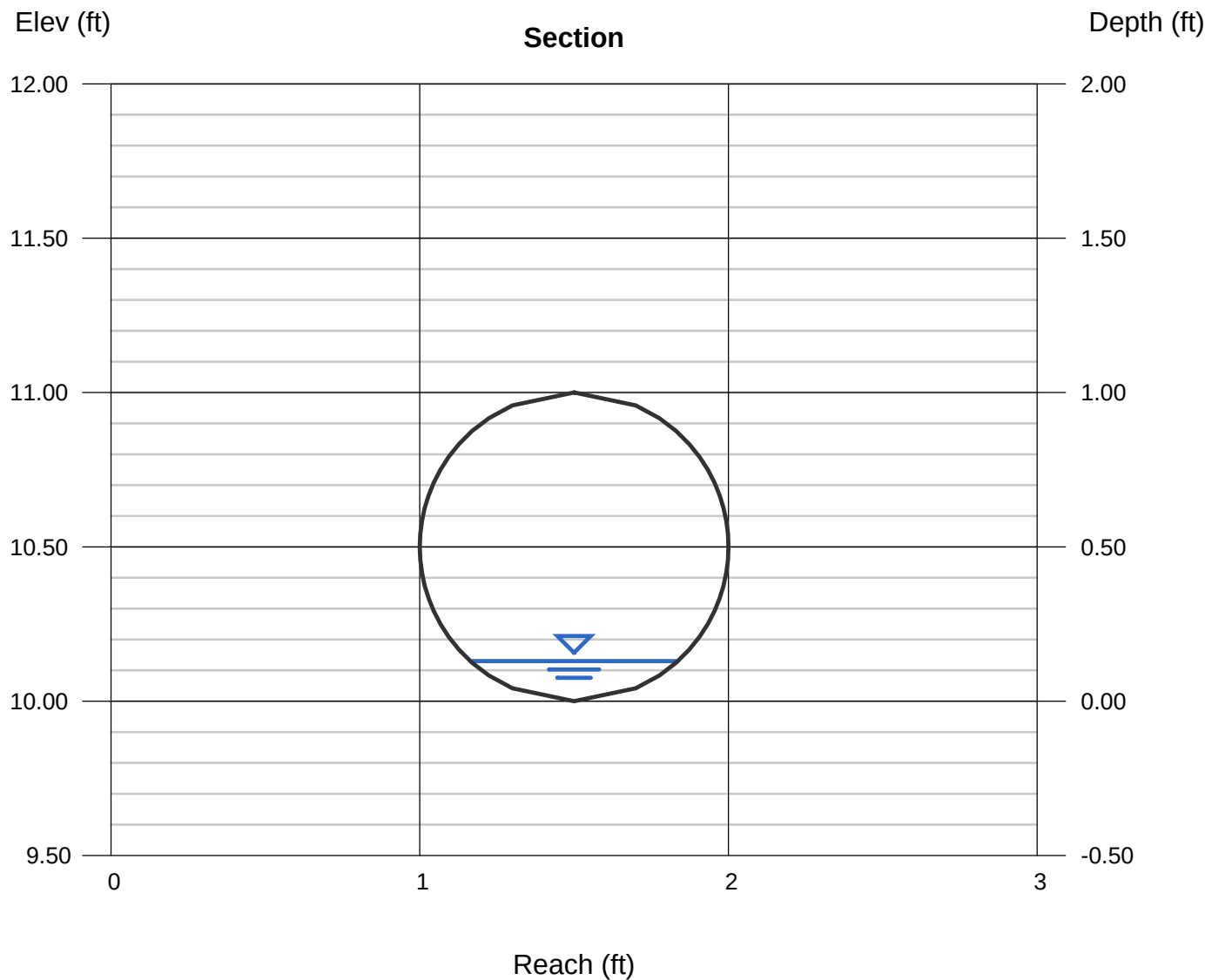
Velocity (ft/s) = 3.64

Wetted Perim (ft) = 0.74

Crit Depth, Yc (ft) = 0.20

Top Width (ft) = 0.67

EGL (ft) = 0.34



Channel Report

Offsite Culvert 2

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 5.30

Highlighted

Depth (ft) = 0.62

Q (cfs) = 5.300

Area (sqft) = 0.69

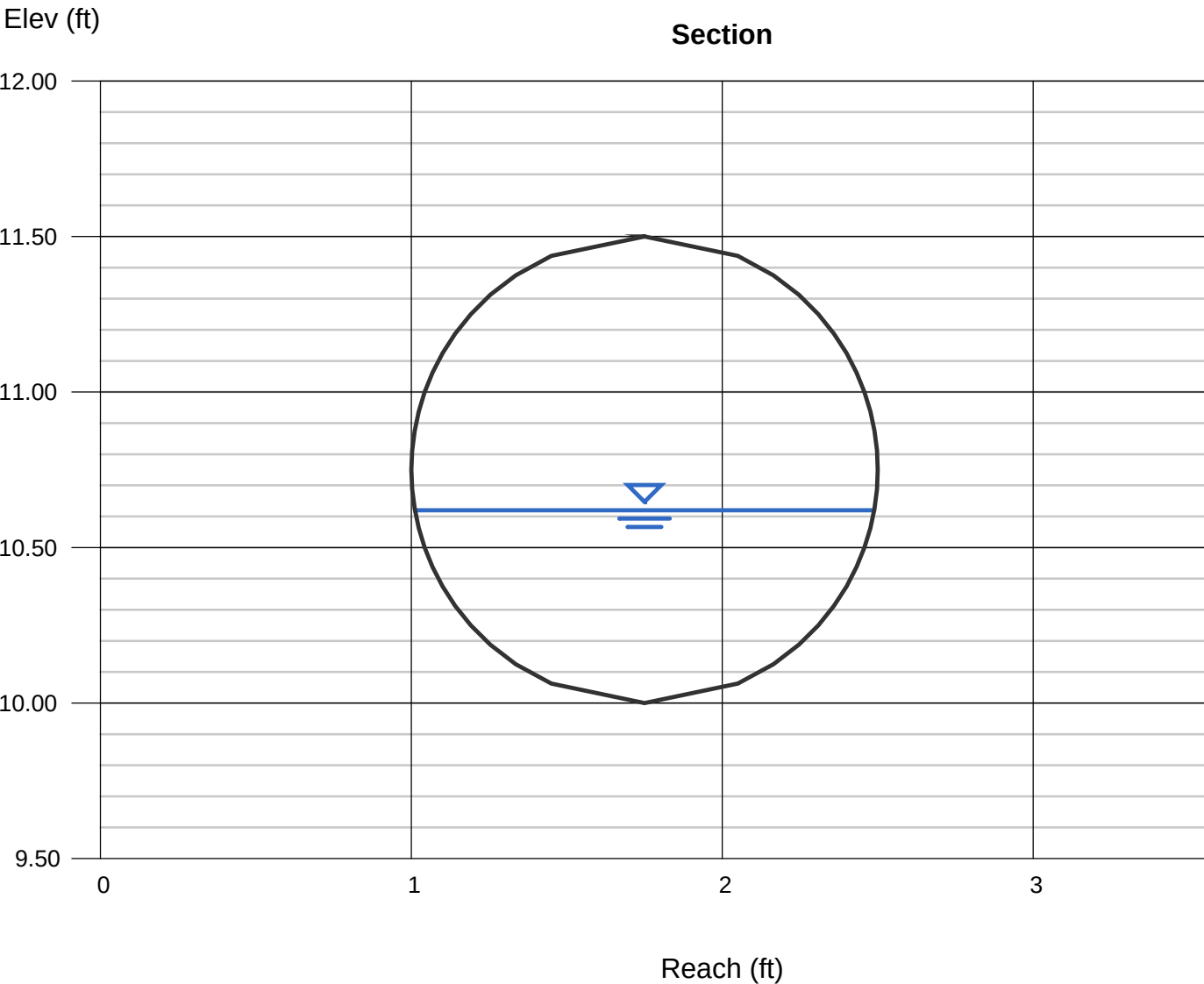
Velocity (ft/s) = 7.64

Wetted Perim (ft) = 2.10

Crit Depth, Yc (ft) = 0.89

Top Width (ft) = 1.48

EGL (ft) = 1.53



Channel Report

Offsite Culvert 3

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 8.15

Highlighted

Depth (ft) = 0.80

Q (cfs) = 8.150

Area (sqft) = 0.96

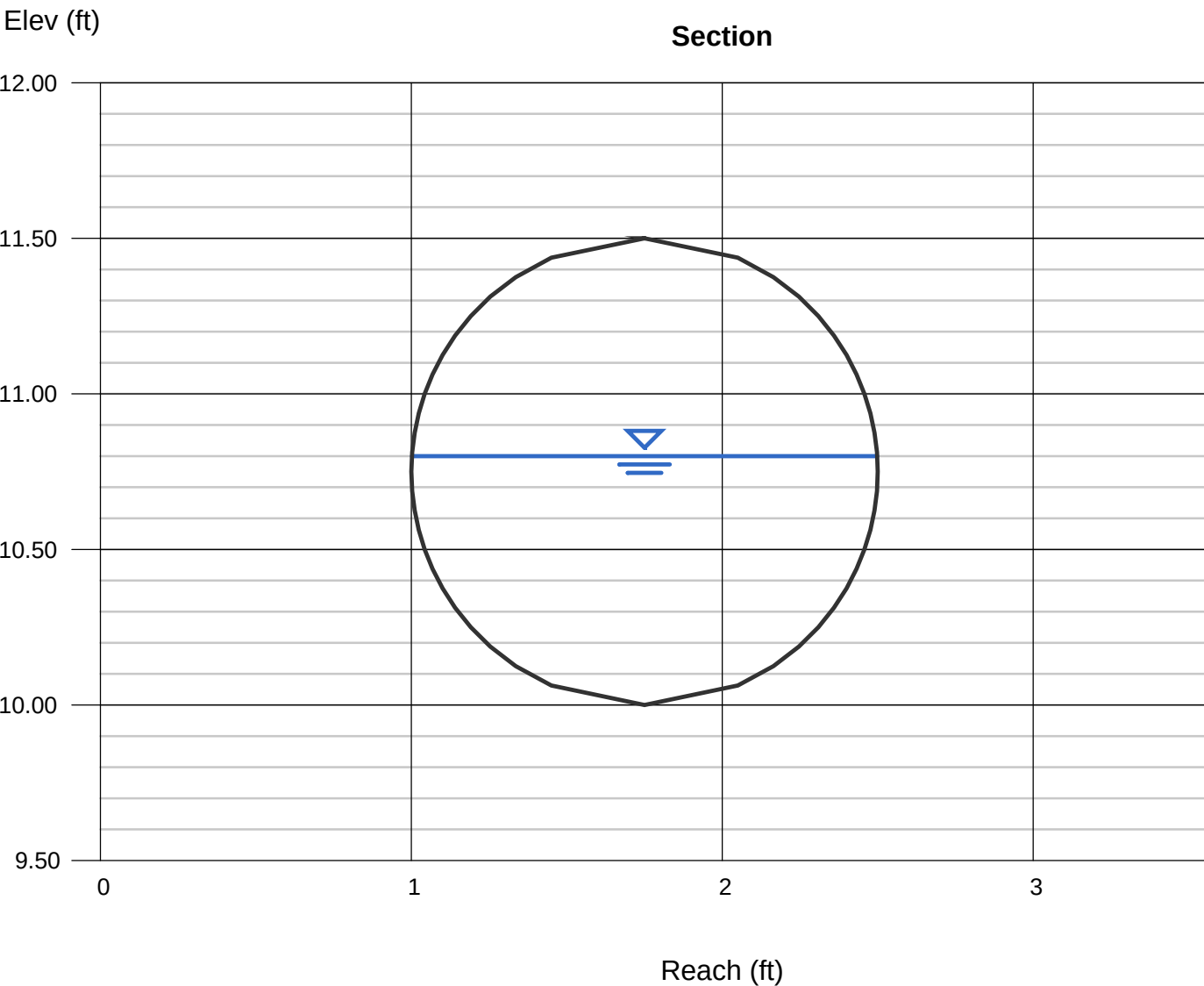
Velocity (ft/s) = 8.48

Wetted Perim (ft) = 2.46

Crit Depth, Yc (ft) = 1.11

Top Width (ft) = 1.50

EGL (ft) = 1.92



Channel Report

Offsite Culvert 4

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 4.63

Highlighted

Depth (ft) = 0.58

Q (cfs) = 4.630

Area (sqft) = 0.63

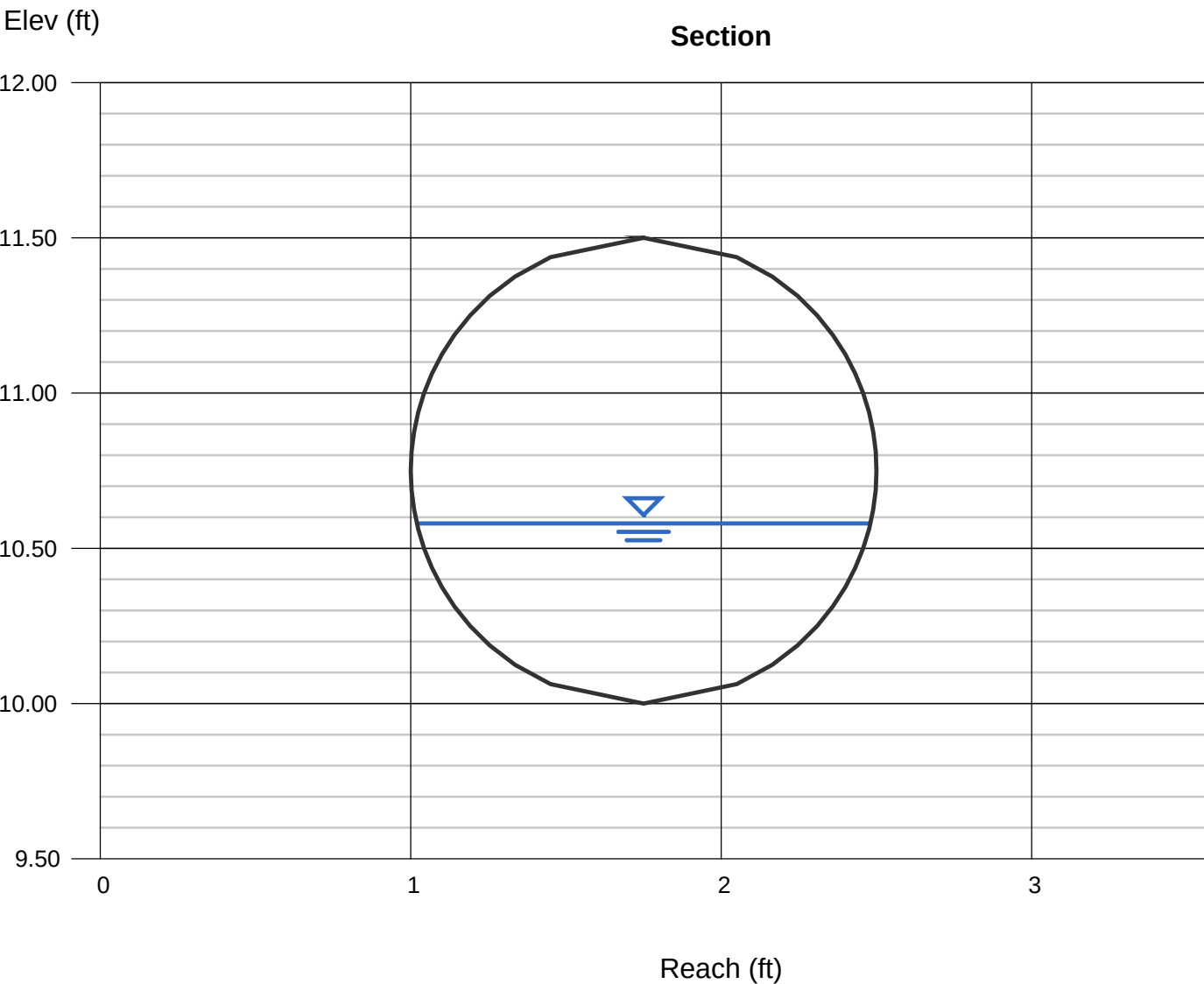
Velocity (ft/s) = 7.30

Wetted Perim (ft) = 2.02

Crit Depth, Yc (ft) = 0.83

Top Width (ft) = 1.46

EGL (ft) = 1.41



Channel Report

Outlet 1-pipe

Circular

Diameter (ft) = 2.50

Invert Elev (ft) = 10.00

Slope (%) = 1.80

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 33.64

Highlighted

Depth (ft) = 1.42

Q (cfs) = 33.64

Area (sqft) = 2.89

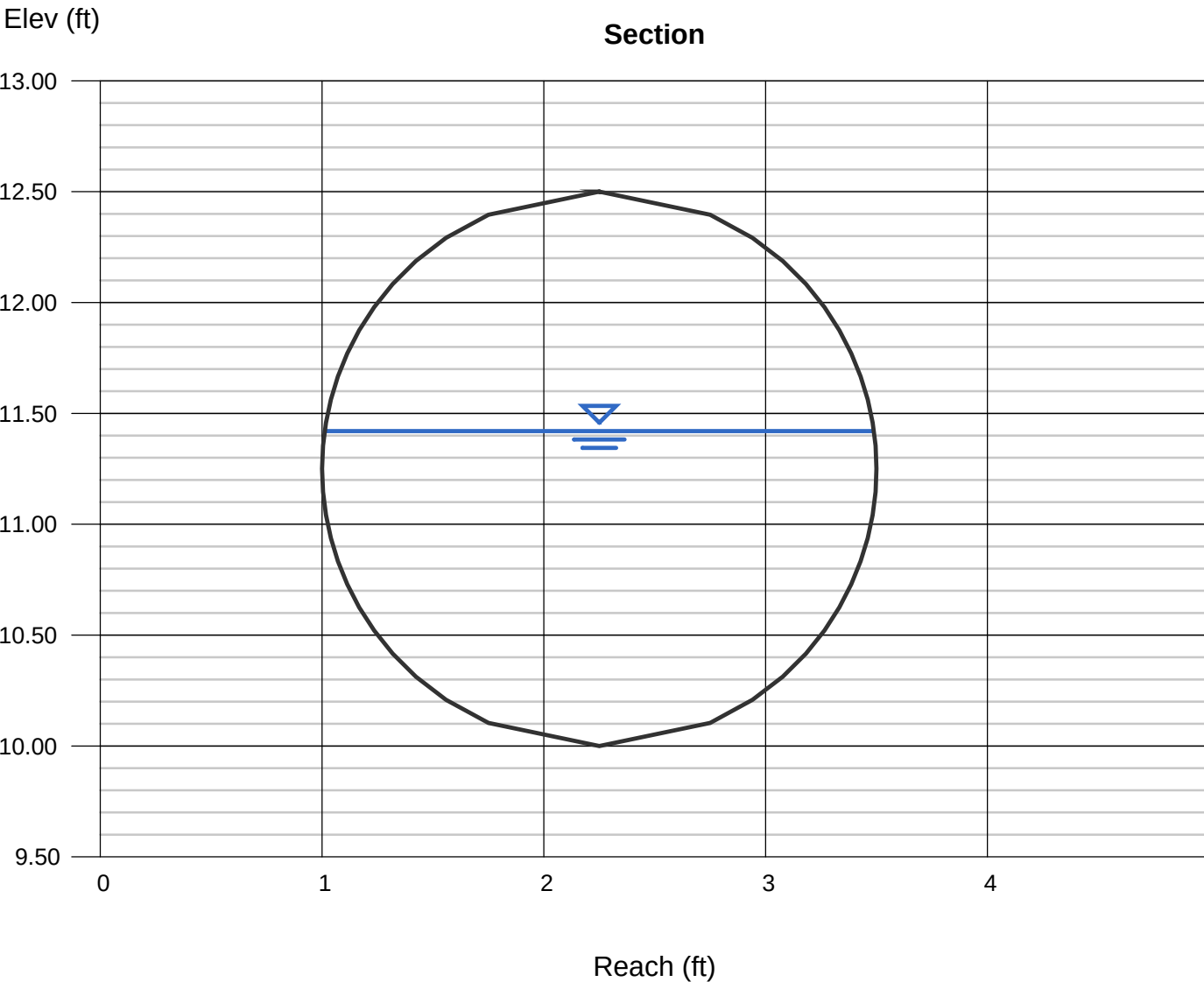
Velocity (ft/s) = 11.65

Wetted Perim (ft) = 4.27

Crit Depth, Yc (ft) = 1.98

Top Width (ft) = 2.48

EGL (ft) = 3.53



Channel Report

Outlet 1-riprap

Trapezoidal

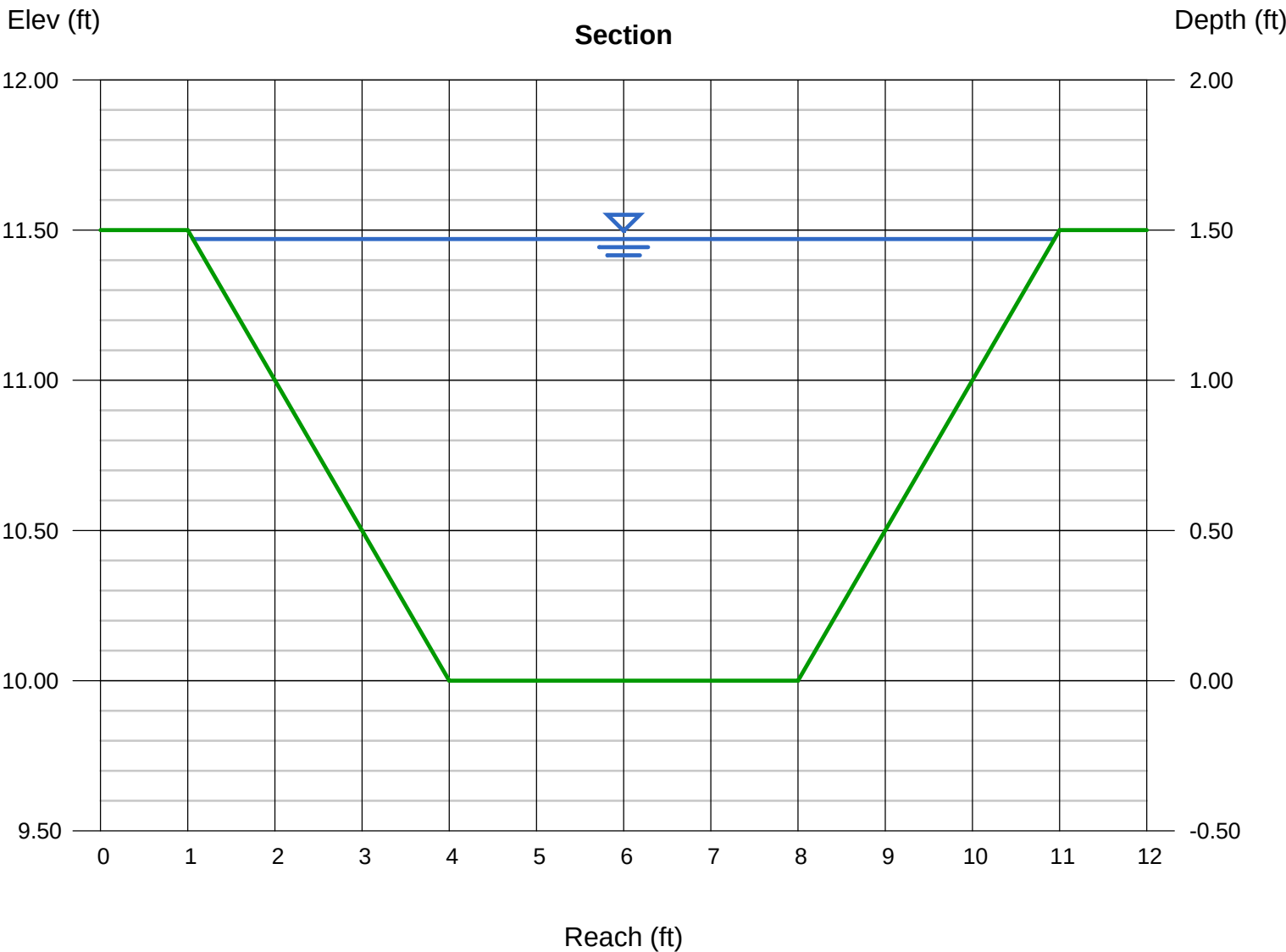
Bottom Width (ft) = 4.00
Side Slopes (z:1) = 2.00, 2.00
Total Depth (ft) = 1.50
Invert Elev (ft) = 10.00
Slope (%) = 1.00
N-Value = 0.044

Calculations

Compute by: Known Q
Known Q (cfs) = 33.64

Highlighted

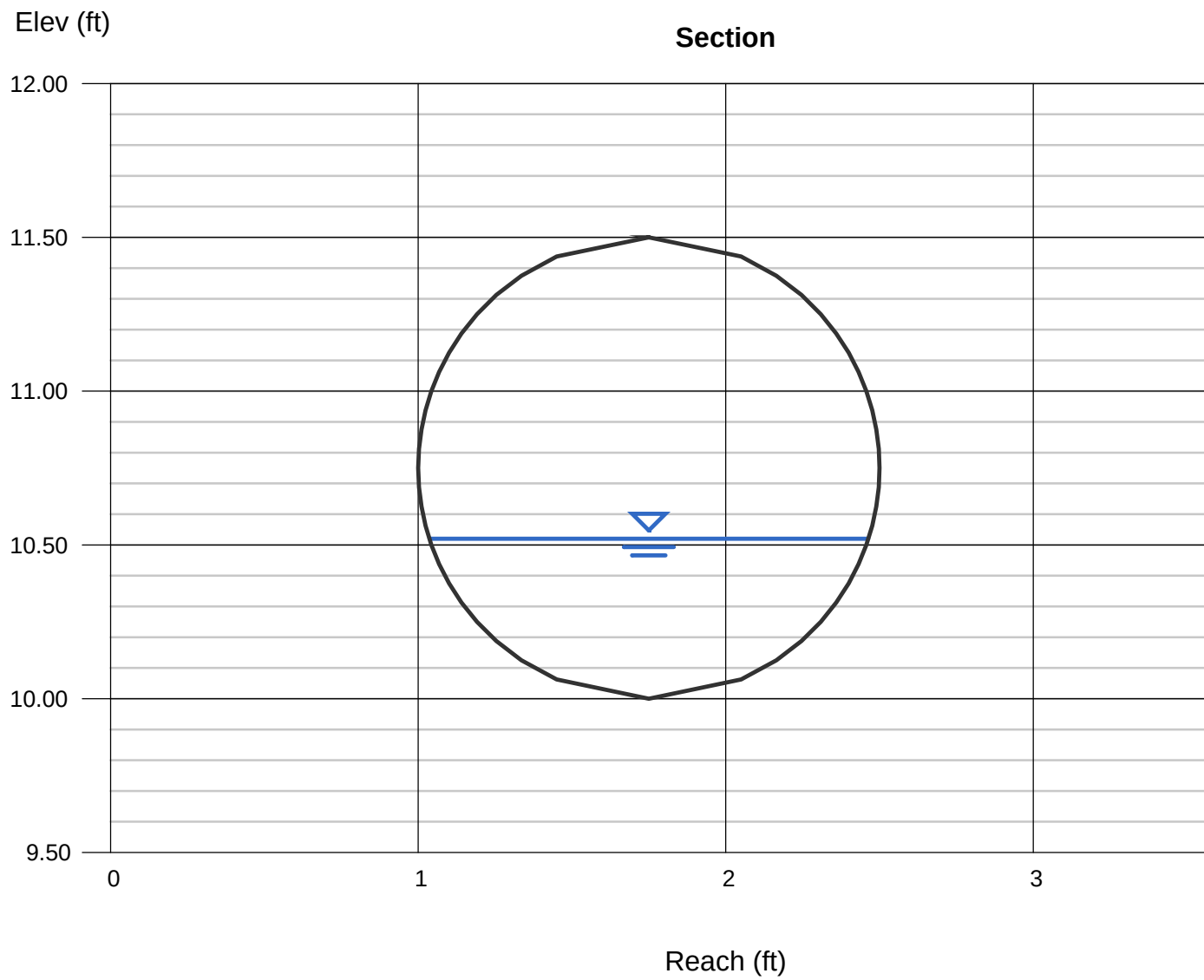
Depth (ft) = 1.47
Q (cfs) = 33.64
Area (sqft) = 10.20
Velocity (ft/s) = 3.30
Wetted Perim (ft) = 10.57
Crit Depth, Yc (ft) = 1.08
Top Width (ft) = 9.88
EGL (ft) = 1.64



Channel Report

Outlet 2-pipe

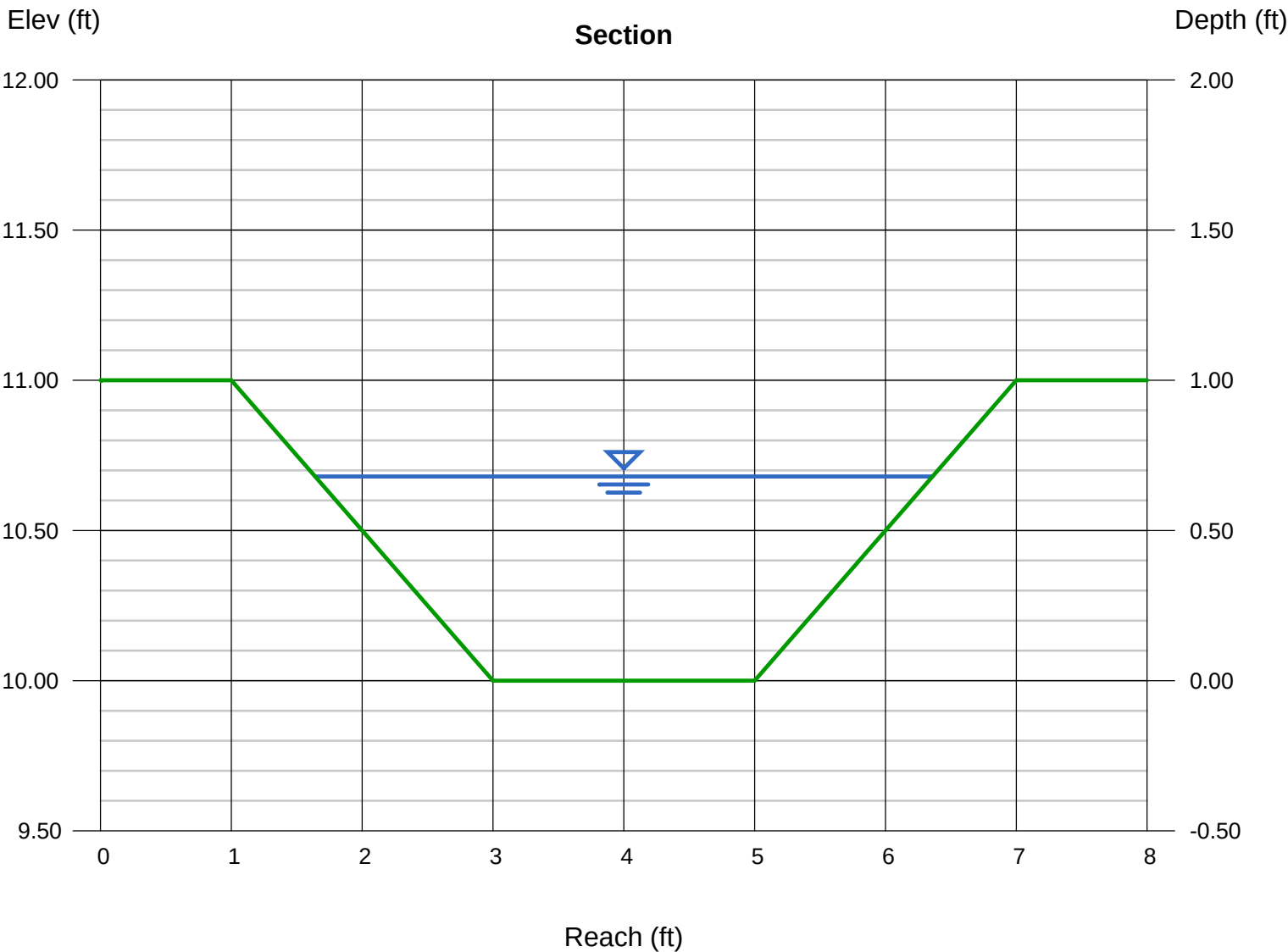
Circular		Highlighted	
Diameter (ft)	= 1.50	Depth (ft)	= 0.52
		Q (cfs)	= 5.300
		Area (sqft)	= 0.54
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 9.73
Slope (%)	= 4.00	Wetted Perim (ft)	= 1.89
N-Value	= 0.013	Crit Depth, Yc (ft)	= 0.89
		Top Width (ft)	= 1.43
		EGL (ft)	= 1.99
Calculations			
Compute by:	Known Q		
Known Q (cfs)	= 5.30		



Channel Report

Outlet 2-riprap

Trapezoidal		Highlighted	
Bottom Width (ft)	= 2.00	Depth (ft)	= 0.68
Side Slopes (z:1)	= 2.00, 2.00	Q (cfs)	= 5.300
Total Depth (ft)	= 1.00	Area (sqft)	= 2.28
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 2.32
Slope (%)	= 1.00	Wetted Perim (ft)	= 5.04
N-Value	= 0.037	Crit Depth, Yc (ft)	= 0.51
Calculations		Top Width (ft)	= 4.72
Compute by:		EGL (ft)	= 0.76
Known Q (cfs)			
		Known Q	
		= 5.30	



Channel Report

Outlet 3-riprap

Trapezoidal

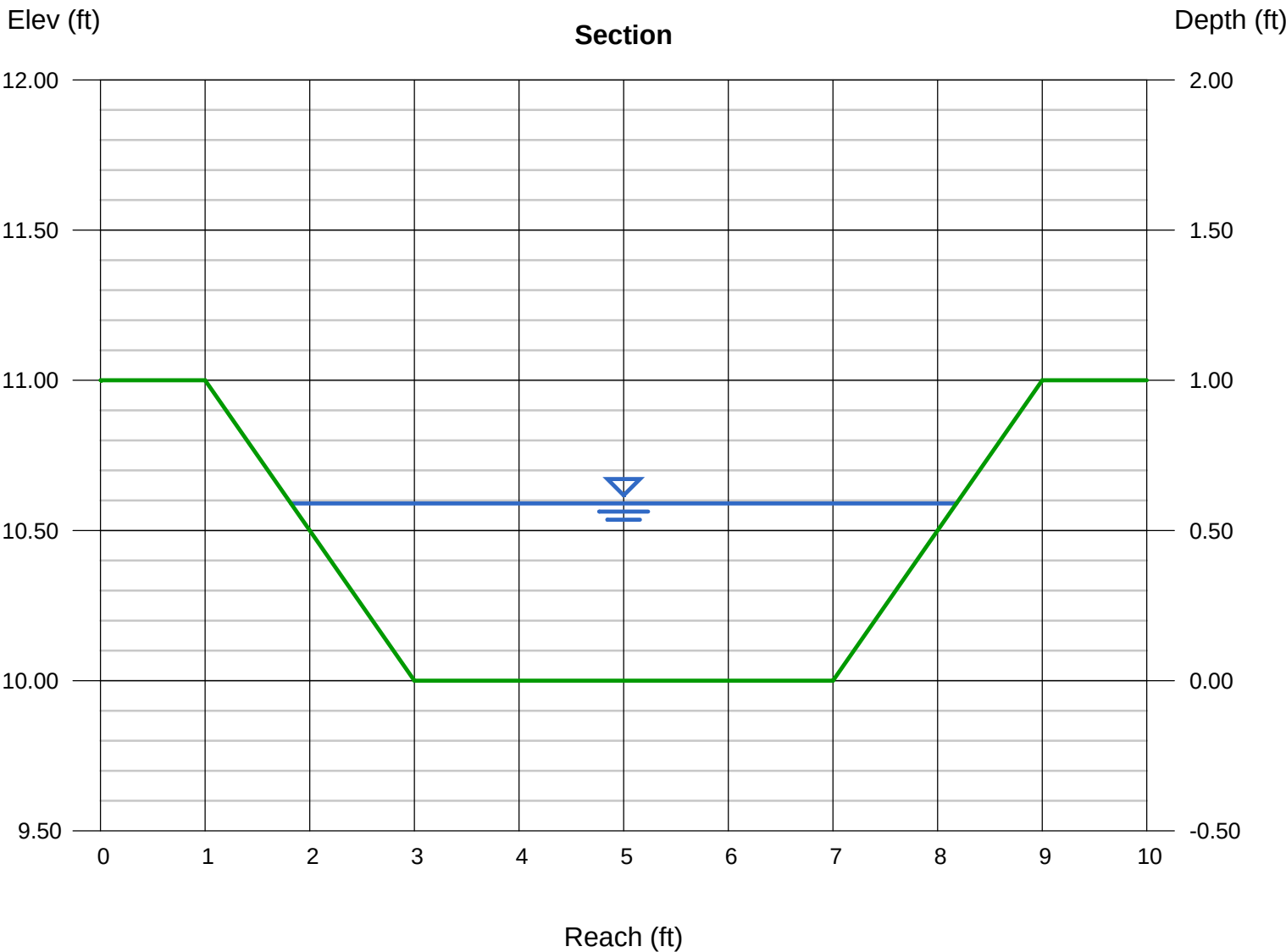
Bottom Width (ft) = 4.00
Side Slopes (z:1) = 2.00, 2.00
Total Depth (ft) = 1.00
Invert Elev (ft) = 10.00
Slope (%) = 1.00
N-Value = 0.037

Highlighted

Depth (ft) = 0.59
Q (cfs) = 7.200
Area (sqft) = 3.06
Velocity (ft/s) = 2.36
Wetted Perim (ft) = 6.64
Crit Depth, Yc (ft) = 0.44
Top Width (ft) = 6.36
EGL (ft) = 0.68

Calculations

Compute by: Known Q
Known Q (cfs) = 7.20



Channel Report

Inlet to BMP 1

Circular

Diameter (ft) = 0.83

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 1.50

Highlighted

Depth (ft) = 0.41

Q (cfs) = 1.500

Area (sqft) = 0.27

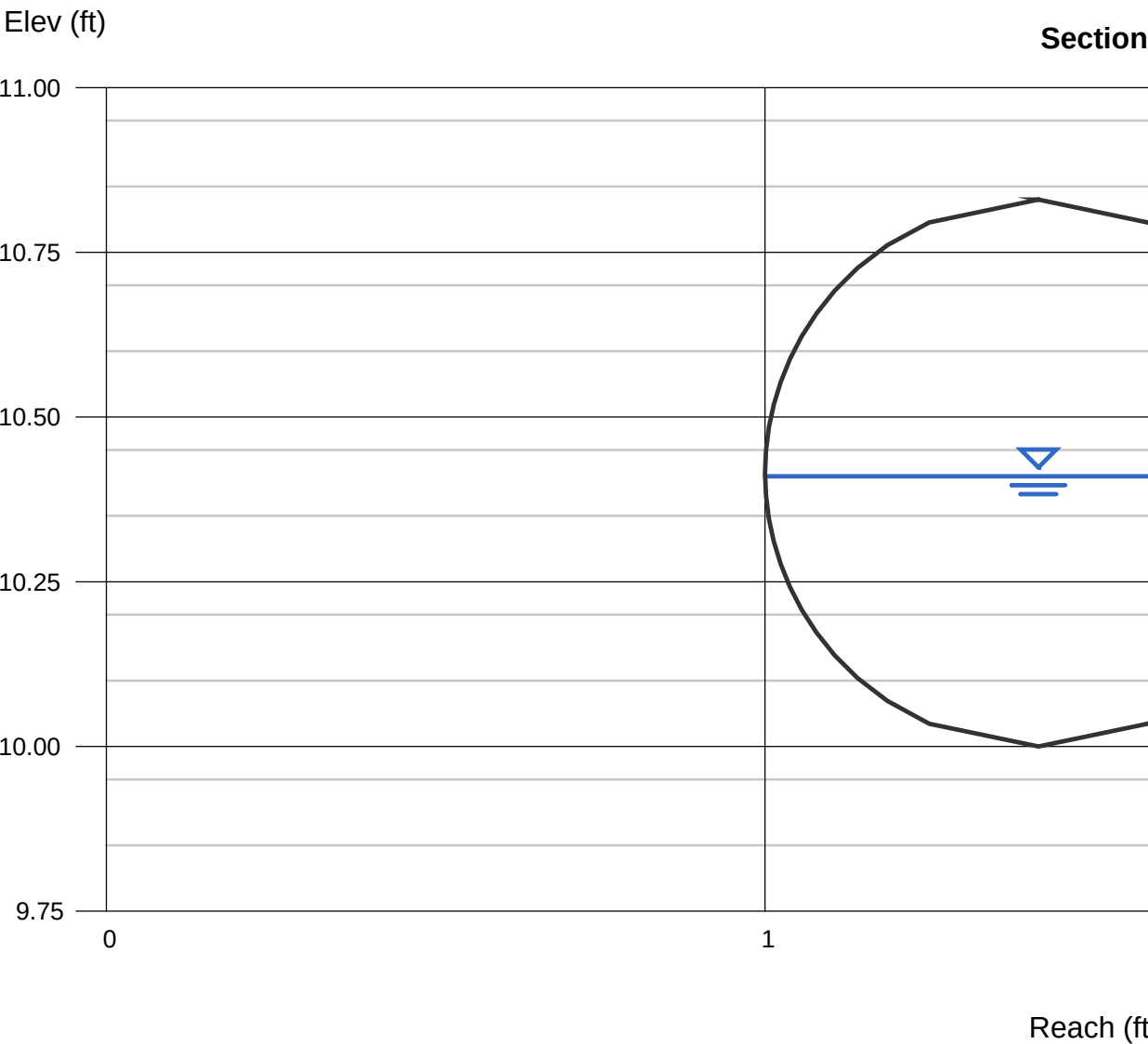
Velocity (ft/s) = 5.62

Wetted Perim (ft) = 1.29

Crit Depth, Yc (ft) = 0.55

Top Width (ft) = 0.83

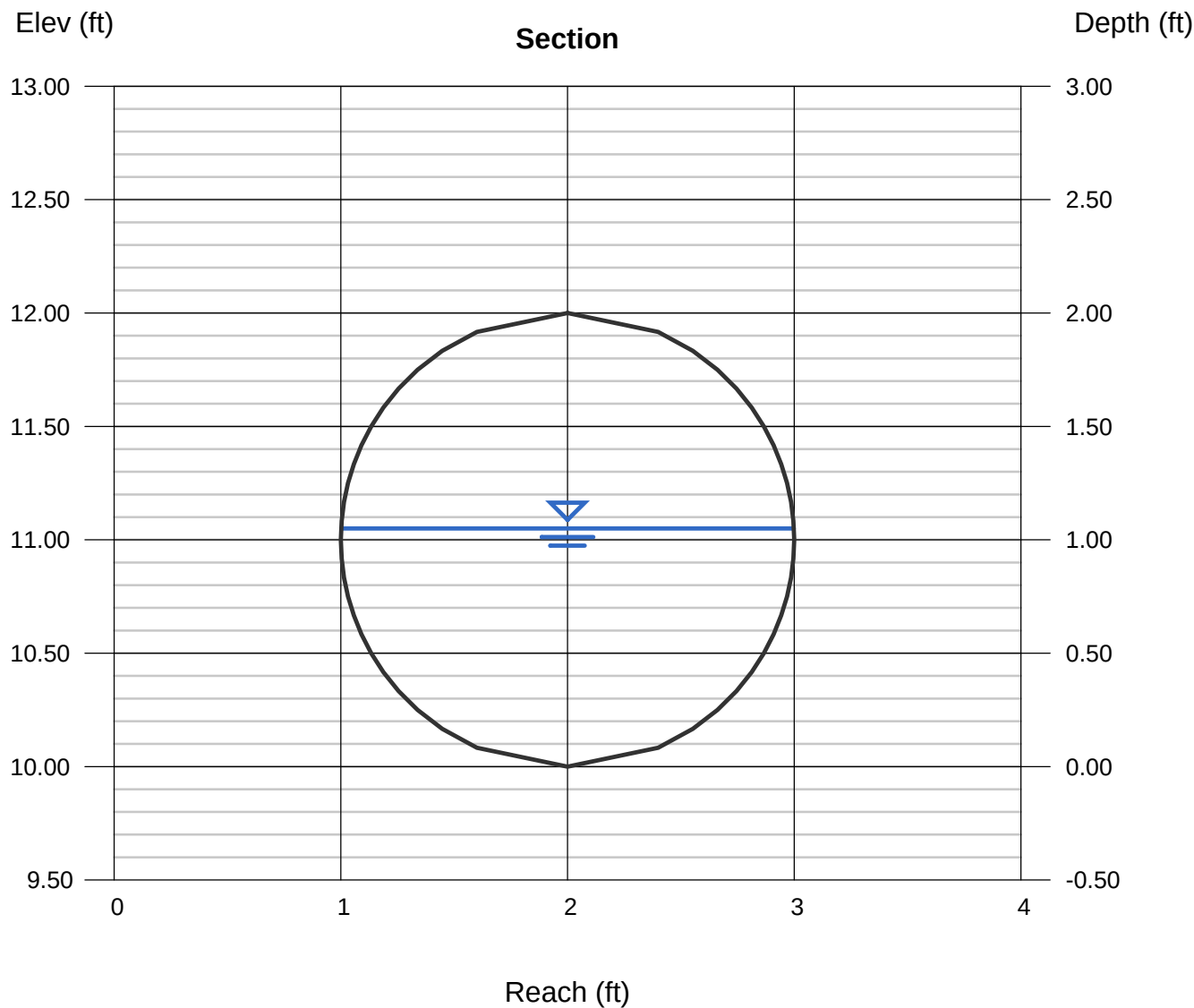
EGL (ft) = 0.90



Channel Report

Inlet at BMP 2

Circular		Highlighted	
Diameter (ft)	= 2.00	Depth (ft)	= 1.05
		Q (cfs)	= 12.20
		Area (sqft)	= 1.68
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 7.27
Slope (%)	= 1.00	Wetted Perim (ft)	= 3.25
N-Value	= 0.013	Crit Depth, Yc (ft)	= 1.26
		Top Width (ft)	= 2.00
		EGL (ft)	= 1.87
Calculations			
Compute by:	Known Q		
Known Q (cfs)	= 12.20		





LEGEND

HYDROLOGY NODE

104

SUB BASIN BOUNDARY

EXISTING STORM DRAIN

SD

NEW STORM DRAIN

SD

EXISTING CONTOUR

XXX

NEW CONTOUR

XXX

UG DETENTION BASIN

FLOW DIRECTION

→

FLOW PATH

→

SPOT ELEVATION

x 245.0

NODE/CONTOUR ELEVATION

ELXXX.X'

FLOW LENGTH

L=XXX.X'

ANALYSIS/EXIT POINT

1

SOIL TYPE BOUNDARY

SUB-BASIN MARKER & AREA (AC)

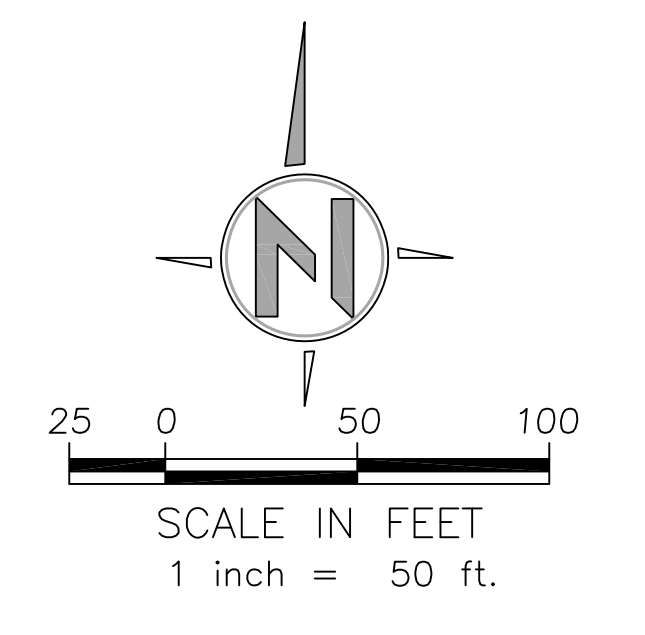
X-X
X.XX

PEAK FLOW RATE SUMMARY

	Drainage Area (acres)		100 Yr Flow (cfs)			% Change from Existing Condition
	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition (Unmitigated)	Proposed Condition (Mitigated)	
Onsite Only						
Exit Point 1	7.30	8.61	10.30	24.00	7.30	-29.13
Exit Point 2	0.77	0.63	1.20	1.16	1.12	-6.67
Exit Point 3	2.12	0.95	3.32	1.67	1.67	-49.70
Total	10.19	10.19	14.82	26.83	10.09	-31.92

	Drainage Area (acres)		100 Yr Flow (cfs)			% Change from Existing Condition
	Existing Condition	Proposed Condition	Existing Condition	Proposed Condition (Unmitigated)	Proposed Condition (Mitigated)	
Combined (Onsite & Offsite)						
Exit Point 1	13.56	14.87	23.08	36.78	20.08	-13.00
Exit Point 2	0.77	0.63	1.20	1.12	1.12	-6.67
Exit Point 3	4.73	3.50	8.84	7.19	7.19	-18.67
Total	19.06	19.06	33.12	45.09	28.39	-14.28

NOTES:
1. OFFSITE BASINS ARE ANALYZED AT THE EXISTING CULVERT LOCATIONS
2. Q GIVEN CORRESPOND TO 100-YR FREQUENCY STORM
3. ONSITE HYDROLOGY ANALYSIS IS SEPARATED FROM OFFSITE ANALYSIS. Q TOTAL (Q-T) AT THE OUTFALL TO EXISTING CREEK IS OBTAINED BY DIRECTLY ADDING THE ONSITE AND OFFSITE FLOWS.
4. Vp= FLOW VELOCITY AT THE PIPE OUTLET. Vr= VELOCITY DUE TO RIPRAP



HYDROLOGY MAP FOR
SVBF TEMPLE
PROPOSED CONDITION
REV. DATE: MARCH, 2017

100-YR FLOODPLAIN ANALYSIS



WATERSHED BASED ON STREAMSTATS

StreamStats Version 3.0

Flow Statistics Ungaged Site Report

Date: Wed June 1, 2016 4:16:39 PM GMT-7

Study Area: California

NAD 1983 Latitude: 33.0964 (33 05 47)

NAD 1983 Longitude: -117.0254 (-117 01 32)

Drainage Area: 0.4 mi²

Peak-Flow Basin Characteristics			
100% 2012 5113 Region 5 South Coast (0.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.4	0.04	850
Mean Annual Precipitation (inches)	14.8	10	45

Peak-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	14.8	ft ³ /s	130		2.55	85.8
PK5	39.6	ft ³ /s	83		11.3	139
PK10	57.2	ft ³ /s	64		20.6	159
PK25	77	ft ³ /s	52		32.8	181
PK50	91.4	ft ³ /s	48		41.4	202
PK100	105	ft ³ /s	47		47.5	233
PK200	120	ft ³ /s	48		53.5	269
PK500	135	ft ³ /s	52		57	319

#<http://pubs.usgs.gov/sir/2012/5113/#>

Gotvald, A.J., Barth, N.A., Veilleux, A.G., and Parrett, Charles, 2012, Methods for determining magnitude and frequency of floods in California, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2012-5113, 38 p., 1 pl.

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U.S. Department of the Interior | U.S. Geological Survey

URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm

Page Contact Information: [StreamStats Help](#)

Page Last Modified: 11/24/2015 11:32:58 (Web1)

[Streamstats Status](#)

[News](#)



Prop_Condn_100yr.rep

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X      X      X      X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXX

```

PROJECT DATA

Project Title: Prop_Condn_100yr
Project File : Prop_Condn_100yr.prj
Run Date and Time: 11/9/2016 3:24:01 PM

Project in English units

Project Description:
Proposed Condition Analysis

PLAN DATA

Plan Title: Plan 01
Plan File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.p01

Geometry Title: 100_Peak
Geometry File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.g01

Flow Title : Peak Data
Flow File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.f01

Plan Summary Information:

Number of:	Cross Sections	=	23	Multiple Openings	=	0
	Culverts	=	0	Inline Structures	=	0
	Bridges	=	0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Prop_Condn_100yr.rep

FLOW DATA

Flow Title: Peak Data
Flow File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.f01

Flow Data (cfs)

* River Reach RS * Q-100yr 1.5 X Q-100yr *
* CL_Creek_Prop CL_Creek_Prop 1100.00 * 90.4 135.6 *
* CL_Creek_Prop CL_Creek_Prop 400 * 41.9 62.85 *

Boundary Conditions

* River Reach Profile * Upstream
Downstream *

* CL_Creek_Prop CL_Creek_Prop Q-100yr *
Normal S = 0.036 *
* CL_Creek_Prop CL_Creek_Prop 1.5 X Q-100yr *
Normal S = 0.036 *

GEOMETRY DATA

Geometry Title: 100_Peak
Geometry File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.g01

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 1100.00

INPUT

Description:

Station Elevation Data		num=	113						
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.92	759995	4788.52	0004	476.07	78.70	9991	476	13.69
14.45	474	18.48	999	472.64	20.45	999	472	24.39	470.82
29.55	469.26	29.59	999	469.25	33.97	468	34.02	467.98	34.09
34.16	467.95	40.14	999	466.44	41.19	466.45	41.92	466.33	42.11
42.31	466.31	42.55	466.33	42.94	466.39	43.62	466.48	44.58	466.54
48.44	466.69	49.39	466.78	52.3	467	55.34	999	467.24	57.50
59.86	467.86	60.64	999	467.9	60.97	467.94	61.31	468	65.92
66.7	469.35	69.14	470	82.34	999	471.26	85.48	471.41	89.09
90.19	471.63	90.56	471.65	90.89	471.67	91.19	471.68	93.06	471.7
94.05	471.71	95.59	999	471.67	95.97	471.69	96.50	999	471.72
98.41	471.66	98.58	471.67	99.02	471.67	99.31	471.68	100.08	471.67
128.8	471.05	129.67	471.04	130.01	471.04	130.61	471.02	132.92	470.99
134.31	470.98	134.67	470.98	152.24	471.14	156.91	471.29	168.18	471.66

Prop_Condn_100yr.rep

168.5	471.67	169.08	471.7	169.36	471.72	169.46	471.72	169.63	471.73
170.22	471.74	170.59	471.75	171.66	471.78	175.05	471.81	175.33	471.82
175.36	471.82	175.39	471.82	176.55	472.41	177.36	472.82	177.46	472.87
177.6	472.94	177.68	472.94	179.22	472.94	179.42	472.74	179.74	472.45
180.62	472.54	181.27	472.61	191.39	472.93	204.51	473.5	204.6	473.6
205.05	474.02	206.35	474.08	206.54	474.09	207.29	474.28	213.1	475.77
216.19	474.48	219.24	473.18	222.07	472.98	223.05	472.94	223.45	472.91
224.84	472.85	226.21	472.76	230.57	472.51	235.68	472.08	236.15	472.05
236.64	472	240.1	471.55	241.38	471.39	243.91	471	245.78	470.8
252.33	470	253.44	469.23	254.7	468.49				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	29.55	.02	59.86	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
29.55	59.86	51.79	50	43.58	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 468.05 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)       * 0.39 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 467.66 * Reach Len. (ft)   * 51.79 * 50.00 *
43.58 *
* Crit W.S. (ft)      * 467.66 * Flow Area (sq ft) *          * 17.98 *
*
* E.G. Slope (ft/ft)  * 0.006628 * Area (sq ft)      *          * 17.98 *
*
* Q Total (cfs)       * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)      * 23.51 * Top Width (ft)     *          * 23.51 *
*
* Vel Total (ft/s)    * 5.03 * Avg. Vel. (ft/s)  *          * 5.03 *
*
* Max Chl Dpth (ft)   * 1.35 * Hydr. Depth (ft)  *          * 0.76 *
*
* Conv. Total (cfs)   * 1110.4 * Conv. (cfs)       *          * 1110.4 *
*
* Length Wtd. (ft)    * 50.01 * Wetted Per. (ft)  *          * 23.74 *
*
* Min Ch El (ft)      * 466.31 * Shear (lb/sq ft)  *          * 0.31 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 254.70 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.31 * Cum Volume (acre-ft) * 0.01 * 0.35 *
0.06 *
* C & E Loss (ft)     * 0.04 * Cum SA (acres)     * 0.05 * 0.48 *
0.06 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

Prop_Condn_100yr.rep
 water surface came back below critical depth. This indicates that there is
 not a valid subcritical answer. The program
 defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 468.40 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.48 * Wt. n-Val.        *          * 0.020 *
0.020 *
* W.S. Elev (ft)      * 467.92 * Reach Len. (ft)   * 51.79 * 50.00 *
43.58 *
* Crit W.S. (ft)      * 467.92 * Flow Area (sq ft) *          * 24.34 *
0.05 *
* E.G. Slope (ft/ft)  * 0.006086 * Area (sq ft)      *          * 24.34 *
0.05 *
* Q Total (cfs)       * 135.60 * Flow (cfs)        *          * 135.55 *
0.05 *
* Top Width (ft)      * 26.48 * Top Width (ft)    *          * 25.56 *
0.92 *
* Vel Total (ft/s)    * 5.56 * Avg. Vel. (ft/s)  *          * 5.57 *
0.86 *
* Max Chl Dpth (ft)   * 1.61 * Hydr. Depth (ft)  *          * 0.95 *
0.06 *
* Conv. Total (cfs)   * 1738.1 * Conv. (cfs)       *          * 1737.5 *
0.6 *
* Length Wtd. (ft)    * 49.97 * Wetted Per. (ft)  *          * 25.83 *
0.92 *
* Min Ch El (ft)      * 466.31 * Shear (lb/sq ft)  *          * 0.36 *
0.02 *
* Alpha              * 1.00 * Stream Power (lb/ft s) * 254.70 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.28 * Cum Volume (acre-ft) * 0.02 * 0.48 *
0.07 *
* C & E Loss (ft)     * 0.05 * Cum SA (acres)    * 0.06 * 0.52 *
0.07 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 1050

INPUT

Description:

Station Elevation Data num= 122
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

Prop_Condn_100yr.rep

0	4811.359985	480.312.119995	4805.320007	478.79	6.98999	478
8.859985	477.0210.60999	47611.57999	475.49	14.94	47417.14999	473.03
19.60999	47221.72998	471.0524.32999	47027.64999	468.6530.16998		468
35.68999	466.9239.31999	466.21	40.34	46642.31999	465.58	49.34
52.47	463.755.32999	463.5860.29999	463.25	60.67	463.2263.28999	463.09
65.03999	463.04	70.72	463.01	72.23	462.97	73.62
77.75	462.94	78.34	462.96	82.2	463.1483.39999	463.1684.64999
90.73999	463.5	93.14	463.6293.82999	463.65	94.45	463.68
102.12	464.05	102.59	464.08	105.56	464.28	106.97
108.13	464.46	111.4	464.77	115.34	465.12	120.16
130.4	467.07	135.79	468	137.08	468.16	137.65
139.51	468.22	140.69	468.21	143.03	468.15	144.27
147.75	467.9	148.49	467.86	148.71	467.87	154.83
159.72	468.12	170.67	468.01	170.73	468.01	170.76
170.78	468.01	170.91	468.01	174.51	468.01	181.49
189.35	468.12	190.09	468.13	191.23	467.57	194.2
195.74	466.12	196.21	465.67	196.26	465.63	196.38
201.48	465.89	220.41	466.39	220.43	466.41	220.9
222.4	466.94	225.01	467.77	225.25	467.86	225.94
229.62	466.91	230.87	466.72	232.81	466.54	234.65
238.92	465.31	240.08	465	242.07	463.49	242.95
246.79	462	246.8	462	252.08	462	253.68
264.15	462	264.84	462	267.39	462	267.45
272.75	462.94	273.01	463	278.87	464.04	283.9
289.01	465.11	289.9	465.22			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0260.29999	.0290.73999	.02		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

60.2999990.73999	50.18	50	49.43	.1	.3
------------------	-------	----	-------	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
111.4	289.9	464.77	T

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 464.03	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.27	* Wt. n-Val.	* 0.020	* 0.020
0.020				
* W.S. Elev (ft)	* 463.76	* Reach Len. (ft)	* 50.18	* 50.00
49.43				
* Crit W.S. (ft)	* 463.76	* Flow Area (sq ft)	* 2.04	* 19.84
0.67				
* E.G. Slope (ft/ft)	* 0.005879	* Area (sq ft)	* 2.04	* 19.84
50.87				
* Q Total (cfs)	* 90.40	* Flow (cfs)	* 4.50	* 84.95
0.95				
* Top Width (ft)	* 79.69	* Top Width (ft)	* 8.41	* 30.44
40.85				
* Vel Total (ft/s)	* 4.01	* Avg. Vel. (ft/s)	* 2.21	* 4.28
1.43				
* Max Chl Dpth (ft)	* 1.76	* Hydr. Depth (ft)	* 0.24	* 0.65
0.13				
* Conv. Total (cfs)	* 1179.0	* Conv. (cfs)	* 58.7	* 1107.9
12.4				
* Length Wtd. (ft)	* 50.01	* Wetted Per. (ft)	* 8.42	* 30.46
5.31				
* Min Ch El (ft)	* 462.93	* Shear (lb/sq ft)	* 0.09	* 0.24

Prop_Condn_100yr.rep

```

0.05 *
* Alpha * 1.09 * Stream Power (lb/ft s) * 289.90 * 0.00 *
0.00 *
* Frctn Loss (ft) * 0.30 * Cum Volume (acre-ft) * 0.01 * 0.33 *
0.03 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.04 * 0.45 *
0.04 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 464.27 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.33 * Wt. n-Val. * 0.020 * 0.020 *
0.020 *
* W.S. Elev (ft) * 463.94 * Reach Len. (ft) * 50.18 * 50.00 *
49.43 *
* Crit W.S. (ft) * 463.94 * Flow Area (sq ft) * 3.77 * 25.49 *
2.01 *
* E.G. Slope (ft/ft) * 0.005209 * Area (sq ft) * 3.77 * 25.49 *
58.93 *
* Q Total (cfs) * 135.60 * Flow (cfs) * 10.32 * 121.37 *
3.91 *
* Top Width (ft) * 86.85 * Top Width (ft) * 10.34 * 30.44 *
46.07 *
* Vel Total (ft/s) * 4.34 * Avg. Vel. (ft/s) * 2.73 * 4.76 *
1.94 *
* Max Chl Dpth (ft) * 1.94 * Hydr. Depth (ft) * 0.36 * 0.84 *
0.22 *
* Conv. Total (cfs) * 1878.8 * Conv. (cfs) * 143.0 * 1681.6 *
54.2 *
* Length Wtd. (ft) * 50.01 * Wetted Per. (ft) * 10.37 * 30.46 *
9.24 *
* Min Ch El (ft) * 462.93 * Shear (lb/sq ft) * 0.12 * 0.27 *
0.07 *
* Alpha * 1.12 * Stream Power (lb/ft s) * 289.90 * 0.00 *
0.00 *
* Frctn Loss (ft) * 0.26 * Cum Volume (acre-ft) * 0.02 * 0.45 *
0.04 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.05 * 0.49 *
0.05 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Prop_Condn_100yr.rep

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop

REACH: CL_Creek_Prop

RS: 1000

INPUT

Description:

Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4783.620026	476.3	4.26001	4764.670013	475.88.400024	474			
10.18002	473.1312.56003	47214.27002	471.1316.70001	47019.15002	468.86				
20.90002	468	22.66	467.1425.09003	46629.90002	464.230.52002	464			
32.54001	463.3536.60001	46239.10001	461.2	39.66	461.1340.34003	461.1			
42.74002	460.5645.22002	460.5748.07001	460.6250.82001	460.3350.96002	460.32				
52.12001	460.3754.01001	460.355.63002	460.4156.46002	460.4557.72002	460.44				
59.24002	460.4261.95001	460.3663.49002	460.366.22002	460.1769.68001	460				
71.38002	459.9376.10002	459.7780.69002	459.7182.40001	459.7485.97002	459.83				
89.98001	46093.23001	460.1998.28001	460.5599.71002	460.66	108.83	461.3			
111.43	461.5	118.44	462	129.52	462.96	140.33	464	145.29	464.39
146.5	464.45	146.59	464.46	152.17	464.88	154.69	465.09	155.89	465.21
156.44	465.29	156.83	465.41	156.99	465.42	157.2	465.42	157.54	465.42
158.19	465.41	158.43	465.4	158.9	465.35	161.17	465.17	161.72	465.14
162.46	465.13	163.68	465.14	164	465.14	165.53	465.17	167.72	465.13
169.32	465.12	175.98	465.1	181.5	465.23	194.8	465.42	195.51	465.42
196.94	465.43	199.56	464.2	200.69	463.66	201.03	463.65	202.23	463.63
202.51	463.38	202.76	463.14	203.59	463.2	204.33	463.27	216.99	463.49
227.78	463.68	228.08	463.95	228.3	464.18	229.19	464.2	229.86	464.21
233.58	464.02	233.9	464	234.61	463.87	239.49	463	241.59	462.31
242.54	462	244.88	462	249.4	462	253.95	462	257.6	462
261.77	462.95	261.9	462.98	261.99	463	266	464.19	270.76	465.64
271.21	465.35	271.5	465.15	275.22	465.21	277.38	465.25	285.07	465.37
292.96	465.51	294.92	465.54	298.28	465.59	299.64	465.62		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0266.22002	.0298.28001	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
66.2200298.28001			48.69	50	48.85	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 460.84	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.25	* Wt. n-Val.	* 0.020	* 0.020	*
0.020 *					
* W.S. Elev (ft)	* 460.58	* Reach Len. (ft)	* 48.69	* 50.00	*
48.85 *					
* Crit W.S. (ft)	* 460.58	* Flow Area (sq ft)	* 3.88	* 19.72	*
0.01 *					

Prop_Condn_100yr.rep					
* E.G. Slope (ft/ft)	* 0.006057	* Area (sq ft)	*	3.88	* 19.72 *
0.01 *					
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	7.96	* 82.44 *
0.00 *					
* Top Width (ft)	* 53.51	* Top Width (ft)	*	21.04	* 32.06 *
0.41 *					
* Vel Total (ft/s)	* 3.83	* Avg. Vel. (ft/s)	*	2.05	* 4.18 *
0.37 *					
* Max Chl Dpth (ft)	* 0.87	* Hydr. Depth (ft)	*	0.18	* 0.62 *
0.02 *					
* Conv. Total (cfs)	* 1161.5	* Conv. (cfs)	*	102.3	* 1059.2 *
0.0 *					
* Length Wtd. (ft)	* 49.83	* Wetted Per. (ft)	*	21.07	* 32.09 *
0.42 *					
* Min Ch El (ft)	* 459.71	* Shear (lb/sq ft)	*	0.07	* 0.23 *
0.01 *					
* Alpha	* 1.11	* Stream Power (lb/ft s)	*	299.64	* 0.00 *
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	*	0.01	* 0.31 *
0.00 *					
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	0.03	* 0.41 *
0.01 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 461.04	* Element	*	Left OB	* Channel *
Right OB *					
* Vel Head (ft)	* 0.29	* Wt. n-Val.	*	0.020	* 0.020 *
0.020 *					
* W.S. Elev (ft)	* 460.76	* Reach Len. (ft)	*	48.69	* 50.00 *
48.85 *					
* Crit W.S. (ft)	* 460.76	* Flow Area (sq ft)	*	8.03	* 25.34 *
0.28 *					
* E.G. Slope (ft/ft)	* 0.005107	* Area (sq ft)	*	8.03	* 25.34 *
0.28 *					
* Q Total (cfs)	* 135.60	* Flow (cfs)	*	20.32	* 114.96 *
0.33 *					
* Top Width (ft)	* 59.23	* Top Width (ft)	*	24.36	* 32.06 *
2.81 *					
* Vel Total (ft/s)	* 4.03	* Avg. Vel. (ft/s)	*	2.53	* 4.54 *
1.15 *					
* Max Chl Dpth (ft)	* 1.05	* Hydr. Depth (ft)	*	0.33	* 0.79 *
0.10 *					
* Conv. Total (cfs)	* 1897.4	* Conv. (cfs)	*	284.3	* 1608.6 *
4.6 *					
* Length Wtd. (ft)	* 49.78	* Wetted Per. (ft)	*	24.41	* 32.09 *
2.82 *					

```

Prop_Condn_100yr.rep
* Min Ch El (ft)      * 459.71 * Shear (lb/sq ft)      * 0.10 * 0.25 *
  0.03 *
* Alpha              * 1.13 * Stream Power (lb/ft s) * 299.64 * 0.00 *
  0.00 *
* Frctn Loss (ft)    * 0.29 * Cum Volume (acre-ft)   * 0.01 * 0.42 *
  0.01 *
* C & E Loss (ft)    * 0.00 * Cum SA (acres)         * 0.03 * 0.46 *
  0.02 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 950

INPUT

Description:

Station Elevation Data				num=	137				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	475.831	019989	475.411	850006	474.934	790009	4745.869995	473.52	
9.119995	472	10.72	471.3	13.53	470	16.91	468.38	17.75	468
19.97998	466.9822	07001	46624.82001	464.726	25998	46432.79001	462.01		
32.82999	462	32.84	46239.13998	46046.69998	458.56	50.22	458		
52.25998	457.8955	19998	457.7958	23999	457.7358	29999	457.7361	54999	457.69
68.39999	457.6371	03999	457.62	72.75	457.63	73.72	457.65	74.87	457.7
74.97	457.69	75.37	457.6675	64999	457.6477	39999	457.7	86.81	458
91.98999	458.41	100.57	459.08	108.61	460	110.02	460.48	111.97	460.87
118.11	462	121.38	462.38	121.79	462.41	123.25	462.52	124.3	462.57
126.04	462.66	126.66	462.71	127.44	462.8	128.51	462.98	130.17	463.29
131	463.42	133.5	464	137.05	464	138.48	464	138.64	464
139.25	464	140.08	464	140.56	464	140.74	464	142.85	464
144.54	464	147.11	463.81	150.93	463.69	156.12	463.52	158.04	463.49
159.38	463.46	164.78	463.38	165.15	463.39	166.21	463.38	168.24	463.35
169.09	463.34	172.32	463.22	179.09	463.01	179.96	462.99	180.84	462.98
182.19	462.99	183.96	463.02	190.55	463.16	191.12	463.16	191.28	463.16
196.84	463.26	197.85	463.28	201.28	463.34	201.39	463.34	201.84	463.15
202.76	463.14	203.56	463.13	203.65	463.04	204.11	462.63	205.61	462.75
205.85	462.77	223.93	463.1	231.24	463.23	232.31	463.44	233.73	463.63
233.92	463.82	234.23	464.13	234.64	464.13	234.81	464.13	235.64	464.14
235.91	464.14	236.77	464.15	237.54	464.15	238.27	464.16	238.98	464.17
239.69	464.18	240.42	464.19	241.19	464.21	242.02	464.23	242.95	464.26
244.01	464.3	245.03	464.34	245.27	464.35	246.85	464.41	248.23	464.46
248.44	464.47	261.66	465.14	271.73	465.28	272.76	465.31	273.1	465.31
273.69	464.84	273.7	464.83	273.98	464.83	274.5	464.85	274.58	464.85
277.97	464.93	279.63	464.98	291.13	465.26	299.26	465.51	304.3	465.64
306.81	465.72	309.28	465.8	310.75	465.84	314.56	465.81	315.41	465.75
318.22	465.79	323.9	465.88						

Prop_Condn_100yr.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .0258.29999 .0291.98999 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 58.2999991.98999 49.87 50 49.98 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

 * E.G. Elev (ft) * 458.59 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.26 * Wt. n-Val. * 0.020 * 0.020 *
 *
 * W.S. Elev (ft) * 458.33 * Reach Len. (ft) * 49.87 * 50.00 *
 49.98 *
 * Crit W.S. (ft) * 458.33 * Flow Area (sq ft) * 4.30 * 17.84 *
 *
 * E.G. Slope (ft/ft) * 0.007193 * Area (sq ft) * 4.30 * 17.84 *
 *
 * Q Total (cfs) * 90.40 * Flow (cfs) * 15.26 * 75.14 *
 *
 * Top Width (ft) * 42.76 * Top Width (ft) * 10.13 * 32.63 *
 *
 * Vel Total (ft/s) * 4.08 * Avg. Vel. (ft/s) * 3.55 * 4.21 *
 *
 * Max Chl Dpth (ft) * 0.71 * Hydr. Depth (ft) * 0.42 * 0.55 *
 *
 * Conv. Total (cfs) * 1065.9 * Conv. (cfs) * 179.9 * 886.0 *
 *
 * Length Wtd. (ft) * 49.99 * Wetted Per. (ft) * 10.16 * 32.65 *
 *
 * Min Ch El (ft) * 457.62 * Shear (lb/sq ft) * 0.19 * 0.25 *
 *
 * Alpha * 1.01 * Stream Power (lb/ft s) * 323.90 * 0.00 *
 0.00 *
 * Frctn Loss (ft) * 0.35 * Cum Volume (acre-ft) * 0.00 * 0.29 *
 0.00 *
 * C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.01 * 0.37 *
 0.01 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

 * E.G. Elev (ft) * 458.82 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.33 * Wt. n-Val. * 0.020 * 0.020 *
 0.020 *
 * W.S. Elev (ft) * 458.49 * Reach Len. (ft) * 49.87 * 50.00 *
 49.98 *
 * Crit W.S. (ft) * 458.49 * Flow Area (sq ft) * 6.06 * 23.36 *

Prop_Condn_100yr.rep

0.04 *					
* E.G. Slope (ft/ft)	*0.006692	* Area (sq ft)	*	6.06	* 23.36 *
0.04 *					
* Q Total (cfs)	* 135.60	* Flow (cfs)	*	24.41	* 111.16 *
0.03 *					
* Top Width (ft)	* 45.90	* Top Width (ft)	*	11.17	* 33.69 *
1.04 *					
* Vel Total (ft/s)	* 4.60	* Avg. Vel. (ft/s)	*	4.03	* 4.76 *
0.72 *					
* Max Chl Dpth (ft)	* 0.87	* Hydr. Depth (ft)	*	0.54	* 0.69 *
0.04 *					
* Conv. Total (cfs)	* 1657.6	* Conv. (cfs)	*	298.4	* 1358.8 *
0.4 *					
* Length Wtd. (ft)	* 49.99	* Wetted Per. (ft)	*	11.21	* 33.72 *
1.04 *					
* Min Ch El (ft)	* 457.62	* Shear (lb/sq ft)	*	0.23	* 0.29 *
0.02 *					
* Alpha	* 1.01	* Stream Power (lb/ft s)	*	323.90	* 0.00 *
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	*	0.00	* 0.39 *
0.01 *					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	0.01	* 0.42 *
0.02 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 900

INPUT

Description:

Station Elevation Data		num=	130				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	473.051	0.19989	473.013	1.60004	472.923	1.880005	472.944
7.429993	472	10.54999	470.621	12.01001	470	15.51001	468.441
17.60001	467.59	21.66	466	23.76999	465.162	26.76001	464
32.20001	462	35.60999	461.093	38.26001	460.36	39.5	460
46.35999	458	51.35001	457.525	1.73001	457.48	56.87	457
58.76999	456.865	59.51999	456.860	1.7999	456.736	1.50999	456.62
63.25	456.51	64.05	456.48	64.87	456.47	65.77	456.46
68.34	456.44	68.5	456.44	68.84	456.446	9.14999	456.456
69.53999	456.47	69.75	456.45	70.23	456.47	73.84	456.587
75.97	456.65	76.2	456.687	6.39999	456.767	6.42999	456.91
77.24001	457.06	80.36	457.368	3.45999	457.58	85.28	457.7
95.5	459.029	6.31999	459.12	97.06	459.23	98.34	459.4
99.33	459.49	100.2	459.51	100.46	459.52	104.33	459.93
104.8	460	106.45	460.38	109.63	461.23	112.37	462
117.94	464	119.35	464.13	140.75	466	146.1	466.17
147.68	466.21	150.58	466.25	150.79	466.25	150.99	466.25
151.52	466.24	151.92	466.24	159.03	466.09	163.39	466
							168.42
							465.71

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170.82	465.5	173.62	465.29	187.28	464	189.37	463.66	190.5	463.48
191.49	463.32	197.05	462.46	197.41	462.61	197.41	462.62	197.7	462.61
199.21	462.6	199.35	462.48	199.81	462.1	200.2	462.13	201.61	462.23
204.76	462.29	207.74	462.35	217.86	462.53	228.96	462.73	230.09	462.82
230.76	462.86	231.66	462.9	232.73	462.95	233.83	462.99	241.61	463.41
244.15	463.5	246.62	463.57	248.88	463.64	252.59	463.84	255.29	463.93
255.89	463.94	258.49	464.03	260.85	464.11	261.65	464.13	263.82	464.21
264.7	464.23	289.47	464.83	295.84	464.98	296.08	465.21	296.34	465.48
296.8	465.48	297.93	465.48	299.01	465.48	300.37	465.48	317.03	466.14

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.0251	35001	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	51.35001	85.28		51.65	50	49.46	.1
							.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 457.80	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.33	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 457.47	* Reach Len. (ft)	* 51.65	* 50.00	*
49.46 *					
* Crit W.S. (ft)	* 457.47	* Flow Area (sq ft)	*	* 19.62	*
* E.G. Slope (ft/ft)	* 0.006838	* Area (sq ft)	*	* 19.62	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 29.99	* Top Width (ft)	*	* 29.99	*
* Vel Total (ft/s)	* 4.61	* Avg. Vel. (ft/s)	*	* 4.61	*
* Max Chl Dpth (ft)	* 1.03	* Hydr. Depth (ft)	*	* 0.65	*
* Conv. Total (cfs)	* 1093.2	* Conv. (cfs)	*	* 1093.2	*
* Length Wtd. (ft)	* 49.97	* Wetted Per. (ft)	*	* 30.22	*
* Min Ch El (ft)	* 456.44	* Shear (lb/sq ft)	*	* 0.28	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 317.03	* 0.00	*
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	* 0.00	* 0.26	*
0.00 *					
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 0.00	* 0.34	*
0.01 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

CROSS SECTION OUTPUT Profile #1.5 X 0-100yr

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Warning: The energy equation could not be balanced within the specified number of
iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set
equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.
```

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22.21002	470.2324.51001	470.1126.43002	470	26.47	47030.02002	469.8
32.71002	469.76 33.28	469.77 33.81	469.8	34.06	469.79 39.34	468
43.49002	466.0143.51001	46643.54001	465.98	43.56	465.97 43.72	465.93
46.04001	465.2249.04001	464.3549.68002	464.1850.20001		46455.74002	462.04
55.84	46261.27002	460.22 61.97	46064.11002		459.368.20001	458
70.03	457.3974.35001	45676.17001	455.8476.58002		455.8478.17001	455.74
82.81	455.4486.64001	455.18 87.97	455.1189.29001		455.0590.52002	455.02
91.60001	45593.02002	454.9995.95001	454.97 96.22		454.97 96.78	454.97
97.13	454.9697.29001	454.96 100.72	455.14 103.62		455.28 106.75	455.41
107.96	455.43 109	455.45 110.01	455.46 110.95		455.43 111.33	455.33
112.15	455.37 117.35	455.63 124.2	456 132.55		457.24 137.59	458
142.3	459.3 143.74	459.68 145.41	460 146.58		460.33 147.93	460.56
156.72	462 171.79	463.26 172.72	463.33 173.45		463.37 176.31	463.63
178.73	463.76 180.99	464 181.21	464 186.06		464.1 190.3	464.18
195.4	464.26 196.78	464.28 198.18	464.28 199.97		464.28 201.9	464.27
203.56	464.25 204.63	464.23 205.18	464.2 205.58		464.16 207.3	464.06
209.09	464 210.24	463.92 216.3	463.56 216.35		463.54 216.36	463.53
216.38	463.52 216.44	463.48 217.07	463.2 219.5		462.1 220.07	462.09
221.15	462.07 221.37	461.87 221.69	461.58 222.43		461.64 223.34	461.71
229.66	461.82 236.5	461.94 242.51	462.05 248.15		462.15 248.47	463.47
248.71	464.52 253.87	464.08 254.44	464 258.02		464 271.57	464
278.55	464 282.14	464 283.03	464.01 283.06		464.01 283.09	464.01
283.12	464.01 283.14	464.01 283.17	464.01 283.2		464.01 283.24	464.01
283.27	464.01 283.31	464.01 284.58	464.02 285.01		464.03 296.17	464.18
299.32	464.25 304.28	464.36 309	464.45 314.5		464.58 318.88	464.67
323.08	464.76 340.86	465.16 341.9	465.19 343.56		465.21 343.69	465.21
344.5	465.25 344.59	465.17 345.16	464.75 357.57		465 363.86	465.13
367.01	465.2					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0278.17001	.02	109	.02	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	78.17001	109		48.06 50	50.3	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 456.11	* Element	* Left OB	* Channel	*	
Right OB						
* Vel Head (ft)	* 0.27	* Wt. n-Val.	* 0.020	* 0.020	*	
0.020						
* W.S. Elev (ft)	* 455.84	* Reach Len. (ft)	* 48.06	* 50.00	*	
50.30						
* Crit W.S. (ft)	* 455.84	* Flow Area (sq ft)	* 0.08	* 18.98	*	
3.54						
* E.G. Slope (ft/ft)	* 0.006340	* Area (sq ft)	* 0.08	* 18.98	*	
3.54						
* Q Total (cfs)	* 90.40	* Flow (cfs)	* 0.06	* 81.20	*	
9.14						
* Top Width (ft)	* 45.14	* Top Width (ft)	* 2.03	* 30.83	*	
12.28						
* Vel Total (ft/s)	* 4.00	* Avg. Vel. (ft/s)	* 0.71	* 4.28	*	
2.58						
* Max Chl Dpth (ft)	* 0.88	* Hydr. Depth (ft)	* 0.04	* 0.62	*	
0.29						
* Conv. Total (cfs)	* 1135.3	* Conv. (cfs)	* 0.8	* 1019.8	*	
114.8						
* Length Wtd. (ft)	* 50.01	* Wetted Per. (ft)	* 2.03	* 30.86	*	
12.31						
* Min Ch El (ft)	* 454.96	* Shear (lb/sq ft)	* 0.02	* 0.24	*	

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```

0.11 *
* Alpha *      1.07 * Stream Power (lb/ft s) * 367.01 * 0.00 *
0.00 *
* Frctn Loss (ft) *      0.33 * Cum Volume (acre-ft) * 0.00 * 0.24 *
0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) * 0.00 * 0.30 *
0.01 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

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*****
*****
* E.G. Elev (ft) * 456.34 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.32 * Wt. n-Val. * 0.020 * 0.020 *
0.020 *
* W.S. Elev (ft) * 456.02 * Reach Len. (ft) * 48.06 * 50.00 *
50.30 *
* Crit W.S. (ft) * 456.02 * Flow Area (sq ft) * 0.64 * 24.60 *
6.09 *
* E.G. Slope (ft/ft) * 0.005495 * Area (sq ft) * 0.64 * 24.60 *
6.09 *
* Q Total (cfs) * 135.60 * Flow (cfs) * 1.06 * 116.48 *
18.06 *
* Top Width (ft) * 50.09 * Top Width (ft) * 3.90 * 30.83 *
15.37 *
* Vel Total (ft/s) * 4.33 * Avg. Vel. (ft/s) * 1.65 * 4.73 *
2.97 *
* Max Chl Dpth (ft) * 1.06 * Hydr. Depth (ft) * 0.16 * 0.80 *
0.40 *
* Conv. Total (cfs) * 1829.2 * Conv. (cfs) * 14.3 * 1571.4 *
243.6 *
* Length Wtd. (ft) * 50.01 * Wetted Per. (ft) * 3.91 * 30.86 *
15.40 *
* Min Ch El (ft) * 454.96 * Shear (lb/sq ft) * 0.06 * 0.27 *
0.14 *
* Alpha * 1.09 * Stream Power (lb/ft s) * 367.01 * 0.00 *
0.00 *
* Frctn Loss (ft) * 0.29 * Cum Volume (acre-ft) * 0.00 * 0.33 *
0.00 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.00 * 0.34 *
0.01 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

Prop_Condn_100yr.rep

need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop

REACH: CL_Creek_Prop RS: 800

INPUT

Description:

Station Elevation Data		num= 102		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	467.32	3.51001	467.3	4.5	467.35	940002	467.287	100006	467.26		
8.170013	467.239	290009	467.1813	29001	467.1514	79001	467.2415	79001	467.12		
24.80002	466	26.53	465.31	29.69	464	30.97	463.2433	55002	462		
37.15002	460.0537	23001	46037.43002	459.9737	49002	459.9737	54001	459.96			
37.63	459.9541	80002	459.3250	48001	458	64.16	456.1265	21002	456		
77.95001	454.8285	62003	454.1187	24002	45490.36002	453.7390	87003	453.66			
91.12003	453.5795	95001	453.49	101.11	453.54	102.56	453.67	105.64	454		
109.74	454.86	112.11	455.36	114.5	456	116.83	456.75	120.21	458		
133.01	458.84	140.51	459.21	152.62	459.92	154.46	459.95	156.93	459.97		
160.28	459.98	169.43	460	169.44	460	169.45	460	172.07	459.96		
174.28	460	177.61	460.43	179.22	460.6	183.02	461.03	183.77	461.12		
184.38	461.22	184.9	461.33	185.68	461.46	187.36	461.5	187.39	461.49		
190.81	461.84	190.87	461.85	193.15	462	194.1	462.03	196.53	462.02		
197.14	462	202.33	461.81	203.53	461.73	206.55	461.62	210.12	461.44		
210.32	461.43	210.48	461.42	210.64	461.41	210.98	461.56	211.26	461.68		
212.12	461.67	212.88	461.66	213.18	461.37	213.42	461.16	214.41	461.24		
215.03	461.29	229.21	461.54	239.47	461.73	239.77	462.56	240.02	463.33		
242.23	463.39	243.22	463.42	249.6	463.57	261.31	463.86	303.14	464		
303.83	464	305.84	464	318.87	464.16	349.5	464.67	353.15	464.61		
354.34	464.67	356.64	464.78	362.93	465.07	373.63	465.57	373.92	465.34		
374.25	465.08	378.42	465.16								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	95001	.02	109.74	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
77.95001		109.74	50.11	50	49.99	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 454.89	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.35	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 454.54	* Reach Len. (ft)	* 50.11	* 50.00	*
49.99 *					
* Crit W.S. (ft)	* 454.54	* Flow Area (sq ft)	*	* 19.02	*
* E.G. Slope (ft/ft)	* 0.006665	* Area (sq ft)	*	* 19.02	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*

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* Top Width (ft)	*	27.28	* Top Width (ft)	*	27.28 *
* Vel Total (ft/s)	*	4.75	* Avg. Vel. (ft/s)	*	4.75 *
* Max Chl Dpth (ft)	*	1.05	* Hydr. Depth (ft)	*	0.70 *
* Conv. Total (cfs)	*	1107.3	* Conv. (cfs)	*	1107.3 *
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	27.42 *
* Min Ch El (ft)	*	453.49	* Shear (lb/sq ft)	*	0.29 *
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	378.42 *
0.00 *					0.00 *
* Frctn Loss (ft)	*	0.32	* Cum Volume (acre-ft)	*	0.22 *
0.00 *					
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.27 *
0.00 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	455.20	* Element	*	Left OB	*	Channel	*
Right OB *								
* Vel Head (ft)	*	0.42	* Wt. n-Val.	*		*	0.020	*
* W.S. Elev (ft)	*	454.78	* Reach Len. (ft)	*	50.11	*	50.00	*
49.99 *								
* Crit W.S. (ft)	*	454.78	* Flow Area (sq ft)	*		*	25.96	*
* E.G. Slope (ft/ft)	*	0.006303	* Area (sq ft)	*		*	25.96	*
* Q Total (cfs)	*	135.60	* Flow (cfs)	*		*	135.60	*
* Top Width (ft)	*	30.99	* Top Width (ft)	*		*	30.99	*
* Vel Total (ft/s)	*	5.22	* Avg. Vel. (ft/s)	*		*	5.22	*
* Max Chl Dpth (ft)	*	1.29	* Hydr. Depth (ft)	*		*	0.84	*
* Conv. Total (cfs)	*	1708.0	* Conv. (cfs)	*		*	1708.0	*
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*		*	31.17	*
* Min Ch El (ft)	*	453.49	* Shear (lb/sq ft)	*		*	0.33	*
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	378.42	*	0.00	*
0.00 *								
* Frctn Loss (ft)	*	0.31	* Cum Volume (acre-ft)	*		*	0.30	*

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0.00 *
* C & E Loss (ft)          * 0.01 * Cum SA (acres)          * 0.31 *
0.00 *
*****
*****

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Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 750

INPUT

Description:

Station Elevation Data		num= 141									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	464.234	870026	464.19	5.27002	464.199	880005	464.12	10.11002	464.12		
13.95001	464.04	15.05002		46417.80002	463.81	21.79001	463.48	22.70001	464		
22.71002		46423.51001	464.09	24.40002		46424.98001	463.77	29.70001	462		
33.72	460.75	34.72	460.44	36.15002	460	37.47	459.61	42.94	458		
44.39001	457.82	48.44	457.48	49.25	457.45	2.35001	457.09	57.35001	456.62		
61.03	456.28	63.53	456.65	59003	455.61	68.24002	455.27	70.29001	454.87		
76.69	454	77.95001	453.68	83.94	452.19	84.57001	452	86.16	451.55		
87.52002	451.21	88.41	451.04	90.14001	450.81	92.35001	450.22	92.65002	450.16		
93.31003	450	94.44	449.86	95.71002	449.77	95.95001	449.78	96.72	449.83		
97.64001	450	97.66	450	105.99	451.53	108.21	452	109.36	452.19		
118.79	453.79	119.89	454	121.31	454.31	122.05	454.52	122.45	454.64		
127.02	456	131.95	457.36	135.08	458	136.63	458.08	138.62	458.17		
141.48	458.27	143.17	458.32	144.79	458.35	146.3	458.36	149.04	458.36		
150.1	458.37	151.14	458.39	156.74	458.55	158.24	458.58	162.44	458.66		
163.04	458.67	164.13	458.68	165.26	458.69	165.57	458.7	165.92	458.69		
166.63	458.68	170.46	458.59	171.41	458.56	177.56	458.34	179.13	458.29		
180.75	458.25	182.09	458.23	191.3	458.6	192.05	458.76	192.75	459.04		
192.79	459.12	193.65	459.39	193.85	459.38	195.88	460	196.32	460		
196.96	460.07	198.22	460.16	198.87	460.24	199.89	460.29	202.03	460.35		
203.45	460.42	207.38	460.65	210.11	460.86	210.63	460.89	211.35	460.92		
212.28	460.94	213.22	460.96	214.39	460.99	214.72	460.99	215.19	460.98		
218.34	460.9	218.92	460.88	219.66	460.86	220.36	460.85	220.61	460.84		
221.02	461.04	221.41	461.23	221.65	461.22	222.97	461.2	223.09	461.08		
223.48	460.7	223.87	460.73	225.04	460.83	230.05	460.91	248.35	461.23		
248.66	461.66	248.86	461.94	249.68	461.96	251.08	462	254.66	462.11		
265.38	462.42	279.91	463	292.55	463.66	301.93	463.9	305.96	464		
309.63	464.09	312.42	464.18	323.15	464.44	324.02	464.47	324.25	464.47		
324.61	464.48	325.71	464.5	337.3	464.5	340.59	464.5	348.72	464.5		
378.42	464.5										

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	95001	.02	109.36	.02

Prop_Condn_100yr.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 77.95001 109.36 50.12 50 50.04 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

```
*****
* E.G. Elev (ft)      * 451.87 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)       * 0.45 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 451.42 * Reach Len. (ft)   * 50.12 * 50.00 *
50.04 *
* Crit W.S. (ft)      * 451.42 * Flow Area (sq ft) *          * 16.71 *
*
* E.G. Slope (ft/ft)   * 0.006300 * Area (sq ft)      *          * 16.71 *
*
* Q Total (cfs)        * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)       * 18.71 * Top Width (ft)     *          * 18.71 *
*
* Vel Total (ft/s)     * 5.41 * Avg. Vel. (ft/s)   *          * 5.41 *
*
* Max Chl Dpth (ft)    * 1.65 * Hydr. Depth (ft)   *          * 0.89 *
*
* Conv. Total (cfs)    * 1138.9 * Conv. (cfs)        *          * 1138.9 *
*
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)   *          * 19.02 *
*
* Min Ch El (ft)       * 449.77 * Shear (lb/sq ft)   *          * 0.35 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 378.42 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.32 * Cum Volume (acre-ft) *          * 0.20 *
0.00 *
* C & E Loss (ft)     * 0.00 * Cum SA (acres)      *          * 0.24 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 452.27 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)       * 0.55 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 451.73 * Reach Len. (ft)   * 50.12 * 50.00 *
50.04 *
* Crit W.S. (ft)      * 451.73 * Flow Area (sq ft) *          * 22.86 *
*
*****
```



```

                                Prop_Condn_100yr.rep
* E.G. Slope (ft/ft)      *0.005969 * Area (sq ft)          *      *      22.86 *
* Q Total (cfs)          * 135.60 * Flow (cfs)          *      *      135.60 *
* Top Width (ft)         * 21.37 * Top Width (ft)       *      *      21.37 *
* Vel Total (ft/s)       * 5.93 * Avg. Vel. (ft/s)    *      *      5.93 *
* Max Chl Dpth (ft)      * 1.96 * Hydr. Depth (ft)    *      *      1.07 *
* Conv. Total (cfs)      * 1755.1 * Conv. (cfs)         *      *      1755.1 *
* Length Wtd. (ft)       * 50.00 * Wetted Per. (ft)    *      *      21.76 *
* Min Ch El (ft)         * 449.77 * Shear (lb/sq ft)    *      *      0.39 *
* Alpha 0.00            * 1.00 * Stream Power (lb/ft s) * 378.42 *      0.00 *
* Frctn Loss (ft)       * 0.30 * Cum Volume (acre-ft) *      *      0.27 *
* C & E Loss (ft)       * 0.01 * Cum SA (acres)      *      *      0.28 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 700

INPUT

Description:

```

Station Elevation Data      num=      148
Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev      Sta      Elev
*****
0      461.383.490021 461.373.600006 461.384.130005 461.44.570007 461.41
5.110016 461.395.810028 461.35 6.77002 461.2710.11002 460.9313.73001 460.84
14.29001 461.1114.59003 461.1619.02002 46024.48001 458.2225.12003 458.01
25.16 45825.27002 457.9732.29001 45642.87003 454.92 44.69 454.77
47.09003 454.650.06003 454.3352.29001 454.23 54.47 454.1656.24002 454.13
59.09003 454.1460.08002 454.1162.90002 454 66.91 453.4769.83002 452
72.42001 450.672.85001 450.3973.11002 450.3 73.53 450.2173.80002 450.15
74.37003 45074.81003 449.8977.58002 448.99 78.75 448.6179.87003 448
81.19 447.27 82.44 446.7883.46002 446.3384.77002 44685.74002 445.9
90.30002 445.5790.65002 445.55 90.91 445.52 93.03 445.395.74002 444.91
95.95001 444.996.46002 444.91 97.22 445.1299.20001 446 101.51 447.39
103.07 448 106.43 449.6 107.52 450 108.99 450.47 109.23 450.55
112.37 452 131.06 453.5 132.83 453.65 136.04 454 138.28 454.41
138.98 454.5 139.13 454.51 139.55 454.56 141.26 454.8 150.7 456
157.33 456.45 158.8 456.57 159.26 456.6 159.8 456.62 160.48 456.63

```

Prop_Condn_100yr.rep

161.32	456.64	163.4	456.64	165.29	456.62	166.16	456.61	175.97	456.34
185.89	456.04	186.47	456.04	186.52	456.04	186.6	456.04	187.9	456
187.91	456	188.05	456.04	195.45	458	204.5	458.26	204.71	458.26
212.18	458.47	212.65	458.48	218.71	458.98	219.65	459.06	219.74	459.06
219.87	459.06	220.02	459.05	220.31	459.04	220.49	459.03	220.51	459.03
223.07	460.29	223.57	460.53	223.63	460.56	223.82	460.65	223.85	460.66
223.85	460.67	223.86	460.67	223.87	460.67	223.88	460.68	224	460.74
224.02	460.74	225.51	460.71	225.55	460.67	226.02	460.21	226.17	460.22
227.54	460.33	230.94	460.39	250.19	460.7	250.64	461.15	252.13	461.21
254.78	461.23	255.21	460.88	255.4	460.73	262.68	460.78	268.36	460.81
271.55	460.83	275.45	460.86	285.21	460.92	285.68	461.29	285.84	461.42
287.72	461.48	289.98	461.57	295.71	461.79	300.55	462	305.97	462.31
307.02	462.37	318.07	463	319.21	463.11	328.5	463.98	328.69	464
328.7	464	328.72	464	347.49	464.38	349.97	464.43	353.18	464.5
360.44	464.5	367.66	464.5	378.42	464.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	58002	.02	108.99	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	77.58002	108.99		49.58	50		.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 447.02	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (ft)	* 0.49	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 446.54	* Reach Len. (ft)	* 49.58	* 50.00	*
52.14					
* Crit W.S. (ft)	* 446.54	* Flow Area (sq ft)	*	* 16.16	*
* E.G. Slope (ft/ft)	* 0.006355	* Area (sq ft)	*	* 16.16	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 17.11	* Top Width (ft)	*	* 17.11	*
* Vel Total (ft/s)	* 5.59	* Avg. Vel. (ft/s)	*	* 5.59	*
* Max Chl Dpth (ft)	* 1.64	* Hydr. Depth (ft)	*	* 0.94	*
* Conv. Total (cfs)	* 1134.0	* Conv. (cfs)	*	* 1134.0	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 17.62	*
* Min Ch El (ft)	* 444.90	* Shear (lb/sq ft)	*	* 0.36	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 378.42	* 0.00	*
0.00					
* Frctn Loss (ft)	* 0.31	* Cum Volume (acre-ft)	*	* 0.18	*
0.00					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 0.22	*
0.00					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 447.46 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)       * 0.61 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 446.85 * Reach Len. (ft)   * 49.58 * 50.00 *
52.14 *
* Crit W.S. (ft)      * 446.85 * Flow Area (sq ft) *          * 21.71 *
*
* E.G. Slope (ft/ft)   * 0.005926 * Area (sq ft)      *          * 21.71 *
*
* Q Total (cfs)        * 135.60 * Flow (cfs)        *          * 135.60 *
*
* Top Width (ft)       * 18.36 * Top Width (ft)    *          * 18.36 *
*
* Vel Total (ft/s)     * 6.25 * Avg. Vel. (ft/s)  *          * 6.25 *
*
* Max Chl Dpth (ft)    * 1.95 * Hydr. Depth (ft)  *          * 1.18 *
*
* Conv. Total (cfs)    * 1761.5 * Conv. (cfs)       *          * 1761.5 *
*
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)  *          * 19.02 *
*
* Min Ch El (ft)       * 444.90 * Shear (lb/sq ft)  *          * 0.42 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 378.42 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.29 * Cum Volume (acre-ft) *          * 0.25 *
0.00 *
* C & E Loss (ft)      * 0.01 * Cum SA (acres)     *          * 0.25 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop

REACH: Cl_Creek_Prop

RS: 650

INPUT

Description:

Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	458	.02	458	.06	458.6400146	457.875730011	456.63		

Prop_Condn_100yr.rep

8.610016	4569.460022	455.7916.61002	45419.89001	453.16	25.25	452
32.64001	451.8239.02002	451.6741.21002	451.6342.42001	451.6243.45001		451.61
45.67001	451.5746.26001	451.5746.56003	451.5746.79001	451.58	47	451.6
50.80002	451.5755.54001	451.5356.27002	451.5357.20001	451.54	64.41	451.59
67.14001	451.6168.24002	451.6376.49002	451.882.86002	451.8686.55002		452
87.15002	452.34 92.25	45293.64001	452 95.44	451.496.49002		451.05
99.62003	450 101.27	449.44 101.91	449.15 104.02	448 104.68		447.63
106.44	446.52 107.24	446 109.86	444.28 110.29	444 112.2		444
114.24	444 114.91	444 115.91	444.34 121.17	446 123.57		447.54
124.32	448 127.08	449.79 127.46	450 128.91	450.14 132.01		450.43
135.22	450.7 138.05	450.87 139.08	450.95 141.04	451.12 141.82		451.19
144.92	451.47 149.76	452 161.4	453.42 162.93	453.59 166.55		454
169.82	454.22 170.96	454.28 171.72	454.3 172.18	454.29 172.64		454.25
173.23	454.2 175.3	454.06 176.36	454 179.73	453.5 179.82		453.44
180.09	453.41 180.62	453.46 185.62	454 192.97	455.82 194		456
195.18	456.17 195.89	456.41 196.36	456.49 198.01	456.67 199.51		456.79
200.12	456.83 201.41	456.87 202.47	456.88 203.84	456.89 206.8		456.87
207.99	456.85 209.07	456.83 210.25	456.78 211.77	456.71 219.97		456.3
223.43	456.13 226.84	457.8 231.83	460.27 232.9	460.25 233.32		460.24
233.7	459.86 233.82	459.74 235.03	459.84 235.32	459.87 239.5		459.93
257.83	460.2 259.28	460.31 263.66	460.48 270.83	460.78 271.73		460.79
271.77	460.79 272.1	460.42 272.21	460.29 274.33	460.3 296		460.44
296.63	460.44 297.37	460.45 298.17	460.46 312.14	460.55 312.82		460.55
320.42	460.61 321.01	460.61 323.18	460.63 329.77	460.67 330.12		460.95
330.39	461.17 333.74	461.35 337.69	461.57 341.7	461.8 345.06		462
351.92	462.59 356.68	463 363.66	463.42 370.62	464 371.58		464.03
375.28	464.12 378.16	464.17 390.64	464.31			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0296.49002	.02	128.91	.02	

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	96.49002	128.91		49.04 50	50.64	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 446.30	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.59	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 445.71	* Reach Len. (ft)	* 49.04	* 50.00	*
50.64 *					
* Crit W.S. (ft)	* 445.71	* Flow Area (sq ft)	*	* 14.65	*
* E.G. Slope (ft/ft)	*0.006097	* Area (sq ft)	*	* 14.65	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 12.57	* Top Width (ft)	*	* 12.57	*
* Vel Total (ft/s)	* 6.17	* Avg. Vel. (ft/s)	*	* 6.17	*
* Max Chl Dpth (ft)	* 1.71	* Hydr. Depth (ft)	*	* 1.17	*
* Conv. Total (cfs)	* 1157.8	* Conv. (cfs)	*	* 1157.8	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 13.35	*
* Min Ch El (ft)	* 444.00	* Shear (lb/sq ft)	*	* 0.42	*

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) * 390.64 *      0.00 *
  0.00 *
* Frctn Loss (ft) *      0.32 * Cum Volume (acre-ft) *      *      0.16 *
  0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) *      *      0.21 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 446.82 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.71 * Wt. n-Val. *      * 0.020 *
*
* W.S. Elev (ft) * 446.11 * Reach Len. (ft) * 49.04 * 50.00 *
50.64 *
* Crit W.S. (ft) * 446.11 * Flow Area (sq ft) *      * 20.03 *
*
* E.G. Slope (ft/ft) * 0.005770 * Area (sq ft) *      * 20.03 *
*
* Q Total (cfs) * 135.60 * Flow (cfs) *      * 135.60 *
*
* Top Width (ft) * 14.27 * Top Width (ft) *      * 14.27 *
*
* Vel Total (ft/s) * 6.77 * Avg. Vel. (ft/s) *      * 6.77 *
*
* Max Chl Dpth (ft) * 2.11 * Hydr. Depth (ft) *      * 1.40 *
*
* Conv. Total (cfs) * 1785.2 * Conv. (cfs) *      * 1785.2 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 15.24 *
*
* Min Ch El (ft) * 444.00 * Shear (lb/sq ft) *      * 0.47 *
*
* Alpha      *      1.00 * Stream Power (lb/ft s) * 390.64 *      0.00 *
  0.00 *
* Frctn Loss (ft) *      0.30 * Cum Volume (acre-ft) *      *      0.22 *
  0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) *      *      0.24 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Prop_Condn_100yr.rep

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 600

INPUT

Description:

Station Elevation Data			num=	185							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	449.562.799988		449.273.419983		449.25	4.22998		449.255.289978		449.29	
6.5	449.368.539978		449.498.819977		449.59	2.69989		449.529.369995		449.52	
9.609985	449.529.709991		449.5210.43997		449.5810.71997		449.5910.95999		449.6		
11.19998	449.6111.45999		449.6112.16998		449.615.12997		449.58	19.84	449.45		
21.59	449.4123.42999		449.3825.31998		449.3827.22998		449.432.46997		449.49		
40.85999	449.4741.81998		449.4842.93997		449.48	47	449.4648.56998		449.45		
50.29999	449.4652.20999		449.4754.43997		449.4957.19998		449.5360.81998		449.6		
76.65997	449.9178.43997		449.9478.82999		449.9481.65997		45095.72998		450.25		
97.62997	450.2897.67999		450.2897.97998		450.27	98.84	450.26	99.87	450.22		
102.4	450.12	105.04	450	106.07	448.97	107.1	448	108.03	447.12		
109.12	446	109.78	445.37	111.24	444	111.37	443.88	111.65	443.6		
112.82	442.39	113.05	442.12	113.15	442	114.11	441.05	114.14	441.01		
114.23	441.02	114.24	441.02	115.65	441.28	116.28	441.44	116.67	441.6		
116.94	442	117.41	442.19	121.98	444	122.48	444.21	127.11	446		
127.8	446.24	132.22	447.76	132.56	447.87	132.92	448	133.32	448.06		
133.51	448.09	137.29	448.63	141.75	449.18	149.42	450	157.1	450.48		
158.47	450.59	160.38	450.76	161.89	450.9	165.07	451.17	169.58	451.52		
170.95	451.65	174.19	452	174.39	452.05	175.29	452.19	178.52	452.57		
179.1	452.66	181.72	452.98	182.39	453.07	182.89	453.11	183.5	453.15		
183.82	453.16	184.11	453.16	185.02	453.12	185.43	453.1	186.98	453.11		
191.22	453.17	194.97	453.22	197.2	453.23	199.27	453.24	201.24	453.24		
203.18	453.24	205.4	453.22	207.17	453.2	207.8	453.18	208.95	453.13		
209.85	453.09	211.07	453.03	213.51	452.98	214.06	452.96	215.57	452.88		
228.88	459.52	229.53	459.85	230.46	459.83	231.04	459.81	231.05	459.8		
231.54	459.31	231.6	459.32	233.05	459.44	244.66	459.6	255.64	459.75		
257.29	459.77	257.63	459.77	257.98	460.01	258.39	460.28	258.47	460.28		
258.48	460.28	258.74	460.28	262.8	460.31	263.27	459.91	263.39	459.81		
270.07	459.86	272.53	459.88	273.94	459.89	276.34	459.9	286.84	459.98		
286.93	459.98	287.03	459.98	289.19	460	290.03	460.01	290.35	460.01		
291.2	460.49	291.26	460.52	299.79	460.58	302.23	460.6	302.56	460.43		
303.15	460.11	306.48	460.14	311.65	460.19	316.85	460.23	316.89	460.23		
317.14	460.23	317.54	460.57	317.74	460.73	318.83	460.74	321.32	460.77		
321.72	460.44	321.92	460.27	326.21	460.31	329.47	460.33	332.58	460.35		
337.49	460.39	348.71	460.49	348.92	460.7	349.22	460.99	356.71	461.69		
359.79	462	364.59	462.67	365.92	462.84	366.18	462.86	368.25	463		
368.88	463	370.61	463.79	371.03	464	371.48	464	371.89	464		
378.79	464.3	383.21	464.47	383.28	464.48	384	464.5	386.11	464.5		

Manning's n Values			num=	3	
Sta	n Val	Sta	n Val	Sta	n Val

0	.0297.67999	.02	127.8	.02	

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
	97.67999	127.8	49.43	50	49.19	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 444.36 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.71 * Wt. n-Val.   *      * 0.020 *
*
* W.S. Elev (ft)      * 443.65 * Reach Len. (ft) * 49.43 * 50.00 *
49.19 *
* Crit W.S. (ft)      * 443.65 * Flow Area (sq ft) *      * 13.34 *
*
* E.G. Slope (ft/ft)  * 0.006605 * Area (sq ft)    *      * 13.34 *
*
* Q Total (cfs)       * 90.40 * Flow (cfs)      *      * 90.40 *
*
* Top Width (ft)      * 9.49 * Top Width (ft)   *      * 9.49 *
*
* Vel Total (ft/s)    * 6.78 * Avg. Vel. (ft/s) *      * 6.78 *
*
* Max Chl Dpth (ft)   * 2.64 * Hydr. Depth (ft) *      * 1.41 *
*
* Conv. Total (cfs)   * 1112.4 * Conv. (cfs)      *      * 1112.4 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 11.22 *
*
* Min Ch El (ft)      * 441.01 * Shear (lb/sq ft) *      * 0.49 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 386.11 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.32 * Cum Volume (acre-ft) *      * 0.15 *
0.00 *
* C & E Loss (ft)     * 0.02 * Cum SA (acres)    *      * 0.19 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
* E.G. Elev (ft)      * 444.98 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.84 * Wt. n-Val.   *      * 0.020 *
*
* W.S. Elev (ft)      * 444.14 * Reach Len. (ft) * 49.43 * 50.00 *
49.19 *
* Crit W.S. (ft)      * 444.14 * Flow Area (sq ft) *      * 18.45 *
*
* E.G. Slope (ft/ft)  * 0.006298 * Area (sq ft)    *      * 18.45 *
*
* Q Total (cfs)       * 135.60 * Flow (cfs)      *      * 135.60 *
*

```



```

Prop_Condn_100yr.rep
* Top Width (ft)      * 11.23 * Top Width (ft)      *      * 11.23 *
* Vel Total (ft/s)    * 7.35 * Avg. Vel. (ft/s)    *      * 7.35 *
* Max Chl Dpth (ft)   * 3.13 * Hydr. Depth (ft)    *      * 1.64 *
* Conv. Total (cfs)    * 1708.7 * Conv. (cfs)          *      * 1708.7 *
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)     *      * 13.25 *
* Min Ch El (ft)       * 441.01 * Shear (lb/sq ft)     *      * 0.55 *
* Alpha                * 1.00 * Stream Power (lb/ft s) * 386.11 * 0.00 *
0.00
* Frctn Loss (ft)      * 0.30 * Cum Volume (acre-ft) *      * 0.20 *
0.00
* C & E Loss (ft)      * 0.02 * Cum SA (acres)        *      * 0.22 *
0.00
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 550

INPUT

Description:

Station Elevation Data			num=	154			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	453.696	429993	453.936	890015	453.946	970001	453.947
7.080017	453.947	130005	453.94	7.23999	453.957	290009	453.957
7.350006	453.957	380005	453.957	420013	453.957	580017	453.928
8.410004	453.93	10.5	453.5	13.84	452.8615	76001	452.4517
17.73999	45218	32001	451.8625	67999	45031	79999	448.52
37.09	447.948	23999	447.5852	54999	447.4854	51999	447.4456
58.54001	447.41	58.94	447.41	59.09	447.41	59.12	447.4259
59.73001	447.5760	26001	447.6	61	447.6161	92999	447.61
73.23001	447.5278	32001	447.588	35001	447.4990	07001	447.48
100.02	447.43	102	447.4	106.61	447.37	107.8	447.36
114.54	447.43	115.29	447.43	124.42	447.56	131.4	447.61
148.99	447.96	150.25	448	151.48	448	151.96	448
155.93	447.39	158.34	446.43	158.9	446.21	159.46	446
164.19	444.17	164.59	444	166.13	443.35	168	442.41
170.55	441.2	173.01	440	174.11	439.46	177.28	438
178.87	438	180.43	438	183.24	439.5	184.11	440
187.85	442	189.24	442.77	191.21	443.73	191.84	444
192.36	444.18	195.53	444.89	199.3	445.78	200.46	446
222.18	448	224.48	448.16	224.54	448.17	228.59	448.46

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229.48	448.54	231.2	448.61	235.04	448.71	237.2	448.75	241.42	448.81
247.89	448.83	248.54	448.82	250.99	448.85	251.76	448.82	252.42	448.83
264.7	448.98	268.21	449	269.58	449.02	269.86	449.02	271.8	449.08
272.69	449.1	277.02	449.25	283.93	452.68	297.37	459.39	298.15	459.38
298.88	459.36	299.15	459.09	299.38	458.86	300.26	458.93	300.89	458.99
313.23	459.16	322.52	459.28	323.52	459.3	323.55	459.3	323.83	459.6
324.04	459.8	324.46	459.8	326.22	459.65	329.26	459.85	330.52	459.86
330.81	459.71	331.5	459.37	335.61	459.41	337.7	459.43	343.63	459.5
345.13	459.51	379.1	459.86	384.53	459.91	388.45	459.95	390.36	459.96
390.51	460.09	390.94	460.46	391.12	460.46	391.56	460.47	391.91	460.47
397.3	460.54	397.61	460.25	397.83	460.04	412.08	460.19	415.32	460.22
423.61	460.32	423.93	460.62	424.15	460.81	424.44	460.84		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	160.02	.02	191.85	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	160.02	191.85		49.94	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)          * 440.62 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.65 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 439.97 * Reach Len. (ft)   * 49.94 * 50.00 *
50.00 *
* Crit W.S. (ft)          * 439.97 * Flow Area (sq ft) *          * 14.00 *
*
* E.G. Slope (ft/ft)      * 0.006097 * Area (sq ft)      *          * 14.00 *
*
* Q Total (cfs)           * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)          * 10.98 * Top Width (ft)    *          * 10.98 *
*
* Vel Total (ft/s)        * 6.46 * Avg. Vel. (ft/s)  *          * 6.46 *
*
* Max Chl Dpth (ft)       * 1.97 * Hydr. Depth (ft)  *          * 1.27 *
*
* Conv. Total (cfs)       * 1157.7 * Conv. (cfs)       *          * 1157.7 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)  *          * 11.92 *
*
* Min Ch El (ft)          * 438.00 * Shear (lb/sq ft)  *          * 0.45 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.31 * Cum Volume (acre-ft) *          * 0.13 *
0.00 *
* C & E Loss (ft)         * 0.02 * Cum SA (acres)    *          * 0.18 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is

Prop_Condn_100yr.rep
 not a valid subcritical answer. The program
 defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft)      * 441.18 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.77 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 440.41 * Reach Len. (ft)   * 49.94 * 50.00 *
50.00 *
* Crit W.S. (ft)      * 440.41 * Flow Area (sq ft) *          * 19.25 *
*
* E.G. Slope (ft/ft)  * 0.005812 * Area (sq ft)      *          * 19.25 *
*
* Q Total (cfs)       * 135.60 * Flow (cfs)        *          * 135.60 *
*
* Top Width (ft)      * 12.73 * Top Width (ft)    *          * 12.73 *
*
* Vel Total (ft/s)    * 7.04 * Avg. Vel. (ft/s)  *          * 7.04 *
*
* Max Chl Dpth (ft)   * 2.41 * Hydr. Depth (ft)  *          * 1.51 *
*
* Conv. Total (cfs)   * 1778.7 * Conv. (cfs)       *          * 1778.7 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft)  *          * 13.88 *
*
* Min Ch El (ft)      * 438.00 * Shear (lb/sq ft)  *          * 0.50 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)    * 0.29 * Cum Volume (acre-ft) *          * 0.18 *
0.00 *
* C & E Loss (ft)     * 0.02 * Cum SA (acres)     *          * 0.21 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 500

INPUT

Description:

Station Elevation Data		num= 132		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	446	.01	4462.82	0007	445.833	860016	445.794	809998	445.76		
7.730011	445.7316	07001	445.6	17.12	445.5920	20001	445.621	58002	445.61		
24.76001	445.6627	58002	445.6936	70001	445.7539	57001	445.76	46.75	445.78		
51.84	445.78	56.41	445.7765	10001	445.74	75.09	445.6775	95001	445.66		

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81.53	445.62	93.95	001	445.55	98.13	445.51	101.98	445.46	103.28	445.46
104.54	445.46	106.72		445.48	112.94	445.57	116.12	445.61	117.63	445.62
118.45	445.62	125.3		445.57	126.15	445.55	129.34	445.46	142.79	445.24
145.63	445.17	147.02		445.12	147.78	445.11	149.49	445.1	150.16	445.08
150.55	445.05	150.75		445	150.88	444.89	151.12	444.84	157.16	444
160.02	443.12	161.34		442.72	163.66	442	168.92	440.43	169.79	440.18
170.47	440	172.59		439.24	176.12	438	176.83	438	178.87	438
183.05	438	184.15		439.24	184.91	440	188.52	441.54	189.49	442
190.06	442.17	191.42		442.49	197.85	444	202.47	444.4	203.22	444.45
203.99	444.47	211.19		444.98	212.42	444.99	213.39	445.02	214.43	445.08
226.26	445.93	226.4		445.94	227.31	446	248.89	446.35	253.05	446.42
255.8	446.46	256.03		446.46	257.37	446.49	257.66	446.5	257.77	446.5
257.8	446.5	257.82		446.5	257.83	446.5	257.85	446.5	257.93	446.51
258.05	446.51	258.16		446.51	258.29	446.51	258.42	446.51	258.54	446.51
258.69	446.51	258.88		446.51	258.99	446.5	260.09	446.49	260.51	446.49
260.96	446.48	269.83		446.62	276.97	451.01	292.93	458.89	295.67	458.9
296.39	458.88	297.25		458.87	297.52	458.6	297.77	458.36	298.64	458.43
299.32	458.48	312.38		458.63	318.91	458.74	323.04	458.83	330.24	459.24
331.58	459.31	335.33		459.19	337.82	459.19	337.83	459.11	341.91	459.16
341.94	459.26	388.05		460.34	396.6	460.45	398.66	460.47	399.34	460.48
400.03	460.48	400.15		460.49	402.11	460.51	412.84	460.65	412.89	460.65
413.16	460.66	414.42		460.68	416.52	460.71	416.69	460.58	417.15	460.21
418.46	460.23	424.44		460.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	160.02	.02	191.42	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	160.02	191.42		49.72	50	49.15	.1
							.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
*****
* E.G. Elev (ft)          * 440.10 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.59 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 439.50 * Reach Len. (ft)   * 49.72 * 50.00 *
49.15 *
* Crit W.S. (ft)          * 439.50 * Flow Area (sq ft) *          * 14.65 *
*
* E.G. Slope (ft/ft)      * 0.006178 * Area (sq ft)      *          * 14.65 *
*
* Q Total (cfs)           * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)          * 12.56 * Top Width (ft)     *          * 12.56 *
*
* Vel Total (ft/s)        * 6.17 * Avg. Vel. (ft/s)   *          * 6.17 *
*
* Max Chl Dpth (ft)       * 1.50 * Hydr. Depth (ft)   *          * 1.17 *
*
* Conv. Total (cfs)       * 1150.1 * Conv. (cfs)        *          * 1150.1 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)   *          * 13.49 *
*
* Min Ch El (ft)          * 438.00 * Shear (lb/sq ft)   *          * 0.42 *
*
* Alpha                   * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)        * 0.31 * Cum Volume (acre-ft) *          * 0.12 *
0.00 *

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* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.17
0.00			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 440.62	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.72	* Wt. n-Val.		* 0.020
* W.S. Elev (ft)	* 439.90	* Reach Len. (ft)	* 49.72	* 50.00
49.15				
* Crit W.S. (ft)	* 439.90	* Flow Area (sq ft)		* 19.96
* E.G. Slope (ft/ft)	* 0.005834	* Area (sq ft)		* 19.96
* Q Total (cfs)	* 135.60	* Flow (cfs)		* 135.60
* Top Width (ft)	* 14.07	* Top Width (ft)		* 14.07
* Vel Total (ft/s)	* 6.79	* Avg. Vel. (ft/s)		* 6.79
* Max Chl Dpth (ft)	* 1.90	* Hydr. Depth (ft)		* 1.42
* Conv. Total (cfs)	* 1775.4	* Conv. (cfs)		* 1775.4
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)		* 15.23
* Min Ch El (ft)	* 438.00	* Shear (lb/sq ft)		* 0.48
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 424.44	* 0.00
0.00				
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)		* 0.16
0.00				
* C & E Loss (ft)	* 0.00	* Cum SA (acres)		* 0.19
0.00				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

Prop_Condn_100yr.rep
defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
REACH: Cl_Creek_Prop RS: 450

INPUT

Description:

Station Elevation Data		num= 120									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4446.609985	443.8510	60999	443.7813	35001	443.7515	44998	443.74			
19.38	443.719	97998	443.720	35001	443.7120	88998	443.7521	67999	443.77		
25.94998	443.82	45.16	44450	97998	444.0458	81998	444.09	66.87	444.12		
72.73999	444.1475	29999	444.13	79	444.0984	89999	444.02	86.84	444		
101.32	443.83	105.38	443.77	113.73	443.64	118.19	443.59	153.8	442.77		
156.71	442.71	157.28	442.69	157.55	442.69	158.2	442.68	169.18	442		
171.68	442	172.83	442	175.81	442	177.17	442	180.07	442		
181.7	442	183.46	442	184.63	442	188.21	442	188.39	442		
188.6	442	191.22	440.71	192.65	440	196.08	438.4	196.94	438		
198.14	437.46	201.29	436	201.77	436	202.85	436	203.1	436		
206.01	437.26	207.76	438	209.64	438.73	210.53	438.95	211.8	439.33		
212.92	439.46	213.76	439.63	214.08	439.78	214.34	440	215.88	440.28		
220.29	441.07	222.89	441.53	225.05	441.89	225.3	441.93	225.84	442		
226.22	442.02	227.11	442.04	228.21	442.02	228.76	442	232	441.86		
232.76	441.85	234.89	441.99	235.08	442	241.23	442.72	244.97	443.21		
250.31	444	253.82	444.2	254.55	444.23	254.65	444.23	255.24	444.25		
256.19	444.3	265.21	444.76	269.02	446.38	271.1	447.26	274.26	447.76		
283.98	449.3	286.04	449.63	294.13	450.91	297.83	451.49	302.94	452.31		
309.61	453.37	316.98	454.54	321.39	455.24	324.58	455.75	333.17	457.12		
334.14	457.27	344.44	458.92	345.12	459.02	349.39	459.41	349.95	459.41		
351.18	459.39	351.54	459.09	351.78	458.89	352.74	458.97	353.57	459.03		
362.6	459.19	380.43	459.51	380.96	459.96	380.97	459.97	381.08	460		
381.14	460.02	383.34	460.06	383.71	460.07	384.5	459.64	384.63	459.57		
389.73	459.65	391.67	459.68	402.42	459.83	403.58	459.85	411.21	459.96		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.02	184.63	.02	215.88	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	184.63	215.88		50.28	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 438.77	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (ft)	* 0.63	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 438.15	* Reach Len. (ft)	* 50.28	* 50.00	*
48.87					
* Crit W.S. (ft)	* 438.15	* Flow Area (sq ft)	*	* 14.20	*
* E.G. Slope (ft/ft)	* 0.006140	* Area (sq ft)	*	* 14.20	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 11.51	* Top Width (ft)	*	* 11.51	*

Prop_Condn_100yr.rep					
* Vel Total (ft/s)	*	6.37	* Avg. Vel. (ft/s)	*	6.37
* Max Chl Dpth (ft)	*	2.15	* Hydr. Depth (ft)	*	1.23
* Conv. Total (cfs)	*	1153.7	* Conv. (cfs)	*	1153.7
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	12.41
* Min Ch El (ft)	*	436.00	* Shear (lb/sq ft)	*	0.44
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	411.21
0.00	*			*	0.00
* Frctn Loss (ft)	*	0.32	* Cum Volume (acre-ft)	*	0.10
0.00	*			*	
* C & E Loss (ft)	*	0.07	* Cum SA (acres)	*	0.15
0.00	*			*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	439.32	* Element	*	Left OB	* Channel
Right OB	*			*		
* Vel Head (ft)	*	0.74	* Wt. n-Val.	*		0.020
* W.S. Elev (ft)	*	438.58	* Reach Len. (ft)	*	50.28	50.00
48.87	*			*		
* Crit W.S. (ft)	*	438.58	* Flow Area (sq ft)	*		19.61
* E.G. Slope (ft/ft)	*	0.005861	* Area (sq ft)	*		19.61
* Q Total (cfs)	*	135.60	* Flow (cfs)	*		135.60
* Top Width (ft)	*	13.55	* Top Width (ft)	*		13.55
* Vel Total (ft/s)	*	6.91	* Avg. Vel. (ft/s)	*		6.91
* Max Chl Dpth (ft)	*	2.58	* Hydr. Depth (ft)	*		1.45
* Conv. Total (cfs)	*	1771.3	* Conv. (cfs)	*		1771.3
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*		14.63
* Min Ch El (ft)	*	436.00	* Shear (lb/sq ft)	*		0.49
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	411.21	0.00
0.00	*			*		


```

Prop_Condn_100yr.rep
* Frctn Loss (ft)      * 0.30 * Cum Volume (acre-ft) *      * 0.14 *
  0.00 *
* C & E Loss (ft)      * 0.09 * Cum SA (acres) *      * 0.18 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 400

INPUT

Description:

Station Elevation Data				num=	147				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.07	6300049	442.79	00085	441.99	2309998	441.98	3980011	442
6.61	442.12	8.76	442.16	10.81	442.12	13.06	442.04	14.06	442
15.48	441.97	19.87	441.93	23.19	441.92	23.26	441.92	27.23	441.92
31.76	441.94	36.88	441.99	36.91	441.99	37.51	442.41	54.99	442.05
45.32	442.12	47.66	442.15	61.28	442.4	63.09	442.46	75.10	442.47
71.88	442.51	73.62	442.52	78.13	442.54	82.41	442.55	83.16	442.55
89.88	442.54	90.87	442.53	96.69	442.49	106.23	442.41	113.01	442.37
116.9	442.35	123.81	442.35	127.25	442.33	131.2	442.3	135.48	442.25
142.15	442.15	144.58	442.1	148.57	442	163.07	441.28	164.84	441.19
167.07	441.08	175.32	440.69	177.73	440.59	180.43	440.49	183.69	440.35
186.22	440.29	186.75	440.27	187.61	440.25	188.08	440.24	195.77	440.09
195.95	440.09	198.61	440.02	199.11	440	202.39	439.84	202.9	439.79
202.92	439.79	204	439.67	205.83	439.46	210.49	439.06	211.67	438.95
213.12	438.82	217.93	438	220.62	437.14	224.02	436	230.25	434.09
230.33	434.06	230.38	434.05	230.39	434.05	230.55	434.06	230.56	434.06
230.62	434.08	230.78	434.14	230.91	434.17	231.36	434.26	232.41	434.49
234.25	434.9	238.94	436	244	437.45	245.55	437.89	245.68	437.93
245.75	437.95	245.76	437.96	245.77	437.96	245.8	437.93	245.82	437.91
245.84	437.91	246.39	438	246.86	438.05	252.16	438.44	252.46	438.5
257.08	440	260.19	440.46	263.67	441.09	268.9	442	269.87	442.06
276.74	442.42	279.39	442.55	280.43	442.59	281.37	442.63	282.64	442.66
283.38	442.67	283.89	442.67	285.49	442.63	285.56	442.57	285.62	442.54
286	442.52	286.86	442.49	293.2	442.35	293.52	442.33	295.06	442.28
297.9	442.14	298.25	442.15	298.83	442.22	300.02	442.38	312.59	444
323.17	444.75	331.55	445.48	338.16	446	356.89	447.97	357.2	448
360.6	448.32	378.71	450	378.74	450	379.9	450.05	380.62	450.35
381.56	450.75	391.47	454.88	396.75	457.08	403.89	460.05	405.32	460.04
405.71	460.03	405.82	459.94	406.32	459.54	408.04	459.67	408.14	459.67
408.7	459.68	409.05	459.69	417.36	459.84	421.57	459.92	424.62	459.97
426.9	460.01	431.09	460.09						

Prop_Condn_100yr.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .02 211.67 .02 244 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 211.67 244 49.39 50 49.1 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

 * E.G. Elev (ft) * 435.91 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.38 * Wt. n-Val. * 0.020 *
 *
 * W.S. Elev (ft) * 435.52 * Reach Len. (ft) * 49.39 * 50.00 *
 49.10 *
 * Crit W.S. (ft) * 435.52 * Flow Area (sq ft) * 8.44 *
 *
 * E.G. Slope (ft/ft) * 0.006917 * Area (sq ft) * 8.44 *
 *
 * Q Total (cfs) * 41.90 * Flow (cfs) * 41.90 *
 *
 * Top Width (ft) * 11.33 * Top Width (ft) * 11.33 *
 *
 * Vel Total (ft/s) * 4.96 * Avg. Vel. (ft/s) * 4.96 *
 *
 * Max Chl Dpth (ft) * 1.47 * Hydr. Depth (ft) * 0.74 *
 *
 * Conv. Total (cfs) * 503.8 * Conv. (cfs) * 503.8 *
 *
 * Length Wtd. (ft) * 50.00 * Wetted Per. (ft) * 11.72 *
 *
 * Min Ch El (ft) * 434.05 * Shear (lb/sq ft) * 0.31 *
 *
 * Alpha * 1.00 * Stream Power (lb/ft s) * 431.09 * 0.00 *
 0.00 *
 * Frctn Loss (ft) * 0.35 * Cum Volume (acre-ft) * 0.09 *
 0.00 *
 * C & E Loss (ft) * 0.03 * Cum SA (acres) * 0.14 *
 0.00 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

 * E.G. Elev (ft) * 436.24 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.45 * Wt. n-Val. * 0.020 *
 *
 * W.S. Elev (ft) * 435.79 * Reach Len. (ft) * 49.39 * 50.00 *
 49.10 *

```

Prop_Condn_100yr.rep
* Crit W.S. (ft)      * 435.79 * Flow Area (sq ft)      *      * 11.67 *
* E.G. Slope (ft/ft) * 0.006552 * Area (sq ft)      *      * 11.67 *
* Q Total (cfs)      * 62.85 * Flow (cfs)      *      * 62.85 *
* Top Width (ft)     * 13.30 * Top Width (ft)     *      * 13.30 *
* Vel Total (ft/s)   * 5.39 * Avg. Vel. (ft/s)   *      * 5.39 *
* Max Chl Dpth (ft)  * 1.74 * Hydr. Depth (ft)   *      * 0.88 *
* Conv. Total (cfs)  * 776.4 * Conv. (cfs)      *      * 776.4 *
* Length Wtd. (ft)   * 50.00 * Wetted Per. (ft)   *      * 13.76 *
* Min Ch El (ft)     * 434.05 * Shear (lb/sq ft)   *      * 0.35 *
* Alpha              * 1.00 * Stream Power (lb/ft s) * 431.09 * 0.00 *
* Frctn Loss (ft)    * 0.33 * Cum Volume (acre-ft) *      * 0.12 *
* C & E Loss (ft)    * 0.03 * Cum SA (acres)      *      * 0.16 *
*****
*****

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Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 350

INPUT

Description:

Station Elevation Data		num= 102									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4413.129974	440.726	109985	440.38	839996	440.18	10.72998	440.13			
11.95999	440.1114	54999	440.0515	91998	44017.82999	439.97	19.20999	439.95			
21.44998	439.93	22.97	439.9324	63998	439.9426	50998	439.97	27.62	440		
32.67999	440.1433	04999	440.1433	44998	440.15	47.37	440.48	51.75	440.55		
59.04999	440.761	23999	440.7364	93997	440.893	42999	441.1393	45999	441.13		
93.47	441.1393	47998	441.13	93.5	441.1393	50998	441.1393	53998	441.13		
134.43	440.87	136.98	440.86	141.19	440.85	154.19	440.57	160.98	440.48		
163.53	440.44	165.58	440.4	167.4	440.35	169.21	440.28	171.22	440.2		
175.33	440	185.77	439.56	187.23	439.5	190.76	439.38	209	438.34		
211.59	438.21	215.95	438	224.47	437.48	228.85	437.21	229.32	437.19		
230.21	437.18	231.49	437.14	233.43	437.06	235.22	436.97	245.74	436.44		
254.46	436	259.11	434.34	260.28	434	264.49	434	265.78	434		
271.97	434	272.28	434	272.54	434.07	275.63	434.79	278.6	435.51		

Prop_Condn_100yr.rep

280.63	436	285.24	437.58	286.61	438	292.29	438.85	294.41	439.16
294.82	439.2	297.04	439.34	297.96	439.41	302.75	440	308.18	440.55
311.17	440.93	317.49	441.66	319.69	441.95	319.81	441.97	320.1	442
328.92	442.55	330.42	442.66	333.91	442.92	341.82	443.55	345.61	443.83
347.26	444	362.74	445.55	367.26	446	368	446.07	368.33	446.1
370.99	446.33	389.52	448	392.15	448.13	412.32	449.47	414.1	449.55
422.9	449.9	425.64	450	429.27	450.16	435.12	450.41	438.61	451.77
444.94	454.13	450.08	456.02						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	245.74	.02	278.6	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	245.74	278.6		49.76	50	51.18	.1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

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*****
* E.G. Elev (ft)          * 434.96 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.29 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 434.67 * Reach Len. (ft)   * 49.76 * 50.00 *
51.18 *
* Crit W.S. (ft)          * 434.67 * Flow Area (sq ft) *          * 9.72 *
*
* E.G. Slope (ft/ft)      * 0.007155 * Area (sq ft)      *          * 9.72 *
*
* Q Total (cfs)           * 41.90 * Flow (cfs)        *          * 41.90 *
*
* Top Width (ft)          * 16.93 * Top Width (ft)    *          * 16.93 *
*
* Vel Total (ft/s)        * 4.31 * Avg. Vel. (ft/s)  *          * 4.31 *
*
* Max Chl Dpth (ft)       * 0.67 * Hydr. Depth (ft)  *          * 0.57 *
*
* Conv. Total (cfs)       * 495.4 * Conv. (cfs)       *          * 495.4 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)  *          * 17.12 *
*
* Min Ch El (ft)          * 434.00 * Shear (lb/sq ft)  *          * 0.25 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 450.08 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.35 * Cum Volume (acre-ft) *          * 0.08 *
0.00 *
* C & E Loss (ft)         * 0.01 * Cum SA (acres)     *          * 0.13 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

Prop_Condn_100yr.rep

```

*****
* E.G. Elev (ft)          * 435.22 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.36 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 434.86 * Reach Len. (ft)   * 49.76 * 50.00 *
51.18 *
* Crit W.S. (ft)          * 434.86 * Flow Area (sq ft) *          * 13.03 *
*
* E.G. Slope (ft/ft)      * 0.006729 * Area (sq ft)      *          * 13.03 *
*
* Q Total (cfs)           * 62.85 * Flow (cfs)        *          * 62.85 *
*
* Top Width (ft)          * 18.25 * Top Width (ft)     *          * 18.25 *
*
* Vel Total (ft/s)        * 4.83 * Avg. Vel. (ft/s)   *          * 4.83 *
*
* Max Chl Dpth (ft)       * 0.86 * Hydr. Depth (ft)   *          * 0.71 *
*
* Conv. Total (cfs)       * 766.2 * Conv. (cfs)        *          * 766.2 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)   *          * 18.49 *
*
* Min Ch El (ft)          * 434.00 * Shear (lb/sq ft)   *          * 0.30 *
*
* Alpha                   * 1.00 * Stream Power (lb/ft s) * 450.08 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.33 * Cum Volume (acre-ft) *          * 0.10 *
0.00 *
* C & E Loss (ft)         * 0.01 * Cum SA (acres)      *          * 0.14 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 300

INPUT

Description:

Station Elevation Data		num= 94		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4381.670013	437.912.040009	437.92.799988	437.917.959991	438				
9.76001	438.09	11.25	438.13	12.53	438.1213.73001	438.117.42999	438		
17.45999	438	23.09	437.8923.70001	437.9	26.87	438	31.97	438.16	
47.62	438.63	49.97	438.6950.79999	438.7153.39999	438.7578.86002	439.14			
81.34	439.1690.20999	439.2993.76999	439.32	94.19	439.3296.86002	439.33			
107.93	439.3	130.48	439.21	131.76	439.21	132.54	439.21	132.61	439.21
134.01	439.19	155.94	438.93	162.28	438.88	166.2	438.83	170.8	438.75
177.24	438.65	181.73	438.56	191.54	438.34	192.53	438.32	201.72	438.03

Prop_Condn_100yr.rep									
201.79	438.03	202.64	438	211.35	437.72	213.52	437.63	222.95	437.37
225.61	437.28	228.58	437.18	241.6	436.71	252.81	436.31	257.5	436.13
260.41	436	262.63	435.82	270.78	435.07	282.5	434	285.96	432.79
288.09	432	288.76	432	288.83	432	289.24	432	292.77	433.4
293.39	433.55	293.63	433.62	294.63	433.73	295.2	433.85	296.3	434
300.68	434.27	301.29	434.42	302.3	434.66	303.11	434.77	309	436
311.47	436.19	314.47	436.44	333.07	438	340.38	438.86	349.45	439.9
350.06	439.97	350.32	440	355.45	440.63	364.47	442	366	442.17
380.3	444	386.88	444.67	391.7	445.13	400.77	446	411.39	446.96
423.34	448	430.04	448.27	439.97	448.55	452.04	448.94	455.86	449.06
458.59	449.14	460.88	449.2	463.17	449.25	476.72	449.39		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.02	270.78	.02	301.29	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	270.78	301.29		49.5	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 433.96	* Element	* Left OB	* Channel	*	
Right OB						
* Vel Head (ft)	* 0.43	* Wt. n-Val.	*	* 0.020	*	
* W.S. Elev (ft)	* 433.53	* Reach Len. (ft)	* 49.50	* 50.00	*	
49.57						
* Crit W.S. (ft)	* 433.53	* Flow Area (sq ft)	*	* 7.94	*	
* E.G. Slope (ft/ft)	* 0.006894	* Area (sq ft)	*	* 7.94	*	
* Q Total (cfs)	* 41.90	* Flow (cfs)	*	* 41.90	*	
* Top Width (ft)	* 9.47	* Top Width (ft)	*	* 9.47	*	
* Vel Total (ft/s)	* 5.28	* Avg. Vel. (ft/s)	*	* 5.28	*	
* Max Chl Dpth (ft)	* 1.53	* Hydr. Depth (ft)	*	* 0.84	*	
* Conv. Total (cfs)	* 504.6	* Conv. (cfs)	*	* 504.6	*	
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 10.02	*	
* Min Ch El (ft)	* 432.00	* Shear (lb/sq ft)	*	* 0.34	*	
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 476.72	* 0.00	*	
0.00						
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	*	* 0.07	*	
0.00						
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 0.11	*	
0.00						

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set

equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 434.32 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.48 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 433.84 * Reach Len. (ft) * 49.50 * 50.00 *
49.57 *
* Crit W.S. (ft)      * 433.84 * Flow Area (sq ft) *      * 11.33 *
*
* E.G. Slope (ft/ft)  * 0.006596 * Area (sq ft)     *      * 11.33 *
*
* Q Total (cfs)       * 62.85 * Flow (cfs)       *      * 62.85 *
*
* Top Width (ft)      * 12.23 * Top Width (ft)   *      * 12.23 *
*
* Vel Total (ft/s)    * 5.55 * Avg. Vel. (ft/s) *      * 5.55 *
*
* Max Chl Dpth (ft)   * 1.84 * Hydr. Depth (ft) *      * 0.93 *
*
* Conv. Total (cfs)   * 773.8 * Conv. (cfs)      *      * 773.8 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 12.87 *
*
* Min Ch El (ft)      * 432.00 * Shear (lb/sq ft) *      * 0.36 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 476.72 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.34 * Cum Volume (acre-ft) *      * 0.09 *
0.00 *
* C & E Loss (ft)     * 0.03 * Cum SA (acres)     *      * 0.13 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 250

INPUT

Description:

Station	Elevation	Data	num=	127	Station	Elevation	Station	Elevation	Station	Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

Prop_Condn_100yr.rep

```

*****
0      437 3.23999 436.495.089996 436.556.429993 436.627.570007 436.64
8.700012 436.629.839996 436.58 10.91 436.56 11.81 436.5612.92999 436.57
16.78 436.6 20.59 436.38 20.91 436.3620.98001 436.36 21.12 436.36
22.53 436.38 22.87 436.39 23.13 436.39 23.34 436.38 23.88 436.38
24.94 436.3525.05002 436.3626.08002 436.3931.58002 436.5534.57001 436.59
38.42999 436.6842.51001 436.846.95999 436.9349.14001 436.98 56 437.19
72.42001 437.4876.85001 437.5692.29001 437.83 93.5 437.8596.67999 437.89
97.72 437.9 127.65 437.78 128.75 437.78 130.1 437.78 133.37 437.76
140.11 437.75 145.79 437.68 153.75 437.6 159.86 437.54 164.2 437.51
168.78 437.48 188.77 437.17 192.64 437.13 195.86 437.08 197.66 437.05
199.79 437.01 202.24 436.95 205.81 436.9 215.66 436.65 228.82 436.28
232.85 436.2 233.81 436.18 237.76 436.05 239.28 436 244.32 435.82
246.8 435.71 256.47 435.35 272.35 434.86 277.07 434.57 279.82 434.43
280.38 434.41 281.72 434.38 283.94 434.29 292.07 434 304.52 433.27
307.87 433.07 309.03 432.92 311.51 432.57 314.12 432.15 314.93 432
319.62 431.01 320.82 430.78 321.35 430.67 321.99 430.45 322.44 430.28
322.55 430.22 322.68 430.17 322.85 430.16 322.87 430.16 323.33 430.16
323.35 430.17 323.4 430.17 323.51 430.18 323.65 430.2 323.69 430.21
324.08 430.31 324.25 430.35 324.49 430.39 325.03 430.45 327.09 430.74
328.55 430.9 335.38 431.83 336.6 432 338.94 432.33 341.29 432.61
345.12 433.12 349.8 433.67 352.45 434 354.68 434.51 359.87 436
371.69 437.89 372.43 438 376.79 438.46 391.24 440 393.29 440.27
396 440.63 404.18 441.7 406.65 442 410.03 442.46 421.48 444
432.2 444.91 434.75 445.14 445.23 446 456.38 446.75 463.98 447.08
466.38 447.19 468.6 447.3 480.94 448 485.76 448.08 490.09 448.16
509.8 448.84 514.38 449

```

```

Manning's n Values      num=      3
Sta      n Val      Sta      n Val      Sta      n Val
*****
0      .02 304.52      .02 335.38      .02

```

```

Bank Sta: Left      Right      Lengths: Left Channel      Right      Coeff Contr.      Expan.
          304.52 335.38          49.83      50      50.53          .1          .3

```

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 431.76 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.32 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 431.44 * Reach Len. (ft) * 49.83 * 50.00 *
50.53 *
* Crit W.S. (ft)      * 431.44 * Flow Area (sq ft) *      * 9.26 *
*
* E.G. Slope (ft/ft) *0.007179 * Area (sq ft)      *      * 9.26 *
*
* Q Total (cfs)      * 41.90 * Flow (cfs)      *      * 41.90 *
*
* Top Width (ft)      * 14.93 * Top Width (ft)      *      * 14.93 *
*
* Vel Total (ft/s)      * 4.53 * Avg. Vel. (ft/s) *      * 4.53 *
*
* Max Chl Dpth (ft) * 1.28 * Hydr. Depth (ft) *      * 0.62 *
*
* Conv. Total (cfs) * 494.5 * Conv. (cfs)      *      * 494.5 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 15.19 *
*
* Min Ch El (ft) * 430.16 * Shear (lb/sq ft) *      * 0.27 *
*

```

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) * 514.38 *      0.00 *
  0.00      *
* Frctn Loss (ft)      *      0.36 * Cum Volume (acre-ft)      *      0.06 *
  0.00      *
* C & E Loss (ft)      *      0.01 * Cum SA (acres)      *      0.10 *
  0.00      *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft)      * 432.03 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      *      0.37 * Wt. n-Val.      *      *      0.020 *
*
* W.S. Elev (ft)      * 431.66 * Reach Len. (ft) * 49.83 * 50.00 *
50.53 *
* Crit W.S. (ft)      * 431.66 * Flow Area (sq ft) *      * 12.80 *
*
* E.G. Slope (ft/ft) * 0.006814 * Area (sq ft)      *      * 12.80 *
*
* Q Total (cfs)      * 62.85 * Flow (cfs)      *      * 62.85 *
*
* Top Width (ft)      * 17.56 * Top Width (ft)      *      * 17.56 *
*
* Vel Total (ft/s)      * 4.91 * Avg. Vel. (ft/s) *      * 4.91 *
*
* Max Chl Dpth (ft) * 1.50 * Hydr. Depth (ft) *      * 0.73 *
*
* Conv. Total (cfs) * 761.4 * Conv. (cfs)      *      * 761.4 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 17.86 *
*
* Min Ch El (ft)      * 430.16 * Shear (lb/sq ft) *      * 0.30 *
*
* Alpha      *      1.00 * Stream Power (lb/ft s) * 514.38 *      0.00 *
  0.00      *
* Frctn Loss (ft)      *      0.34 * Cum Volume (acre-ft) *      *      0.08 *
  0.00      *
* C & E Loss (ft)      *      0.01 * Cum SA (acres)      *      *      0.11 *
  0.00      *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Prop_Condn_100yr.rep

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 200

INPUT

Description:

Station Elevation Data		num= 121		Elev		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4342.340027	433.884.200012	433.85.110046	433.785.960022	433.79								
6.860046	433.827.960022	433.89 9.51001	43420.63004	434.3921.02002	434.4								
22.10004	434.4129.30002	434.5133.39001	434.6143.50003	434.6846.03003	434.7								
47.92001	434.7550.35004	434.7953.85004	434.8656.41003	434.9160.67001	435.02								
68.16003	435.1871.07001	435.2374.78003	435.2878.10004	435.3682.15002	435.39								
96.98001	435.53 102.96	435.57 106.13	435.59 118.41	435.63 127.91	435.6								
128.6	435.59 136.62	435.61 137.45	435.6 147.28	435.58 151.74	435.56								
159.19	435.58 160.04	435.58 170.25	435.61 172.33	435.63 176.28	435.62								
177.44	435.63 178.45	435.62 180.99	435.59 183.25	435.57 206.09	435.21								
206.16	435.21 206.25	435.21 206.5	435.21 206.64	435.21 206.77	435.21								
207.07	435.21 207.69	435.2 230.28	434.99 232.1	434.96 234.07	434.95								
235.94	434.91 237.58	434.91 240.19	434.91 241.54	434.91 243.31	434.89								
245.87	434.83 249.64	434.73 263.89	434.31 264.85	434.29 267.19	434.23								
274.24	434 294.09	433.1 300.28	432.74 310.01	432.15 310.55	432.12								
312.46	432 320.13	430.42 321.75	430.08 322.11	430 329.35	428.88								
335.75	428 336.23	427.9 337.27	427.77 338.12	427.71 338.69	427.7								
338.73	427.7 339.42	427.72 341	427.8 342.55	427.9 343.55	428								
353.41	429.77 354.48	429.97 354.66	430 354.7	430.01 354.73	430.02								
354.74	430.02 354.75	430.02 354.76	430.02 355.1	430.11 362.72	432								
364.25	432.52 366.03	433.15 368.39	434 370.02	434.16 396.32	436								
403.2	436.56 407.8	437.03 411.92	437.41 417.62	438 433.59	439.6								
434.13	439.65 438.16	440 451.33	441.24 458.45	442 467.38	443.02								
476.99	444 479.33	444.17 484.29	444.51 493.12	445.18 498.76	445.57								
502.37	445.85 503.85	445.97 504.7	445.75 504.76	445.74 505.12	445.75								
518.96	446.29												

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	321.75	.02	353.41	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	321.75	353.41		51.69 50	50.23	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 428.97	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.30	* Wt. n-Val.	* 0.020	*
* W.S. Elev (ft)	* 428.67	* Reach Len. (ft)	* 51.69	* 50.00
50.23				
* Crit W.S. (ft)	* 428.67	* Flow Area (sq ft)	* 9.56	*
* E.G. Slope (ft/ft)	* 0.007215	* Area (sq ft)	* 9.56	*

Prop_Condn_100yr.rep

* Q Total (cfs)	* 41.90	* Flow (cfs)	* 41.90
* Top Width (ft)	* 16.40	* Top Width (ft)	* 16.40
* Vel Total (ft/s)	* 4.38	* Avg. Vel. (ft/s)	* 4.38
* Max Chl Dpth (ft)	* 0.97	* Hydr. Depth (ft)	* 0.58
* Conv. Total (cfs)	* 493.3	* Conv. (cfs)	* 493.3
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	* 16.54
* Min Ch El (ft)	* 427.70	* Shear (lb/sq ft)	* 0.26
* Alpha 0.00	* 1.00	* Stream Power (lb/ft s)	* 518.96
* Frctn Loss (ft) 0.00	* 0.36	* Cum Volume (acre-ft)	* 0.04
* C & E Loss (ft) 0.00	* 0.00	* Cum SA (acres)	* 0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 429.23	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.35	* Wt. n-Val.	* 0.020	
* W.S. Elev (ft) 50.23	* 428.87	* Reach Len. (ft)	* 51.69	* 50.00
* Crit W.S. (ft)	* 428.87	* Flow Area (sq ft)	* 13.17	
* E.G. Slope (ft/ft)	* 0.006813	* Area (sq ft)	* 13.17	
* Q Total (cfs)	* 62.85	* Flow (cfs)	* 62.85	
* Top Width (ft)	* 19.02	* Top Width (ft)	* 19.02	
* Vel Total (ft/s)	* 4.77	* Avg. Vel. (ft/s)	* 4.77	
* Max Chl Dpth (ft)	* 1.17	* Hydr. Depth (ft)	* 0.69	
* Conv. Total (cfs)	* 761.4	* Conv. (cfs)	* 761.4	
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	* 19.19	
* Min Ch El (ft)	* 427.70	* Shear (lb/sq ft)	* 0.29	

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) *      518.96 *      0.00 *
  0.00      *
* Frctn Loss (ft) *      0.34 * Cum Volume (acre-ft) *      *      0.06 *
  0.00      *
* C & E Loss (ft) *      0.00 * Cum SA (acres) *      *      0.09 *
  0.00      *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 150

INPUT

Description:

Station Elevation Data		num= 143		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4348.119995	432.07	9.51001	432.04	11	432.09	12.51001	432.18	
16.72	432.51	18.22	432.57	27.07001	432.57	31.57001	432.33	32.34	432.29
32.63	432.28	32.76999	432.28	32.89999	432.28	33.04001	432.28	33.20999	432.29
34.17001	432.36	34.23001	432.36	34.42001	432.37	35.92001	432.39	50.35001	432.49
52.28	432.5	57.5	432.56	61.89001	432.62	66.98001	432.69	93.31	433.33
97.5	433.41	102.45	433.49	104.14	433.52	104.63	433.52	106.77	433.5
111.66	433.55	114.87	433.52	119.3	433.54	122.78	433.5	128.36	433.5
129.97	433.49	143.03	433.29	144.14	433.27	147.72	433.2	150.45	433.14
151.3	433.13	152.07	433.12	153.02	433.11	157.3	433.1	173.85	432.98
177.64	432.99	179.71	433.01	185.57	433.05	191.75	433.09	195.2	433.1
200.17	433.14	203.19	433.13	205.97	433.16	211.66	433.11	212.95	433.13
214.28	433.12	215.96	433.13	221.09	433.15	226.83	433.24	229.73	433.24
232.37	433.27	262.73	433.13	263.34	433.13	264.57	433.11	266.12	433.1
266.47	433.1	266.74	433.1	267.21	433.1	267.43	433.1	267.65	433.1
293.6	432.63	296.5	432.56	297.71	432.53	300.74	432.47	303.75	432.42
306.47	432.4	308.81	432.4	310.79	432.41	313.89	432.46	315.27	432.45
316.77	432.4	320.64	432.21	325.12	432	330.77	430.82	334.48	430.04
334.69	430	335.54	429.68	337.91	428.87	340.25	428	340.77	427.88
342.09	427.4	342.72	427.27	343.5	427.16	344.63	427.05	346.94	426.87
348.53	426.71	349.11	426.61	349.9	426.5	350.09	426.46	350.28	426.44
350.35	426.43	350.57	426.42	350.72	426.42	350.89	426.42	351.26	426.44
351.61	426.46	352.26	426.53	353.86	426.72	354.74	426.83	359.73	427.6
362.1	428	366.57	428.66	366.94	428.71	374.92	430	381.78	431.15
391.35	432	403.05	432.71	410.25	433.2	422.35	434	422.5	434.01
430.72	434.53	431.01	434.54	435.52	434.81	439.36	435.03	441.88	435.15
443.14	435.2	443.74	435.22	445.09	435.26	448.2	435.32	452.77	435.33
453.61	435.35	454.32	435.38	462.45	435.77	462.93	435.79	466.46	436
474.96	436.65	480.55	437.06	487.19	437.57	490.15	437.8	492.27	438
495.48	438.32	496.99	438.48	501.47	439				

Manning's n Values

num= 3

```

Prop_Condn_100yr.rep
Sta   n Val   Sta   n Val   Sta   n Val
*****
0      .02  334.48      .02  366.57      .02

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
          334.48  366.57          50.7      50      50.4          .1          .3

CROSS SECTION OUTPUT Profile #Q-100yr
*****
* E.G. Elev (ft)      * 427.75 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.29 * Wt. n-Val.    *          * 0.020 *
*
* W.S. Elev (ft)      * 427.46 * Reach Len. (ft) * 50.70 * 50.00 *
50.40 *
* Crit W.S. (ft)      * 427.46 * Flow Area (sq ft) *          * 9.67 *
*
* E.G. Slope (ft/ft)  * 0.007245 * Area (sq ft)    *          * 9.67 *
*
* Q Total (cfs)       * 41.90 * Flow (cfs)      *          * 41.90 *
*
* Top Width (ft)      * 16.90 * Top Width (ft)   *          * 16.90 *
*
* Vel Total (ft/s)    * 4.33 * Avg. Vel. (ft/s) *          * 4.33 *
*
* Max Chl Dpth (ft)   * 1.04 * Hydr. Depth (ft) *          * 0.57 *
*
* Conv. Total (cfs)   * 492.3 * Conv. (cfs)      *          * 492.3 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *          * 17.04 *
*
* Min Ch El (ft)      * 426.42 * Shear (lb/sq ft) *          * 0.26 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 501.47 * 0.00 *
0.00 *
* Frctn Loss (ft)    * 0.36 * Cum Volume (acre-ft) *          * 0.03 *
0.00 *
* C & E Loss (ft)     * 0.00 * Cum SA (acres)    *          * 0.06 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

```

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr
*****
* E.G. Elev (ft)      * 428.01 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.36 * Wt. n-Val.    *          * 0.020 *
*
* W.S. Elev (ft)      * 427.65 * Reach Len. (ft) * 50.70 * 50.00 *
50.40 *
* Crit W.S. (ft)      * 427.65 * Flow Area (sq ft) *          * 13.05 *
*

```

```

Prop_Condn_100yr.rep
* E.G. Slope (ft/ft)      *0.006847 * Area (sq ft)      *      *      13.05 *
* Q Total (cfs)          * 62.85 * Flow (cfs)          *      *      62.85 *
* Top Width (ft)         * 18.62 * Top Width (ft)         *      *      18.62 *
* Vel Total (ft/s)       * 4.82 * Avg. Vel. (ft/s)       *      *      4.82 *
* Max Chl Dpth (ft)      * 1.23 * Hydr. Depth (ft)      *      *      0.70 *
* Conv. Total (cfs)      * 759.6 * Conv. (cfs)           *      *      759.6 *
* Length Wtd. (ft)       * 50.00 * Wetted Per. (ft)      *      *      18.82 *
* Min Ch El (ft)         * 426.42 * Shear (lb/sq ft)      *      *      0.30 *
* Alpha                  * 1.00 * Stream Power (lb/ft s) * 501.47 *      0.00 *
0.00
* Frctn Loss (ft)        * 0.34 * Cum Volume (acre-ft)  *      *      0.05 *
0.00
* C & E Loss (ft)        * 0.00 * Cum SA (acres)        *      *      0.07 *
0.00
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 100

INPUT

Description:

Station Elevation Data				num=	134				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4306.160004	43010.07999	430.06	11.59	430.0914.11002	430.1			
22.67001	430.1427.54001	430.17	34.91	430.2442.01999	430.32	45.37	430.36		
46.64001	430.3748.20999	430.3849.98999	430.3851.76001	430.3757.14001	430.34				
59.64001	430.33	75.12	430.6380.92001	430.62	86.62	430.6488.73001	430.69		
96.26001	430.7296.98001	430.7399.61002	430.71	102.64	430.67	109.06	430.53		
115.4	430.52	117.02	430.48	118.35	430.48	119.58	430.56		
123.79	430.59	125.37	430.6	129.68	430.6	136.71	430.58		
141.6	430.57	142.69	430.56	146.62	430.52	159.71	430.51		
165.67	430.51	167.61	430.52	169.11	430.54	171.62	430.61		
181.33	430.64	187.09	430.7	213.16	431.01	215.32	431.06		
217.98	431.08	218.21	431.08	219.07	431.09	244.76	431.41	250.98	431.41
256.62	431.44	257.59	431.43	258.48	431.43	259.63	431.41	267.17	431.42
270.67	431.36	272.49	431.35	290.13	431.04	292.84	431.01	296.85	430.93
299.05	430.89	303.9	430.8	306.68	430.76	308.93	430.74	309.48	430.78
338.08	430.08	340.56	430.01	340.91	430	341.29	429.81	344.68	428
348.01	426.44	349.54	426	352.87	426	353.94	426	356.17	426
357.36	426	366.88	427.44	370.37	428	370.61	428.01	371.35	428.06
373.42	428.14	376.28	428.28	377.76	428.34	378.79	428.39	379.13	428.38

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379.49	428.31	380.25	428.34	381.71	428.41	385.66	428.62	408.47	429.89
408.9	429.92	409.06	429.93	409.19	429.94	409.27	429.94	409.36	429.95
409.39	429.95	409.5	429.96	409.58	429.96	409.75	429.97	410.44	430
412.55	430.17	412.67	430.18	412.84	430.19	416.15	430.47	417.35	430.49
418.63	430.61	420.22	430.76	424.01	431.06	424.95	431.12	425.71	431.15
426.5	431.18	427.51	431.19	428.05	431.19	428.6	431.18	430.53	431.13
431.77	431.12	434.25	431.13	434.82	431.15	435.41	431.18	435.75	431.18
437.73	431.17	439.88	431.19	442.67	431.22	444.07	431.25	444.63	431.28
454.47	432	459	432.38	459.66	432.44	476.97	434		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	340.56	.02	370.61	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	340.56	370.61		48.38	50	50.42	.1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)          * 427.11 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.31 * Wt. n-Val.          *          * 0.020 *
*
* W.S. Elev (ft)          * 426.80 * Reach Len. (ft)     * 48.38 * 50.00 *
50.42 *
* Crit W.S. (ft)          * 426.80 * Flow Area (sq ft)    *          * 9.43 *
*
* E.G. Slope (ft/ft)      * 0.007008 * Area (sq ft)         *          * 9.43 *
*
* Q Total (cfs)           * 41.90 * Flow (cfs)           *          * 41.90 *
*
* Top Width (ft)          * 15.43 * Top Width (ft)       *          * 15.43 *
*
* Vel Total (ft/s)        * 4.44 * Avg. Vel. (ft/s)     *          * 4.44 *
*
* Max Chl Dpth (ft)       * 0.80 * Hydr. Depth (ft)     *          * 0.61 *
*
* Conv. Total (cfs)       * 500.5 * Conv. (cfs)          *          * 500.5 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)     *          * 15.63 *
*
* Min Ch El (ft)          * 426.00 * Shear (lb/sq ft)     *          * 0.26 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 476.97 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.36 * Cum Volume (acre-ft) *          * 0.02 *
0.00 *
* C & E Loss (ft)         * 0.01 * Cum SA (acres)       *          * 0.04 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

Prop_Condn_100yr.rep
 not a valid subcritical answer. The program
 defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft)      * 427.38 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.38 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 427.01 * Reach Len. (ft)   * 48.38 * 50.00 *
50.42 *
* Crit W.S. (ft)      * 427.01 * Flow Area (sq ft) *          * 12.77 *
*
* E.G. Slope (ft/ft)   * 0.006675 * Area (sq ft)      *          * 12.77 *
*
* Q Total (cfs)        * 62.85 * Flow (cfs)        *          * 62.85 *
*
* Top Width (ft)       * 17.21 * Top Width (ft)     *          * 17.21 *
*
* Vel Total (ft/s)     * 4.92 * Avg. Vel. (ft/s)   *          * 4.92 *
*
* Max Chl Dpth (ft)    * 1.01 * Hydr. Depth (ft)   *          * 0.74 *
*
* Conv. Total (cfs)    * 769.2 * Conv. (cfs)        *          * 769.2 *
*
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)   *          * 17.48 *
*
* Min Ch El (ft)       * 426.00 * Shear (lb/sq ft)   *          * 0.30 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 476.97 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.34 * Cum Volume (acre-ft) *          * 0.03 *
0.00 *
* C & E Loss (ft)     * 0.01 * Cum SA (acres)      *          * 0.05 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 50

INPUT

Description:

Station Elevation Data num= 176

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	430.282.300049	430.525.920044	430.888.780029	431.139.119995	431.16				

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9.300049	431.169.390015	431.1611.90002	430.8713.96002	430.5914.15002	430.59
17.77002	43022.91003	428.8426.86002	42829.90002	427.2530.90002	427.08
31.80002	427.0132.35004	427.0635.12003	426.636.57004	426.3736.76001	426.35
36.85004	426.3537.00003	426.3540.06003	426.4740.46002	426.4947.19003	426.8
48.52002	426.8350.36002	426.951.64001	426.9452.49002	426.9653.41003	426.97
57.35004	427.0564.08002	427.1765.91003	427.2179.30002	427.4688.83002	427.66
104.04	428 104.14	428 106.83	428.03 109.33	428.04 112.06	428.02
113.35	428 118.81	427.93 121.98	427.93 124.89	427.99 125	428
128.58	428.09 133.18	428.23 133.67	428.24 134.33	428.24 142.84	428.18
153.07	428.11 157.29	428.09 163.22	428.09 164.65	428.08 164.83	428.08
183.94	428.15 184.57	428.14 184.76	428.13 184.9	428.13 185.02	428.14
185.34	428.14 185.53	428.14 190.07	428.17 190.31	428.17 193.77	428.2
194.55	428.2 200.04	428.28 201.39	428.28 202.87	428.27 208.2	428.19
208.71	428.2 219.91	428 222.98	427.93 224.61	427.91 226.01	427.91
227.54	427.94 230.27	428 240.25	428.37 242.87	428.44 245.12	428.47
250.31	428.52 252.39	428.55 254.31	428.59 263.7	428.61 269.77	428.75
272.82	428.81 277.54	428.92 279.28	428.95 287.37	429.16 294.62	429.19
296.4	429.23 296.96	429.24 298.05	429.24 306.28	429.2 318.96	429.22
339.1	429.03 339.3	429.03 339.51	429.02 339.74	429.02 340.31	429.01
340.77	429.01 367.05	428.78 372.54	428.69 380.17	428.6 381.98	428.57
384.69	428.53 385.87	428.51 386.93	428.51 387.77	428.52 388.44	428.54
389.96	428.6 390.23	428.62 391.62	428.71 395.24	428.95 400.11	428.87
401.82	429.03 403.48	429 407.06	429.35 407.72	429.35 408.26	429.36
408.64	429.36 409.36	429.34 410.24	429.44 411.32	429.38 412.12	429.45
413.51	429.32 414.24	429.33 416.47	428.91 417.04	428.86 417.34	428.75
419.54	428 425.01	426.25 425.65	426 430.43	425.01 431.75	424.7
432.29	424.57 432.84	424.55 433.22	424.54 433.51	424.56 433.55	424.57
433.73	424.59 435.69	424.78 447.65	425.92 448.54	426 459.11	426.74
460.36	426.81 463.03	426.95 464.22	427.02 466.04	427.14 467.13	427.23
468.23	427.34 471.17	427.68 473.62	427.94 474.27	428 486.44	428.69
487.3	428.72 489.59	428.76 490.56	428.76 491.73	428.75 493.27	428.75
495.25	428.8 498.35	428.9 500	428.96 501.76	429.05 506.4	429.29
508.35	429.37 511.54	429.54 511.83	429.55 513.2	429.51 513.86	429.5
514.42	429.5 516.38	429.63 521.54	429.93 522.48	430 528.92	430.91
531.65	431.26				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	417.34	.02	447.65	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	417.34	447.65		51.51	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 425.92	* Element	* Left OB	* Channel
Right OB *				
* Vel Head (ft)	* 0.29	* Wt. n-Val.	* 0.020	*
* W.S. Elev (ft)	* 425.63	* Reach Len. (ft)	* 51.51	* 50.00
50.01 *				
* Crit W.S. (ft)	* 425.63	* Flow Area (sq ft)	* 9.72	*
* E.G. Slope (ft/ft)	* 0.007302	* Area (sq ft)	* 9.72	*
* Q Total (cfs)	* 41.90	* Flow (cfs)	* 41.90	*
* Top Width (ft)	* 17.21	* Top Width (ft)	* 17.21	*
* Vel Total (ft/s)	* 4.31	* Avg. Vel. (ft/s)	* 4.31	*

Prop_Condn_100yr.rep					
* Max Chl Dpth (ft)	*	1.09	* Hydr. Depth (ft)	*	0.56
* Conv. Total (cfs)	*	490.3	* Conv. (cfs)	*	490.3
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	17.38
* Min Ch El (ft)	*	424.54	* Shear (lb/sq ft)	*	0.25
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	531.65
0.00	*			*	0.00
* Frctn Loss (ft)	*	0.37	* Cum Volume (acre-ft)	*	0.01
0.00	*			*	
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.02
0.00	*			*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

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CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	426.17	* Element	*	Left OB	* Channel
Right OB	*			*		
* Vel Head (ft)	*	0.34	* Wt. n-Val.	*		0.020
* W.S. Elev (ft)	*	425.84	* Reach Len. (ft)	*	51.51	50.00
50.01	*			*		
* Crit W.S. (ft)	*	425.84	* Flow Area (sq ft)	*		13.52
* E.G. Slope (ft/ft)	*	0.006822	* Area (sq ft)	*		13.52
* Q Total (cfs)	*	62.85	* Flow (cfs)	*		62.85
* Top Width (ft)	*	20.31	* Top Width (ft)	*		20.31
* Vel Total (ft/s)	*	4.65	* Avg. Vel. (ft/s)	*		4.65
* Max Chl Dpth (ft)	*	1.30	* Hydr. Depth (ft)	*		0.67
* Conv. Total (cfs)	*	760.9	* Conv. (cfs)	*		760.9
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*		20.51
* Min Ch El (ft)	*	424.54	* Shear (lb/sq ft)	*		0.28
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	531.65	0.00
0.00	*			*		
* Frctn Loss (ft)	*	0.33	* Cum Volume (acre-ft)	*		0.02
0.00	*			*		
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*		0.02
0.00	*			*		

Prop_Condn_100yr.rep

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

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Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop

REACH: Cl_Creek_Prop RS: 0

INPUT

Description:

Station Elevation Data num= 175

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4251.840027	424.473.340027	424	5.77002	423.867.410034	423.78			
7.890015	423.778.299988	423.7811.14001	424	23.59003	424.34	28.56	424.47		
30.77002	424.52	31.69	424.54	32.25	424.54	32.81	424.5433.70001	424.53	
35.12003	424.536.52002	424.538.40002	424.5440.36002	424.5942.09003	424.65				
43.43002	424.71	45.28	424.845.58002	424.8	46	424.8148.87003	424.81		
50.81	424.8173.09003	425.2678.07001	425.2979.52002	425.380.89001	425.32				
82.08002	425.34	105.06	425.46	107.2	425.5	108.04	425.51	108.85	425.52
110.63	425.51	111.53	425.51	115.23	425.53	117.03	425.55	117.77	425.56
127.46	425.64	132.65	425.76	134.27	425.78	139.72	425.84	155.84	425.96
163.34	426	163.37	426	163.38	426	165.75	426	165.76	426
165.77	426	171.16	425.96	171.38	425.96	186.39	425.82	187.51	425.82
194.7	425.77	197.27	425.76	199.34	425.77	201.36	425.81	203.71	425.89
206.65	426	212.2	426.15	214.33	426.2	216.79	426.24	229.6	426.4
230.29	426.41	235.13	426.45	237.06	426.47	243.05	426.5	256.78	426.6
258.99	426.63	260.19	426.64	264.68	426.67	265.84	426.68	266.74	426.7
267.5	426.71	268.22	426.71	269.8	426.7	275.25	426.7	278.6	426.7
288.12	426.97	289.41	426.96	290.64	426.95	292	426.94	299.82	426.8
308.16	426.75	312.26	426.68	314.18	426.66	317.12	426.65	322.93	426.6
323.92	426.61	324.8	426.63	326.45	426.62	329.12	426.68	330.99	426.71
333.09	426.74	335.4	426.74	340.13	426.73	357.2	426.44	358.58	426.44
358.84	426.44	359.04	426.44	359.53	426.43	359.92	426.42	360.46	426.42
361.15	426.42	363.63	426.43	365.7	426.43	365.79	426.42	366.07	426.42
377.26	426.28	394.6	426.19	396.98	426.12	397.67	426.11	399.07	426.07
400.08	426.06	401.72	426.06	402.65	426.08	404.94	426.13	405.98	426.13
406.87	426.08	407.71	426	410.18	425.67	417.75	424.78	424.42	424
429.73	422.56	430.15	422.45	430.47	422.39	430.98	422.31	431.42	422.25
431.62	422.23	432.04	422.2	432.22	422.18	432.43	422.14	432.53	422.13
432.66	422.13	432.85	422.14	432.86	422.14	433.45	422.18	435.16	422.27
442.75	422.79	448.35	423.07	467.54	424	473.7	424.53	474.86	424.6
476.42	424.65	480.86	424.76	487.38	425.15	490.47	425.2	491.85	425.29
492.63	425.34	493.16	425.36	493.71	425.39	494.25	425.39	494.74	425.4
495.33	425.39	496.09	425.4	497.15	425.35	498.08	425.34	500.18	425.32
501.35	425.32	501.74	425.33	503.36	425.41	505.42	425.49	509.39	425.62
510.43	425.66	511.11	425.71	512.33	425.83	514.8	425.99	514.97	426
519.27	426.62	530.29	428	533.98	429.27	535.81	430	536.95	430.33

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
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Prop_Condn_100yr.rep

 0 .02 417.75 .02 448.35 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 417.75 448.35 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

 * E.G. Elev (ft) * 423.35 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.26 * Wt. n-Val. * * 0.020 *
 0.020 *
 * W.S. Elev (ft) * 423.09 * Reach Len. (ft) * * *
 *
 * Crit W.S. (ft) * 423.09 * Flow Area (sq ft) * * 10.27 *
 0.01 *
 * E.G. Slope (ft/ft) * 0.007682 * Area (sq ft) * * 10.27 *
 0.01 *
 * Q Total (cfs) * 41.90 * Flow (cfs) * * 41.90 *
 0.00 *
 * Top Width (ft) * 21.08 * Top Width (ft) * * 20.59 *
 0.49 *
 * Vel Total (ft/s) * 4.08 * Avg. Vel. (ft/s) * * 4.08 *
 0.34 *
 * Max Chl Dpth (ft) * 0.96 * Hydr. Depth (ft) * * 0.50 *
 0.01 *
 * Conv. Total (cfs) * 478.0 * Conv. (cfs) * * 478.0 *
 0.0 *
 * Length Wtd. (ft) * * Wetted Per. (ft) * * 20.73 *
 0.49 *
 * Min Ch El (ft) * 422.13 * Shear (lb/sq ft) * * 0.24 *
 0.01 *
 * Alpha * 1.00 * Stream Power (lb/ft s) * 536.95 * 0.00 *
 0.00 *
 * Frctn Loss (ft) * * Cum Volume (acre-ft) * * *
 *
 * C & E Loss (ft) * * Cum SA (acres) * * *
 *

Warning: Slope too steep for slope area to converge during supercritical flow
 calculations (normal depth is below critical depth).
 Water surface set to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

 * E.G. Elev (ft) * 423.58 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.31 * Wt. n-Val. * * 0.020 *
 0.020 *
 * W.S. Elev (ft) * 423.27 * Reach Len. (ft) * * *
 *
 * Crit W.S. (ft) * 423.27 * Flow Area (sq ft) * * 13.96 *
 0.41 *
 * E.G. Slope (ft/ft) * 0.006378 * Area (sq ft) * * 13.96 *
 0.41 *
 * Q Total (cfs) * 62.85 * Flow (cfs) * * 62.32 *
 0.53 *
 * Top Width (ft) * 25.37 * Top Width (ft) * * 21.24 *
 4.13 *

Prop_Condn_100yr.rep					
* Vel Total (ft/s)	*	4.37	* Avg. Vel. (ft/s)	*	4.46 *
1.28 *					
* Max Chl Dpth (ft)	*	1.14	* Hydr. Depth (ft)	*	0.66 *
0.10 *					
* Conv. Total (cfs)	*	787.0	* Conv. (cfs)	*	780.4 *
6.6 *					
* Length Wtd. (ft)	*		* Wetted Per. (ft)	*	21.40 *
4.14 *					
* Min Ch El (ft)	*	422.13	* Shear (lb/sq ft)	*	0.26 *
0.04 *					
* Alpha	*	1.03	* Stream Power (lb/ft s)	*	536.95 * 0.00 *
0.00 *					
* Frctn Loss (ft)	*		* Cum Volume (acre-ft)	*	
* C & E Loss (ft)	*		* Cum SA (acres)	*	

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
Water surface set to critical depth.

SUMMARY OF REACH LENGTHS

River: CL_Creek_Prop

* Reach	* River Sta.	* Left	* Channel	* Right
*CL_Creek_Prop	* 1100.00	* 51.79*	50*	43.58*
*CL_Creek_Prop	* 1050	* 50.18*	50*	49.43*
*CL_Creek_Prop	* 1000	* 48.69*	50*	48.85*
*CL_Creek_Prop	* 950	* 49.87*	50*	49.98*
*CL_Creek_Prop	* 900	* 51.65*	50*	49.46*
*CL_Creek_Prop	* 850	* 48.06*	50*	50.3*
*CL_Creek_Prop	* 800	* 50.11*	50*	49.99*
*CL_Creek_Prop	* 750	* 50.12*	50*	50.04*
*CL_Creek_Prop	* 700	* 49.58*	50*	52.14*
*CL_Creek_Prop	* 650	* 49.04*	50*	50.64*
*CL_Creek_Prop	* 600	* 49.43*	50*	49.19*
*CL_Creek_Prop	* 550	* 49.94*	50*	50*
*CL_Creek_Prop	* 500	* 49.72*	50*	49.15*
*CL_Creek_Prop	* 450	* 50.28*	50*	48.87*
*CL_Creek_Prop	* 400	* 49.39*	50*	49.1*
*CL_Creek_Prop	* 350	* 49.76*	50*	51.18*
*CL_Creek_Prop	* 300	* 49.5*	50*	49.57*
*CL_Creek_Prop	* 250	* 49.83*	50*	50.53*
*CL_Creek_Prop	* 200	* 51.69*	50*	50.23*
*CL_Creek_Prop	* 150	* 50.7*	50*	50.4*
*CL_Creek_Prop	* 100	* 48.38*	50*	50.42*
*CL_Creek_Prop	* 50	* 51.51*	50*	50.01*
*CL_Creek_Prop	* 0	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

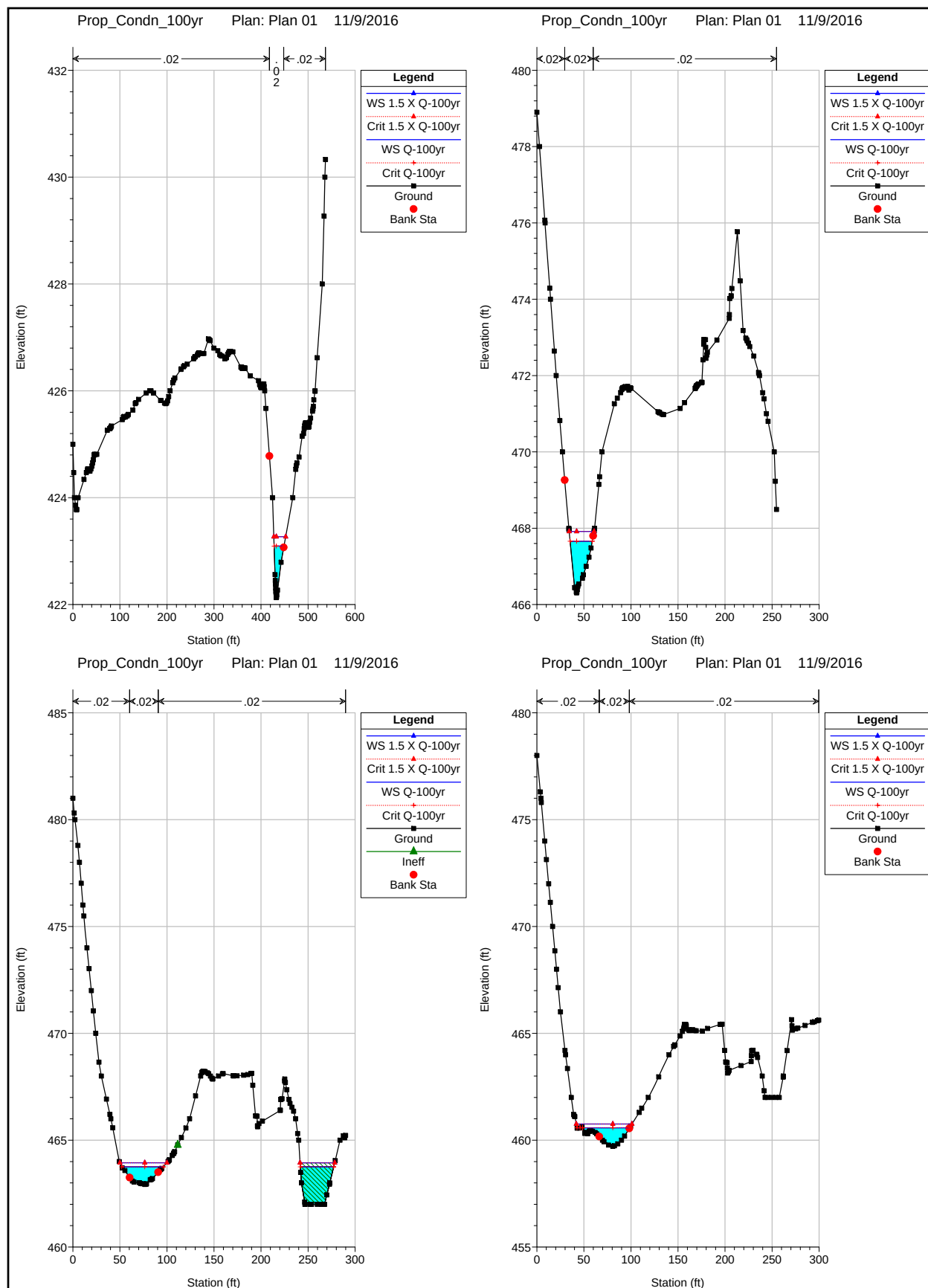
River: CL_Creek_Prop

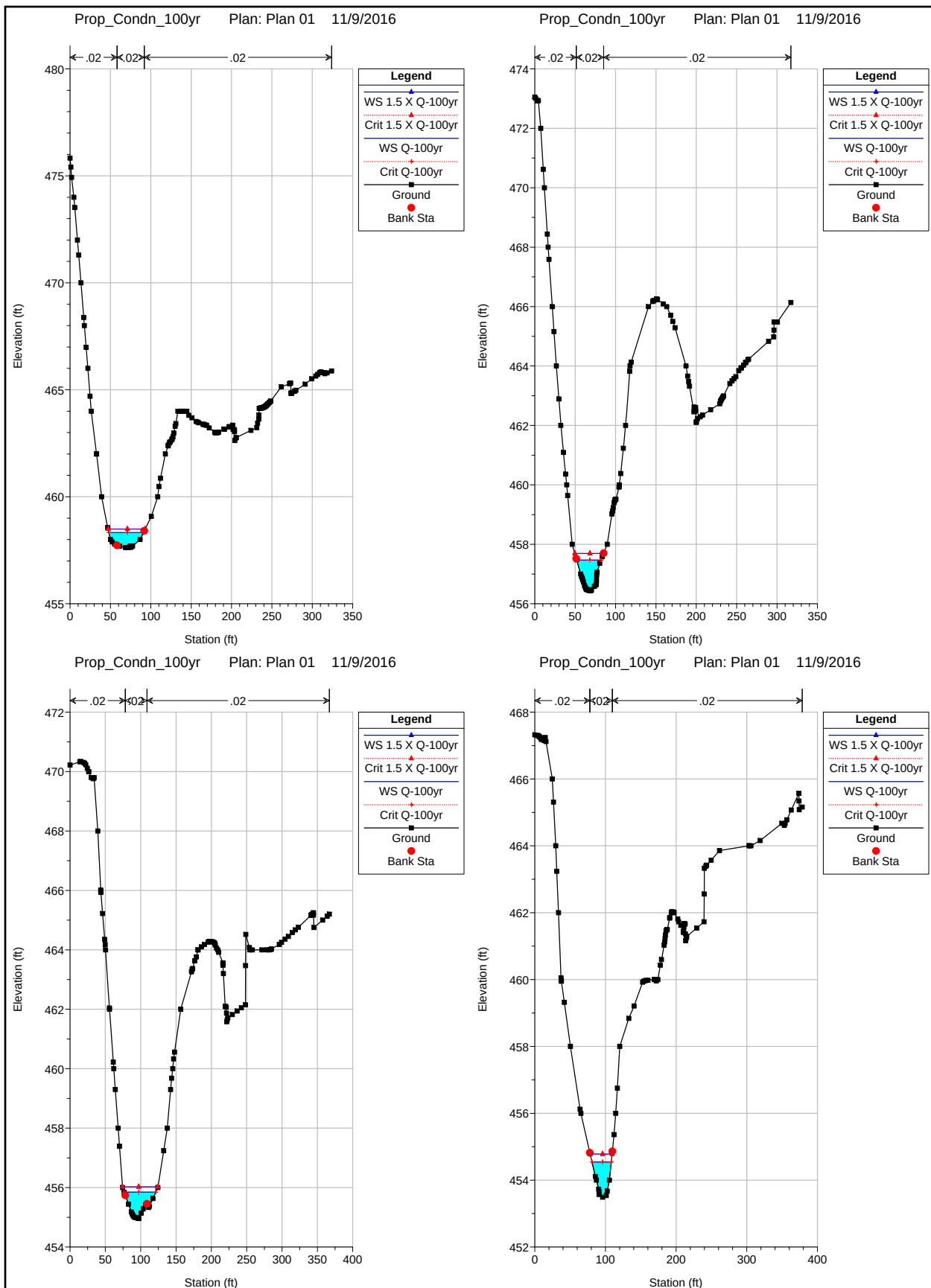
* Reach	* River Sta.	* Contr.	* Expan.

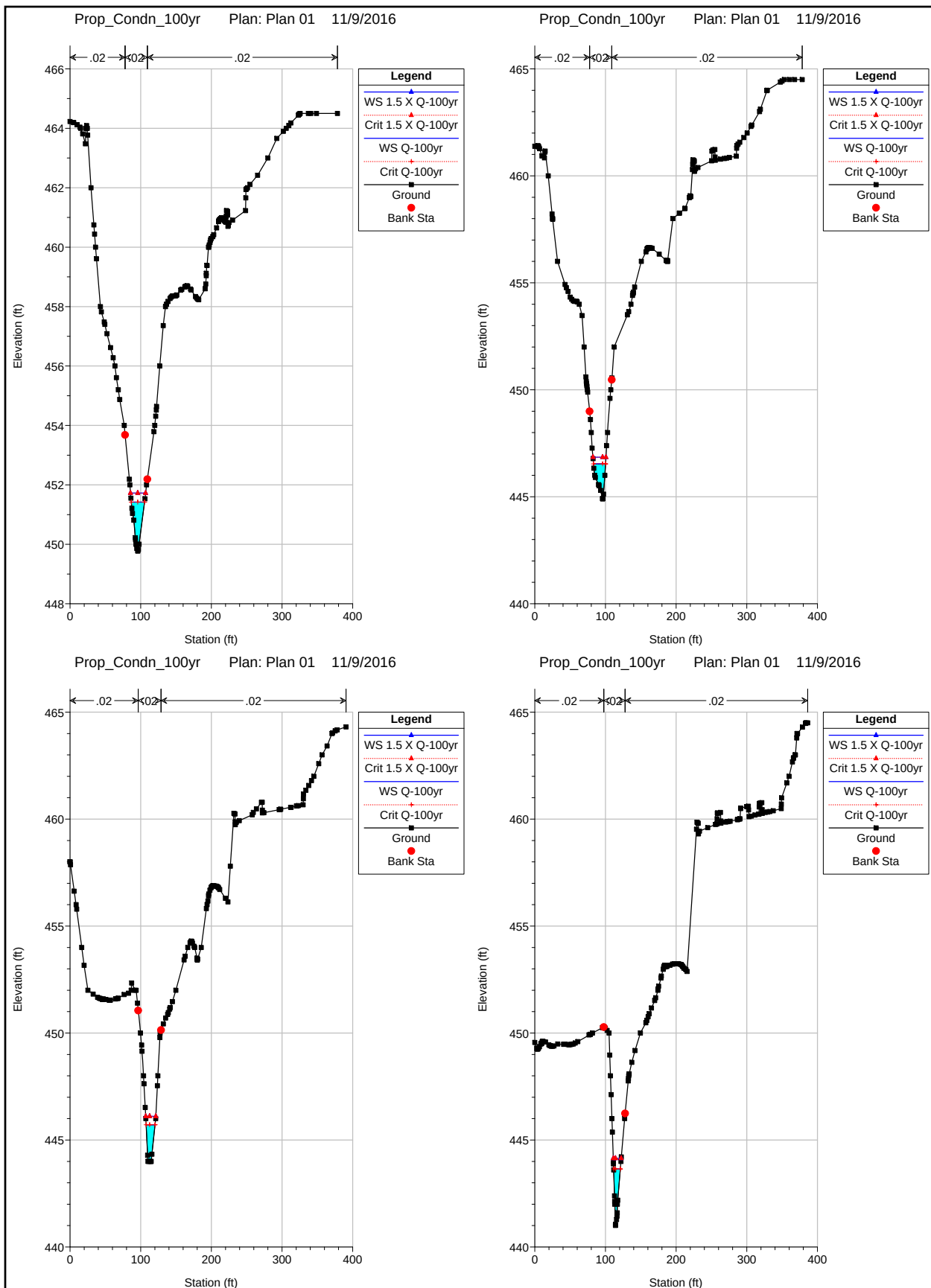
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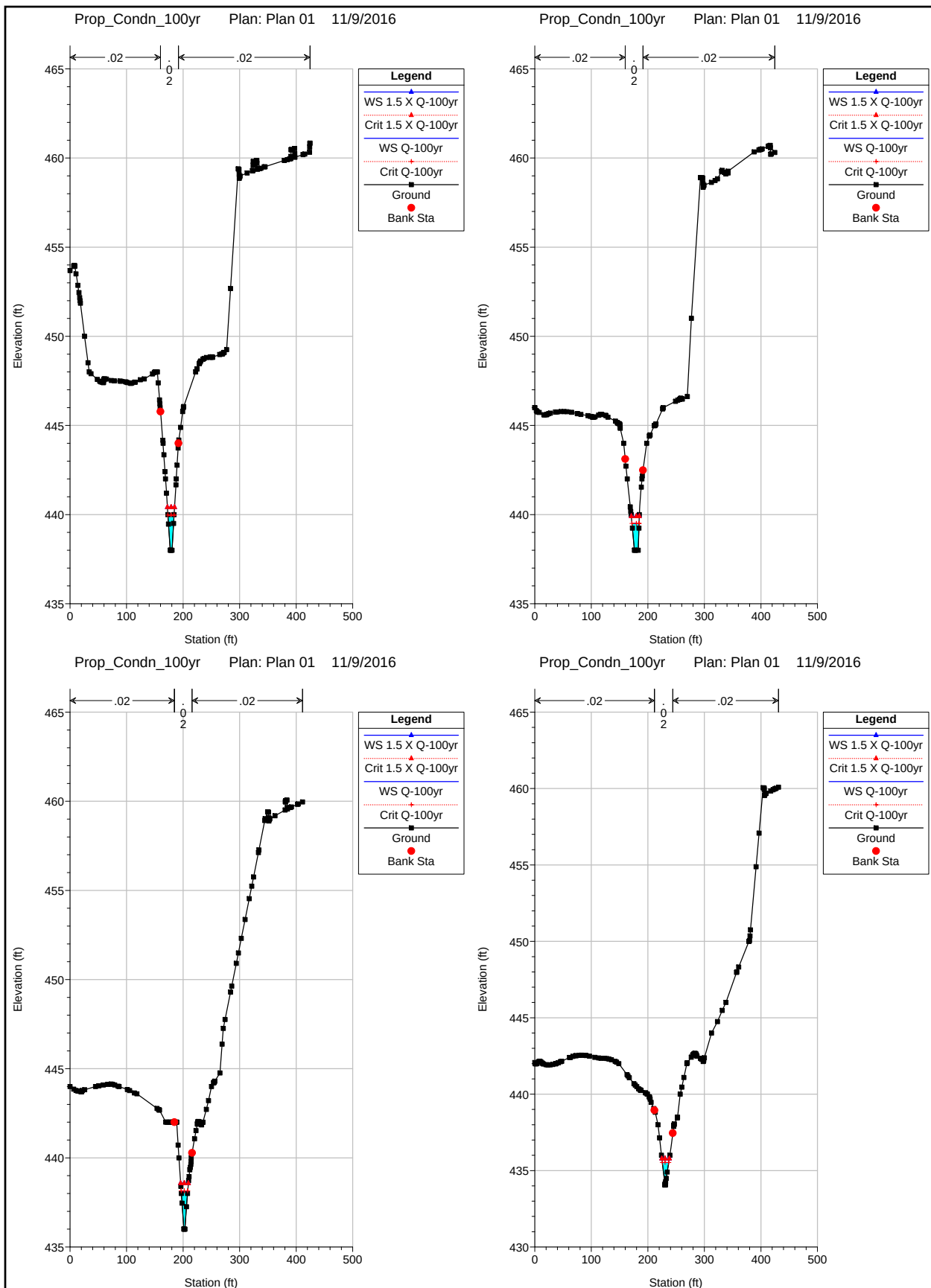
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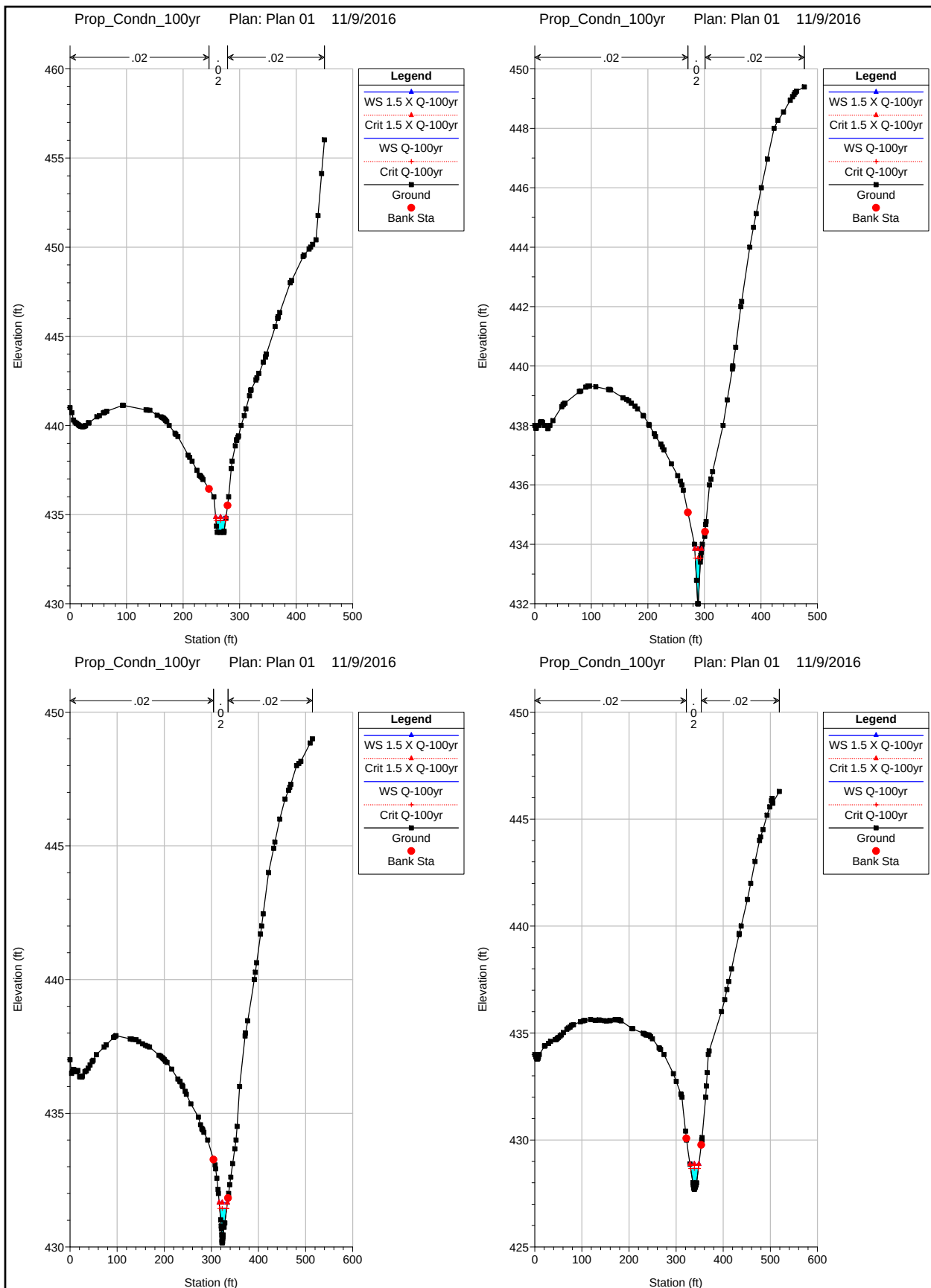
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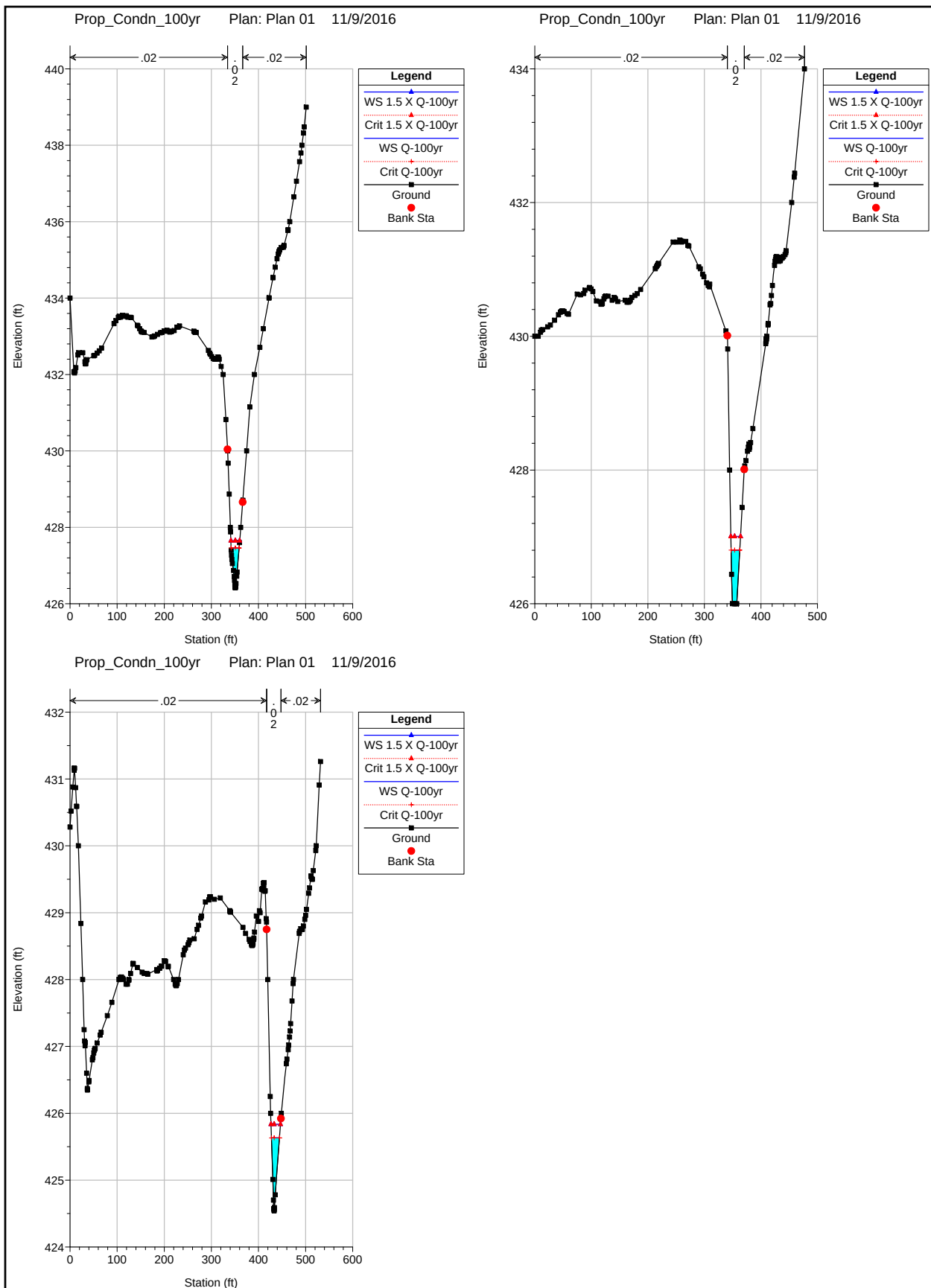







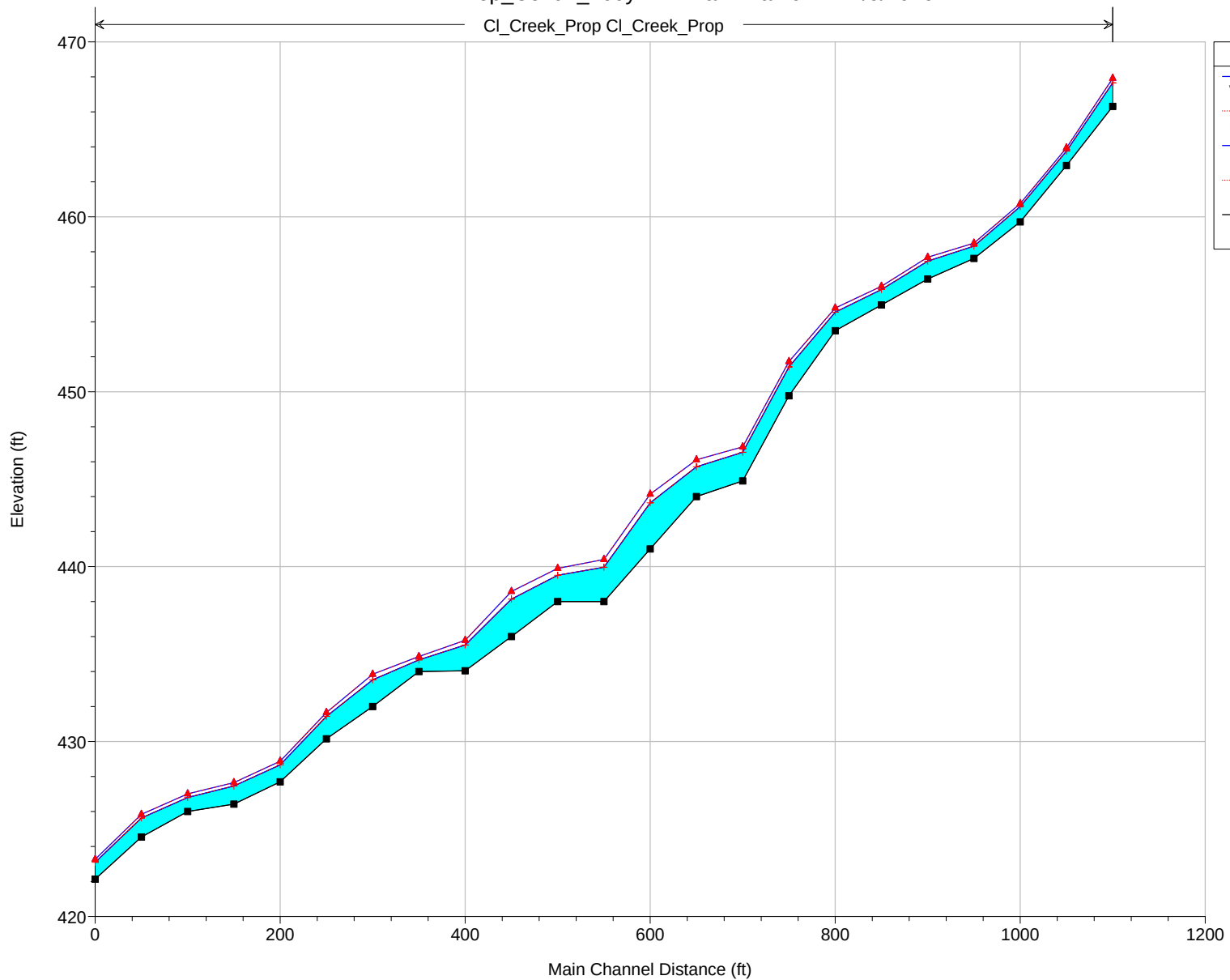






Prop_Condn_100yr Plan: Plan 01 11/9/2016

CI_Creek_Prop CI_Creek_Prop



Legend

- WS 1.5 X Q-100yr
- Crit 1.5 X Q-100yr
- WS Q-100yr
- Crit Q-100yr
- Ground

HEC-RAS Plan: Plan 01 River: Cl Creek Prop Reach: Cl Creek Prop

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)	
Cl_Creek_Prop	1100.00	Q-100yr	90.40	466.31	467.66	467.66	468.05	0.006628	5.03	17.98	23.51	1.01
Cl_Creek_Prop	1100.00	1.5 X Q-100yr	135.60	466.31	467.92	467.92	468.40	0.006086	5.57	24.39	26.48	1.01
Cl_Creek_Prop	1050	Q-100yr	90.40	462.93	463.76	463.76	464.03	0.005879	4.28	22.55	79.69	0.93
Cl_Creek_Prop	1050	1.5 X Q-100yr	135.60	462.93	463.94	463.94	464.27	0.005209	4.76	31.28	86.85	0.92
Cl_Creek_Prop	1000	Q-100yr	90.40	459.71	460.58	460.58	460.84	0.006057	4.18	23.61	53.51	0.94
Cl_Creek_Prop	1000	1.5 X Q-100yr	135.60	459.71	460.76	460.76	461.04	0.005107	4.54	33.66	59.23	0.90
Cl_Creek_Prop	950	Q-100yr	90.40	457.62	458.33	458.33	458.59	0.007193	4.21	22.14	42.76	1.00
Cl_Creek_Prop	950	1.5 X Q-100yr	135.60	457.62	458.49	458.49	458.82	0.006692	4.76	29.46	45.90	1.01
Cl_Creek_Prop	900	Q-100yr	90.40	456.44	457.47	457.47	457.80	0.006838	4.61	19.62	29.99	1.00
Cl_Creek_Prop	900	1.5 X Q-100yr	135.60	456.44	457.69	457.69	458.09	0.006375	5.06	26.93	35.54	1.00
Cl_Creek_Prop	850	Q-100yr	90.40	454.96	455.84	455.84	456.11	0.006340	4.28	22.61	45.14	0.96
Cl_Creek_Prop	850	1.5 X Q-100yr	135.60	454.96	456.02	456.02	456.34	0.005495	4.73	31.33	50.09	0.93
Cl_Creek_Prop	800	Q-100yr	90.40	453.49	454.54	454.54	454.89	0.006665	4.75	19.02	27.28	1.00
Cl_Creek_Prop	800	1.5 X Q-100yr	135.60	453.49	454.78	454.78	455.20	0.006303	5.22	25.96	30.99	1.01
Cl_Creek_Prop	750	Q-100yr	90.40	449.77	451.42	451.42	451.87	0.006300	5.41	16.71	18.71	1.01
Cl_Creek_Prop	750	1.5 X Q-100yr	135.60	449.77	451.73	451.73	452.27	0.005969	5.93	22.86	21.37	1.01
Cl_Creek_Prop	700	Q-100yr	90.40	444.90	446.54	446.54	447.02	0.006355	5.59	16.16	17.11	1.01
Cl_Creek_Prop	700	1.5 X Q-100yr	135.60	444.90	446.85	446.85	447.46	0.005926	6.25	21.71	18.36	1.01
Cl_Creek_Prop	650	Q-100yr	90.40	444.00	445.71	445.71	446.30	0.006097	6.17	14.65	12.57	1.01
Cl_Creek_Prop	650	1.5 X Q-100yr	135.60	444.00	446.11	446.11	446.82	0.005770	6.77	20.03	14.27	1.01
Cl_Creek_Prop	600	Q-100yr	90.40	441.01	443.65	443.65	444.36	0.006605	6.78	13.34	9.49	1.01
Cl_Creek_Prop	600	1.5 X Q-100yr	135.60	441.01	444.14	444.14	444.98	0.006298	7.35	18.45	11.23	1.01
Cl_Creek_Prop	550	Q-100yr	90.40	438.00	439.97	439.97	440.62	0.006097	6.46	14.00	10.98	1.01
Cl_Creek_Prop	550	1.5 X Q-100yr	135.60	438.00	440.41	440.41	441.18	0.005812	7.04	19.25	12.73	1.01
Cl_Creek_Prop	500	Q-100yr	90.40	438.00	439.50	439.50	440.10	0.006178	6.17	14.65	12.56	1.01
Cl_Creek_Prop	500	1.5 X Q-100yr	135.60	438.00	439.90	439.90	440.62	0.005834	6.79	19.96	14.07	1.01
Cl_Creek_Prop	450	Q-100yr	90.40	436.00	438.15	438.15	438.77	0.006140	6.37	14.20	11.51	1.01
Cl_Creek_Prop	450	1.5 X Q-100yr	135.60	436.00	438.58	438.58	439.32	0.005861	6.91	19.61	13.55	1.01

HEC-RAS Plan: Plan 01 River: Cl_Creek_Prop Reach: Cl_Creek_Prop (Continued)

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)	
Cl_Creek_Prop	400	Q-100yr	41.90	434.05	435.52	435.52	435.91	0.006917	4.96	8.44	11.33	1.01
Cl_Creek_Prop	400	1.5 X Q-100yr	62.85	434.05	435.79	435.79	436.24	0.006552	5.39	11.67	13.30	1.01
Cl_Creek_Prop	350	Q-100yr	41.90	434.00	434.67	434.67	434.96	0.007155	4.31	9.72	16.93	1.00
Cl_Creek_Prop	350	1.5 X Q-100yr	62.85	434.00	434.86	434.86	435.22	0.006729	4.83	13.03	18.25	1.01
Cl_Creek_Prop	300	Q-100yr	41.90	432.00	433.53	433.53	433.96	0.006894	5.28	7.94	9.47	1.02
Cl_Creek_Prop	300	1.5 X Q-100yr	62.85	432.00	433.84	433.84	434.32	0.006596	5.55	11.33	12.23	1.02
Cl_Creek_Prop	250	Q-100yr	41.90	430.16	431.44	431.44	431.76	0.007179	4.53	9.26	14.93	1.01
Cl_Creek_Prop	250	1.5 X Q-100yr	62.85	430.16	431.66	431.66	432.03	0.006814	4.91	12.80	17.56	1.01
Cl_Creek_Prop	200	Q-100yr	41.90	427.70	428.67	428.67	428.97	0.007215	4.38	9.56	16.40	1.01
Cl_Creek_Prop	200	1.5 X Q-100yr	62.85	427.70	428.87	428.87	429.23	0.006813	4.77	13.17	19.02	1.01
Cl_Creek_Prop	150	Q-100yr	41.90	426.42	427.46	427.46	427.75	0.007245	4.33	9.67	16.90	1.01
Cl_Creek_Prop	150	1.5 X Q-100yr	62.85	426.42	427.65	427.65	428.01	0.006847	4.82	13.05	18.62	1.01
Cl_Creek_Prop	100	Q-100yr	41.90	426.00	426.80	426.80	427.11	0.007008	4.44	9.43	15.43	1.00
Cl_Creek_Prop	100	1.5 X Q-100yr	62.85	426.00	427.01	427.01	427.38	0.006675	4.92	12.77	17.21	1.01
Cl_Creek_Prop	50	Q-100yr	41.90	424.54	425.63	425.63	425.92	0.007302	4.31	9.72	17.21	1.01
Cl_Creek_Prop	50	1.5 X Q-100yr	62.85	424.54	425.84	425.84	426.17	0.006822	4.65	13.52	20.31	1.00
Cl_Creek_Prop	0	Q-100yr	41.90	422.13	423.09	423.09	423.35	0.007682	4.08	10.28	21.08	1.02
Cl_Creek_Prop	0	1.5 X Q-100yr	62.85	422.13	423.27	423.27	423.58	0.006378	4.46	14.38	25.37	0.97

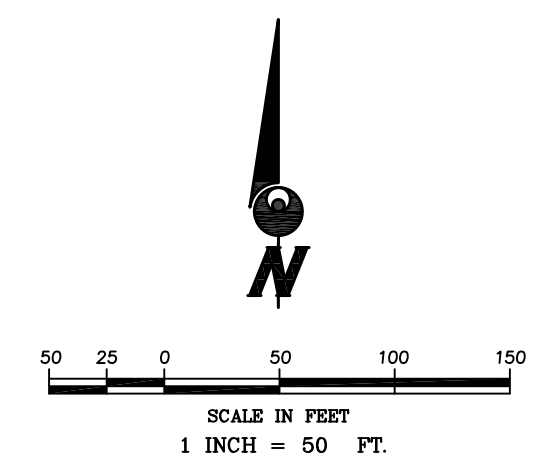
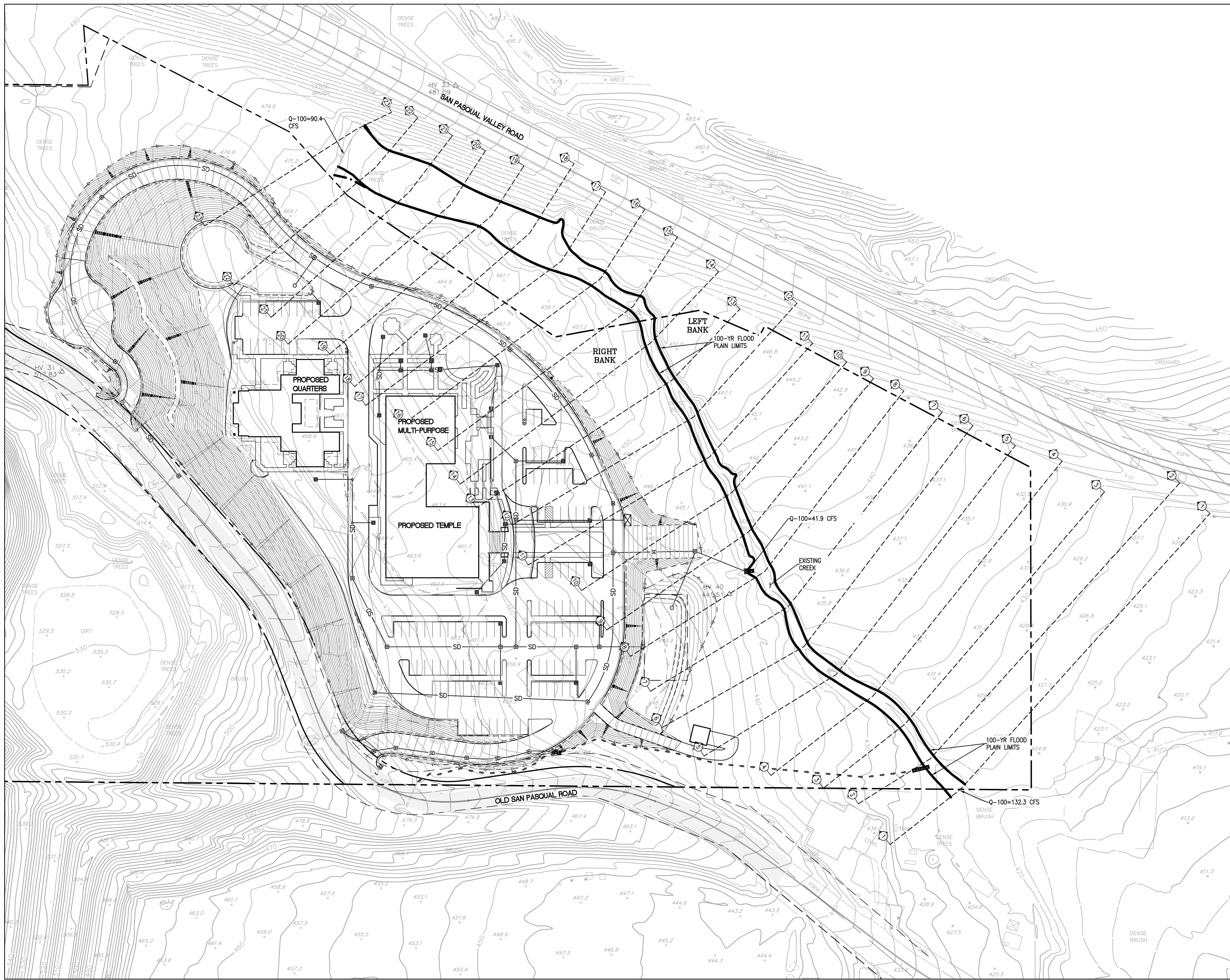


EXHIBIT 1
EXISTING CREEK CROSS
SECTIONS
PROPOSED CONDITION

ATTACHMENT D:

Excerpts from Hydrology Manual

**Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS**

Land Use		Runoff Coefficient "C"				
NRCS Elements	County Elements	% IMPER.	Soil Type			
			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

-Exist.
Condition

Prop.
Condition

*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, C_p , 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

County of San Diego Hydrology Manual



Rainfall Isophuvials

100 Year Rainfall Event - 6 Hours

3.4	Isopluvial (inches)
-----	---------------------

SITE LOCATION



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County of San Diego Hydrology Manual



Rainfall Isophyvals

100 Year Rainfall Event - 24 Hours

6.0 Isophyval (inches)

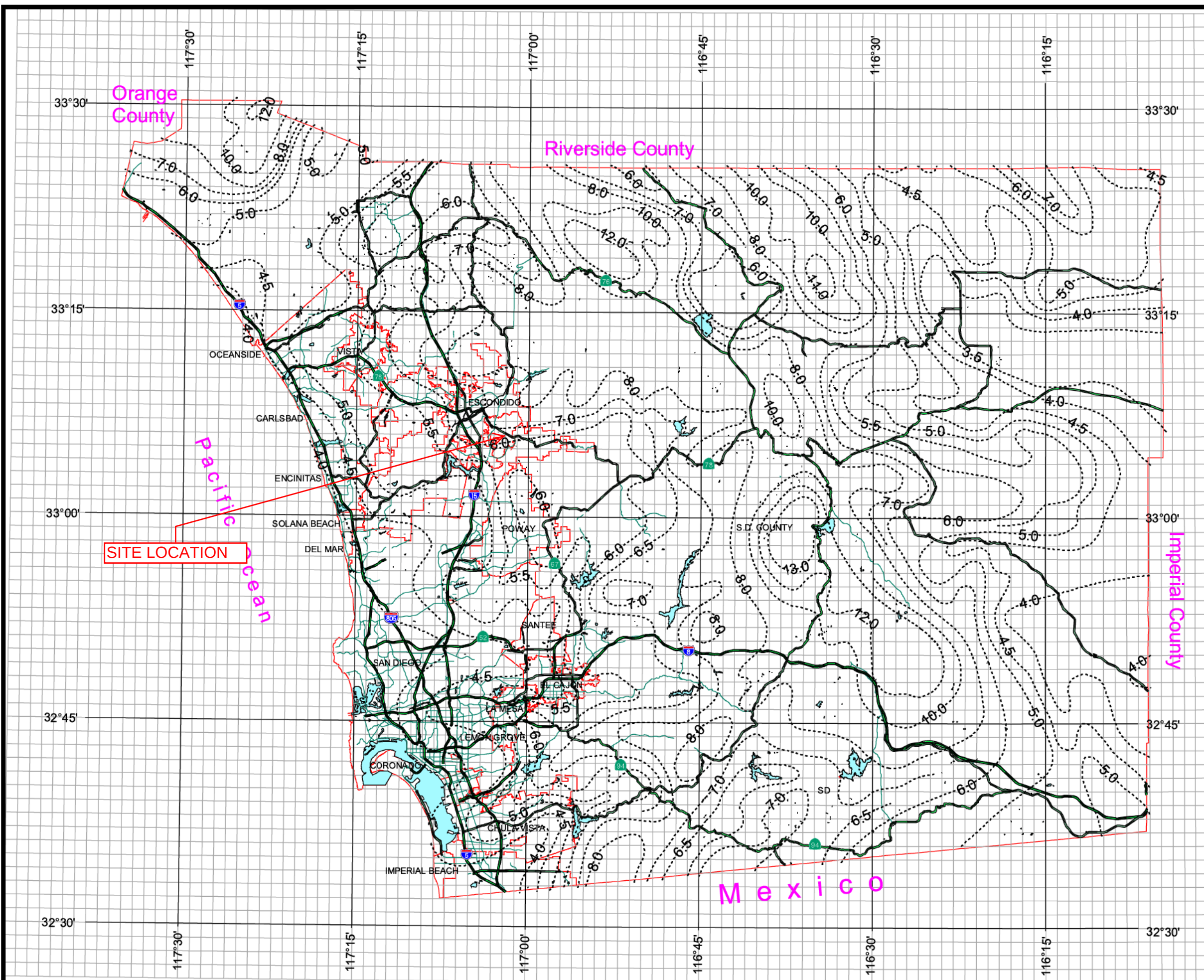


3 0 3 Miles

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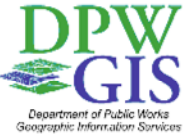
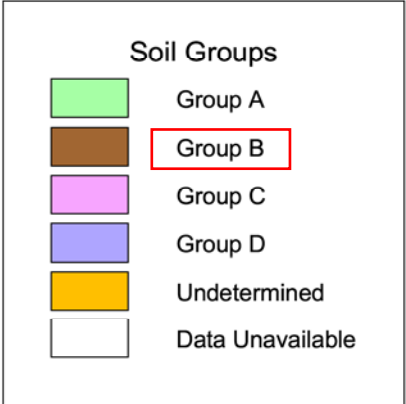


County of San Diego Hydrology Manual



Soil Hydrologic Groups

Legend

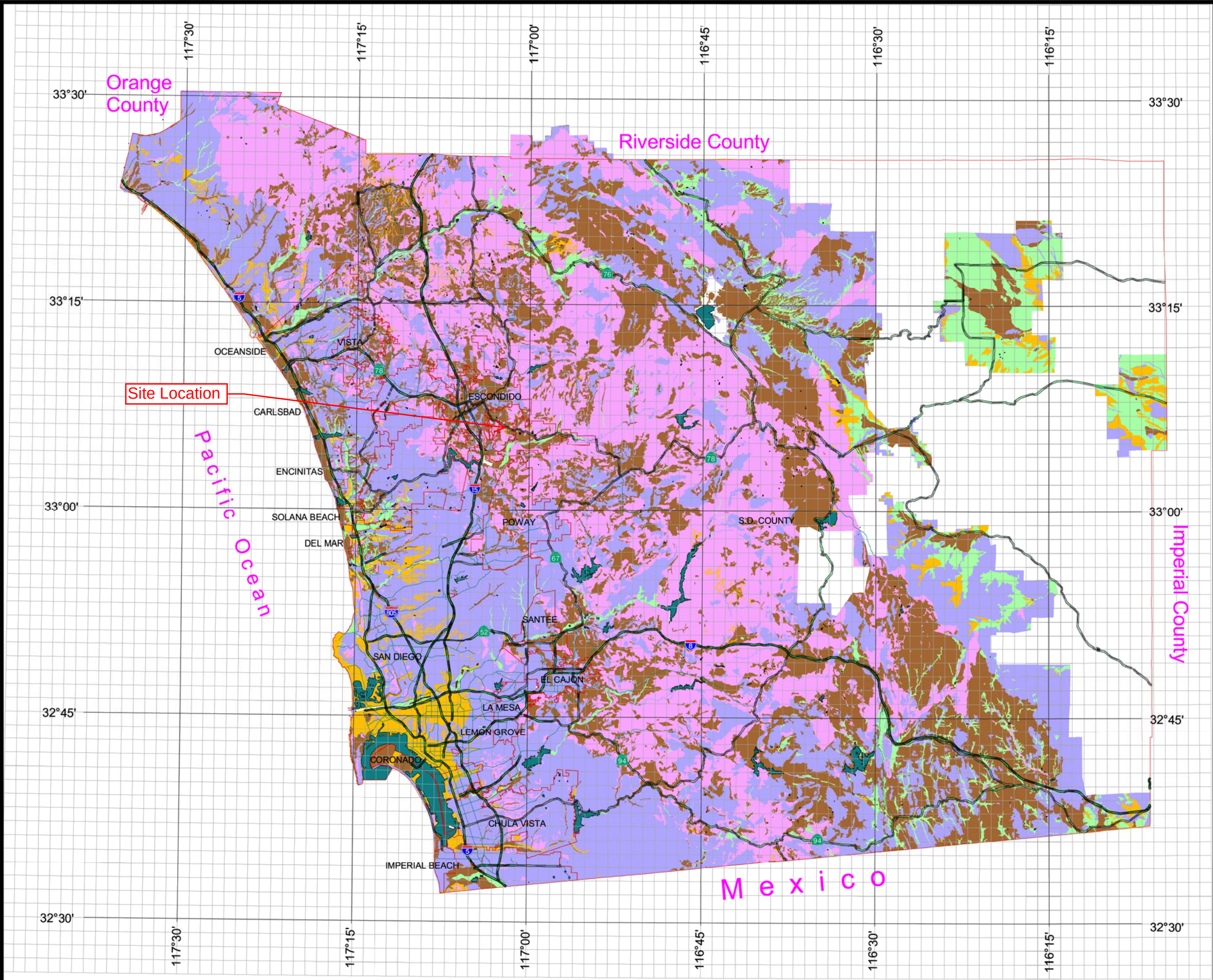


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3 0 3 Miles



5.6.6 Side Slopes

Side slopes of wetland-bottom channels shall not be steeper than 3H:1V whenever practical. When the side slopes of a wetland-bottom channel are grass-lined, refer to the guidelines provided in Section 5.5.

5.6.7 Horizontal Channel Alignment and Bend Protection

Channel bends shall be designed according to the criteria provided in Section 5.5.8.

5.6.8 Maintenance

Wetland-bottom channels require a maintenance and operation plan, along with appropriate easements and mechanisms for assuring the perpetual maintenance of the facility. The project owner shall ensure that appropriate mechanism is in place to provide maintenance for the lifetime of the facility.

5.7 DESIGN CRITERIA – RIPRAP-LINED CHANNELS

This Section presents minimum design criteria for rock riprap-lined channels. Riprapped transitions and bends in otherwise non-riprap channels are also considered riprap-lined channels, and shall be designed in accordance with the design standards outlined in this Section. The design engineer is responsible for confirming that a channel design meets these criteria, the general open-channel criteria outlined in Section 5.3, and any special considerations for a particular design situation.

5.7.1 Longitudinal Channel Slope

The longitudinal slope of riprap-lined channels shall be dictated by maximum permissible velocity requirements. Table 5-3 summarizes the maximum permissible velocity for standard riprap gradations. Where topography is steeper than desirable, drop structures may be used to maintain design velocities (see Section 5.12).

Table 5-3 Channel Bottom Riprap Protection

Design Velocity (ft/s)	Rock Gradation
6-10	No. 2 Backing
10-12	¼ ton
12-14	½ ton
14-16	1 ton
16-18	2 ton
> 18	Special Design

5.7.2 Roughness Coefficients

The Manning roughness coefficient (n) for hydraulic computations shall be estimated for loose rock riprap using the Manning-Strickler equation (Equation 5-5). Equation 5-5 (Chang, 1992) does not apply to grouted rock riprap or to very shallow flow. Table 5-4 provides Manning roughness coefficients for standard rock riprap classifications based on the Manning-Strickler method.

$$n = 0.0395d_{50}^{1/6} \quad (5-5)$$

where ...

- n = Manning roughness coefficient (dimensionless); and
 d_{50} = median stone diameter (feet).

Table 5-4 Standard Rock Riprap Gradations

##Rock Gradation ^a	Median Stone Weight (W_{50}) ^c	Median Stone Diameter (d_{50}) ^d	Manning n (UngROUTED) ^e
No. 3 Backing	5 lb	0.4 ft	0.034
No. 2 Backing	25 lb	0.7 ft	0.037
No. 1 Backing ^b	75 lb	1.0 ft	0.039
Light	200 lb	1.3 ft	0.041
¼ Ton	500 lb	1.8 ft	0.044
½ Ton	1000 lb	2.3 ft	0.045
1 Ton	2000 lb	2.9 ft	0.047
2 Ton	4000 lb	3.6 ft	0.049

(a) Except for 2 ton rock, classification is based upon Caltrans Method B Placement, which allows dumping of the rock and spreading by mechanical equipment. Local surface irregularities shall not vary from the planned grade by more than 1 foot, measured perpendicular to the slope. Two-ton rock requires special placement, see Caltrans (2002) or Greenbook for more information. (b) No. 1 Backing has same gradation as Facing Riprap. (c) per Caltrans (2002). (d) Assumes specific weight of 165 lb/ft³. The designer shall take care to apply a unit weight that is applicable to the type of riprap specified for the project, and adjust their calculations when necessary. (e) Based on Manning-Strickler relationship (Chang, 1988).

Where hydraulic radius is less than or equal to two times the maximum rock size, the roughness coefficient will be greater than indicated by Equation 5-5. In these cases, the design engineer shall use the method outlined in Section 5.7.17 to calculate the roughness of the channel. Appendix A (Table A-3) provides recommended Manning roughness coefficient (n) for grouted riprap applications. A 20% roughness coefficient reduction ($N_{grouted} = 0.80 N_{ungROUTED}$) for grouted rip-rap shall be required for velocity-based design for energy dissipation/scour minimization measures applications. For channel capacity design, the roughness coefficients in Table 5-4 and Appendix A shall be used.

5.7.3 Low Flow and Trickle Channels

Riprap-lined channels conveying a 100-year peak runoff of 20 cfs or less do not require trickle channels. The design engineer shall evaluate the factors such as drainage slope, flow velocity, soil type, and upstream impervious area, and specify a trickle channel when needed based on their engineering judgment. Low-flow channels shall be designed in accordance with Section 5.5.3.2.

5.7.4 Bottom Width

The selection of the over-all channel bottom width shall consider factors such as ultimate conveyance requirements, constructability, channel stability, and maintenance.

5.7.5 Freeboard and Flow Depth

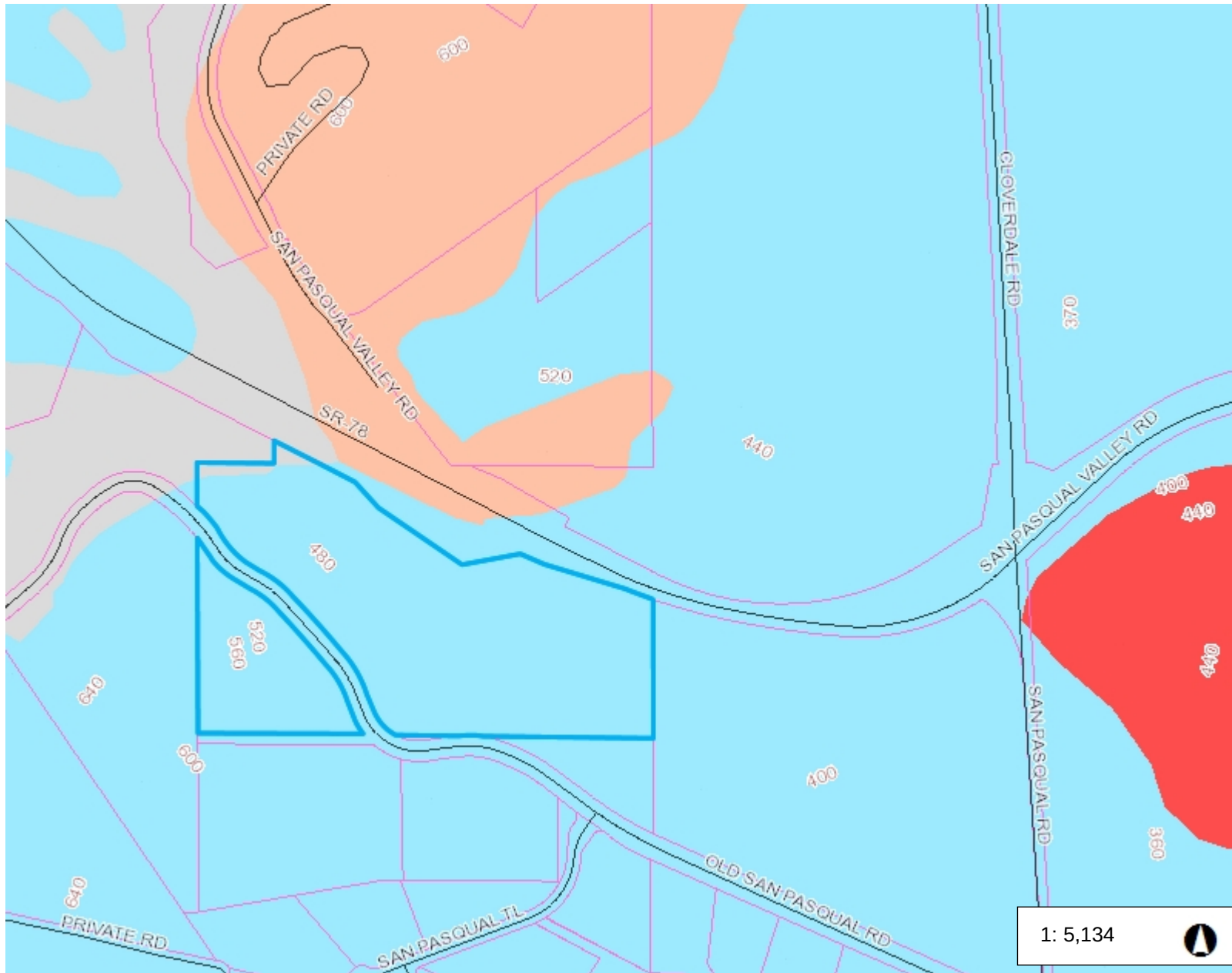
Riprap-lined channels shall meet the minimum freeboard requirements outlined in Section 5.3.7. Excessive depths and high velocities shall be avoided whenever practicable to maintain public safety. Section 5.3.9 discusses access and safety for open channels, including thresholds for flow depth and velocity.

5.7.6 Side Slopes

The side slopes of riprap-lined channel shall not ordinarily be steeper than 2H:1V, except in cases where an embankment stability analysis can justify a steeper side slope. The stability analysis should be completed in consultation with a soils engineer, and consider such factors such as: soil

ATTACHMENT E:
FEMA Flood Plain Map

PDS2015-MUP-15-011 Soil Map



Legend

- Streets
- Parcels with no labels
- Soil Hydrologic Group**
 - Hydrologic Group Undefined
 - Hydrologic Group A
 - Hydrologic Group B
 - Hydrologic Group C
 - Hydrologic Group D
- Topography - 40' Contour Inter

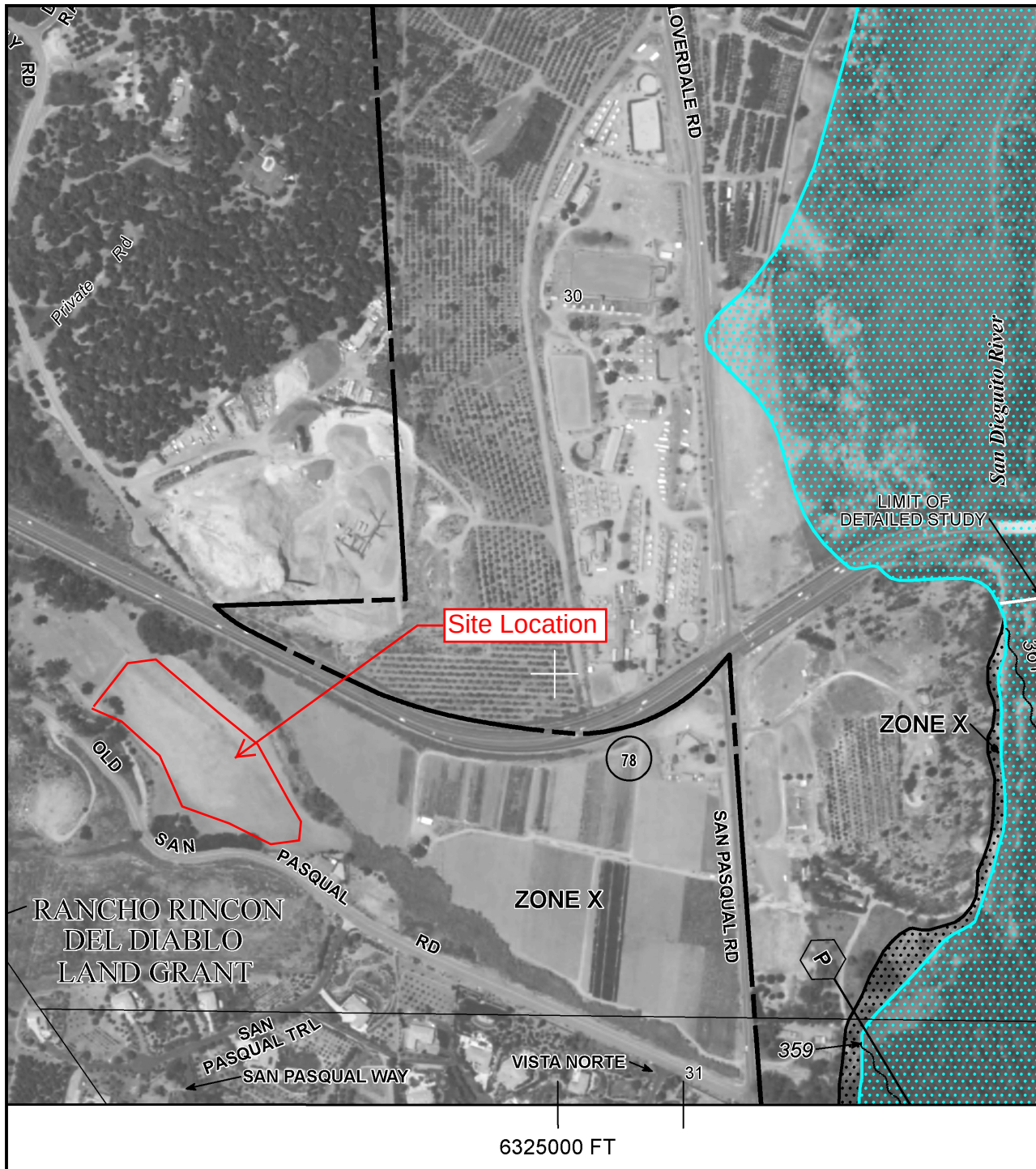
Notes

0.2 0 0.08 0.2 Miles

NAD_1983_StatePlane_California_VI_FIPS_0406_Feet
Department of Public Works

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



ance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1082G

FIRM

**FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY,
CALIFORNIA
AND INCORPORATED AREAS**

PANEL 1082 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ESCONDIDO, CITY OF	060290	1082	G
SAN DIEGO COUNTY	060284	1082	G
SAN DIEGO, CITY OF	060295	1082	G

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



**MAP NUMBER
06073C1082G**

**MAP REVISED
MAY 16, 2012**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ATTACHMENT A:

Site Vicinity Map
Site Imagery Map



Site-Imagery



PROJECT
BOUNDARY

PROJECT
LOCATION

ATTACHMENT B:

Existing Conditions Runoff Coefficient Calculations
Existing Condition Hydrology Calculations

Existing Conditions Hydrology Map

ONSITE DRAINAGE BASINS A, B, & C

Runoff Coefficient Calculation (Existing Condition)

Project: SVBF Temple

Soil Type: B per Soil Map in Attachment D

C = $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Cp= 0.25 (per table 3-1, County of San Diego Hydrology Manual, Soil Class B)

Onsite Basins #	Area (Acres)		%imp	*Composite Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
A	7.30	0.03	0.4	0.25	Undisturbed Natural
B	0.77	0.00	0.0	0.25	Undisturbed Natural
C	2.12	0.08	3.8	0.27	Undisturbed Natural
Total	10.19				

Offsite Basins #	Area (Acres)		%imp	*Composite Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
D	2.61	0.20	7.7	0.30	Undisturbed Natural
E	4.17	0.12	2.9	0.27	Undisturbed Natural
F	2.09	0.24	11.5	0.32	LDR, 1.0 DU/AC or LESS
Total	8.87				

Notes:

*The composite runoff coefficient (C) is calculated for the site by using the following equation: $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$; where $C_p = 0.25$ per Table 3-1 of the County of San Diego Hydrology Manual. The composite runoff coefficients are used in the CivilD software for all downstream basins.

**Closest land use type selected from Table 3-1 of the hydrology manual to assign for initial basin. The composite C value cannot be entered as input for initial basin analysis. Coefficient for basin F is 0.32 (LDR, 1.0 DU/AC or LESS) whereas, all other basins have value closer to 0.25 (Undisturbed Natural).

12478ex100yr1.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
EXIT POINT 1
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 82.000(Ft.)
Highest elevation = 534.000(Ft.)
Lowest elevation = 506.000(Ft.)
Elevation difference = 28.000(Ft.) Slope = 34.146 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 34.15 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 4.72 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (34.146^{(1/3)})] = 4.72$
Calculated TC of 4.716 minutes is less than 5 minutes,
resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) = 8.958(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.314(CFS)
Total initial stream area = 0.140(Ac.)

```

+++++
Process from Point/Station      101.000 to Point/Station      102.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

```

```

-----
Estimated mean flow rate at midpoint of channel =      2.669(CFS)
Depth of flow =    0.124(Ft.), Average velocity =    3.463(Ft/s)
***** Irregular Channel Data *****

```

```

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2             10.00              0.00
      3             20.00              0.20
Manning's 'N' friction factor =    0.020

```

```

-----
Sub-Channel flow =    2.669(CFS)
      '      '      flow top width =    12.415(Ft.)
      '      '      velocity=    3.463(Ft/s)
      '      '      area =    0.771(Sq.Ft)
      '      '      Froude number =    2.450

```

```

Upstream point elevation =    506.000(Ft.)
Downstream point elevation =    464.000(Ft.)
Flow length =    475.000(Ft.)
Travel time =    2.29 min.
Time of concentration =    7.00 min.
Depth of flow =    0.124(Ft.)
Average velocity =    3.463(Ft/s)
Total irregular channel flow =    2.669(CFS)
Irregular channel normal depth above invert elev. =    0.124(Ft.)
Average velocity of channel(s) =    3.463(Ft/s)
Adding area flow to channel
Rainfall intensity (I) =    7.209(In/Hr) for a    100.0 year storm
User specified 'C' value of 0.250 given for subarea
Rainfall intensity =    7.209(In/Hr) for a    100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.250  CA =    0.685
Subarea runoff =    4.625(CFS) for    2.600(Ac.)
Total runoff =    4.938(CFS)  Total area =    2.740(Ac.)
Depth of flow =    0.156(Ft.), Average velocity =    4.039(Ft/s)

```

```

+++++
Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

```

```

-----
Estimated mean flow rate at midpoint of channel =    7.642(CFS)
Depth of flow =    0.080(Ft.), Average velocity =    2.996(Ft/s)
***** Irregular Channel Data *****

```

```

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2              5.00              0.00
      3             35.00              0.00
      4             40.00              0.20
Manning's 'N' friction factor =    0.020

```

```

-----
Sub-Channel flow =    7.642(CFS)
      '      '      flow top width =    33.986(Ft.)
      '      '      velocity=    2.996(Ft/s)

```

```

                                12478ex100yr1.out
'      '      area =      2.551(Sq.Ft)
'      '      Froude number =      1.927

Upstream point elevation = 464.000(Ft.)
Downstream point elevation = 434.000(Ft.)
Flow length = 584.000(Ft.)
Travel time = 3.25 min.
Time of concentration = 10.25 min.
Depth of flow = 0.080(Ft.)
Average velocity = 2.996(Ft/s)
Total irregular channel flow = 7.642(CFS)
Irregular channel normal depth above invert elev. = 0.080(Ft.)
Average velocity of channel(s) = 2.996(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 5.638(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.250 given for subarea
Rainfall intensity = 5.638(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.250 CA = 1.825
Subarea runoff = 5.351(CFS) for 4.560(Ac.)
Total runoff = 10.289(CFS) Total area = 7.300(Ac.)
Depth of flow = 0.095(Ft.), Average velocity = 3.345(Ft/s)
End of computations, total study area = 7.300 (Ac.)

```

12478ex100yr2.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
EXIT POINT 2
SVBF TEMPLE
ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 272.000(Ft.)
Highest elevation = 456.000(Ft.)
Lowest elevation = 432.000(Ft.)
Elevation difference = 24.000(Ft.) Slope = 8.824 %
Top of Initial Area Slope adjusted by User to 8.000 %
Bottom of Initial Area Slope adjusted by User to 8.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 8.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 7.65 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (8.000^{(1/3)})] = 7.65$
The initial area total distance of 272.00 (Ft.) entered leaves a
remaining distance of 172.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 1.09 minutes
for a distance of 172.00 (Ft.) and a slope of 8.00 %
with an elevation difference of 13.76(Ft.) from the end of the top area

12478ex100yr2.out

$Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{.385} * 60(\text{min/hr})$
 = 1.087 Minutes
 $Tt = [(11.9 * 0.0326^3) / (13.76)]^{.385} = 1.09$
 Total initial area $Ti = 7.65$ minutes from Figure 3-3 formula plus
 1.09 minutes from the Figure 3-4 formula = 8.74 minutes
 Rainfall intensity (I) = 6.250(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
 Subarea runoff = 1.203(CFS)
 Total initial stream area = 0.770(Ac.)
 End of computations, total study area = 0.770 (Ac.)

12478ex100yr3.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS

EXIT POINT 3

SVBF TEMPLE

ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 77.000(Ft.)
Highest elevation = 486.000(Ft.)
Lowest elevation = 474.000(Ft.)
Elevation difference = 12.000(Ft.) Slope = 15.584 %
Top of Initial Area Slope adjusted by User to 15.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 15.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 6.20 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (15.000^{(1/3)})] = 6.20$
Rainfall intensity (I) = 7.794(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.234(CFS)
Total initial stream area = 0.120(Ac.)

```

12478ex100yr3.out
+++++
Process from Point/Station      301.000 to Point/Station      302.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      1.805(CFS)
Depth of flow =      0.111(Ft.), Average velocity =      2.932(Ft/s)
***** Irregular Channel Data *****

-----
Information entered for subchannel number 1 :
Point number      'X' coordinate      'Y' coordinate
      1              0.00              0.20
      2             10.00              0.00
      3             20.00              0.20
Manning's 'N' friction factor =      0.020

-----
Sub-Channel flow =      1.805(CFS)
'      '      flow top width =      11.097(Ft.)
'      '      velocity=      2.932(Ft/s)
'      '      area =      0.616(Sq.Ft)
'      '      Froude number =      2.194

Upstream point elevation =      474.000(Ft.)
Downstream point elevation =      428.000(Ft.)
Flow length =      625.000(Ft.)
Travel time =      3.55 min.
Time of concentration =      9.76 min.
Depth of flow =      0.111(Ft.)
Average velocity =      2.932(Ft/s)
Total irregular channel flow =      1.805(CFS)
Irregular channel normal depth above invert elev. =      0.111(Ft.)
Average velocity of channel(s) =      2.932(Ft/s)
Adding area flow to channel
Rainfall intensity (I) =      5.820(In/Hr) for a      100.0 year storm
User specified 'C' value of 0.270 given for subarea
Rainfall intensity =      5.820(In/Hr) for a      100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.269 CA =      0.570
Subarea runoff =      3.084(CFS) for      2.000(Ac.)
Total runoff =      3.318(CFS) Total area =      2.120(Ac.)
Depth of flow =      0.139(Ft.), Average velocity =      3.414(Ft/s)
End of computations, total study area =      2.120 (Ac.)

```

OFFSITE DRAINAGE BASINS D, E, & F

12478ex100yrD.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN D
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 500.000 to Point/Station 501.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 234.000(Ft.)
Highest elevation = 658.200(Ft.)
Lowest elevation = 592.000(Ft.)
Elevation difference = 66.200(Ft.) Slope = 28.291 %
Top of Initial Area Slope adjusted by User to 28.000 %
Bottom of Initial Area Slope adjusted by User to 28.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 28.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 5.04 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (28.000^{(1/3)})] = 5.04$
The initial area total distance of 234.00 (Ft.) entered leaves a
remaining distance of 134.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.55 minutes
for a distance of 134.00 (Ft.) and a slope of 28.00 %

12478ex100yrD.out

with an elevation difference of 37.52(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.554 Minutes
 $Tt = [(11.9 * 0.0254^3) / (37.52)]^{\wedge}.385 = 0.55$
 Total initial area $Ti = 5.04$ minutes from Figure 3-3 formula plus
 0.55 minutes from the Figure 3-4 formula = 5.59 minutes
 Rainfall intensity (I) = 8.334(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.250$
 Subarea runoff = 1.750(CFS)
 Total initial stream area = 0.840(Ac.)

+++++
 Process from Point/Station 501.000 to Point/Station 502.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

 Estimated mean flow rate at midpoint of channel = 2.594(CFS)
 Depth of flow = 0.265(Ft.), Average velocity = 7.362(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	5.00	0.00
3	10.00	1.00

 Manning's 'N' friction factor = 0.025

Sub-Channel flow = 2.594(CFS)

'	'	flow top width =	2.655(Ft.)
'	'	velocity =	7.362(Ft/s)
'	'	area =	0.352(Sq.Ft)
'	'	Froude number =	3.561

Upstream point elevation = 592.000(Ft.)
 Downstream point elevation = 482.000(Ft.)
 Flow length = 473.000(Ft.)
 Travel time = 1.07 min.
 Time of concentration = 6.66 min.
 Depth of flow = 0.265(Ft.)
 Average velocity = 7.362(Ft/s)
 Total irregular channel flow = 2.594(CFS)
 Irregular channel normal depth above invert elev. = 0.265(Ft.)
 Average velocity of channel(s) = 7.362(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.300 given for subarea
 Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.275$ $CA = 0.453$
 Subarea runoff = 1.622(CFS) for 0.810(Ac.)
 Total runoff = 3.372(CFS) Total area = 1.650(Ac.)
 Depth of flow = 0.293(Ft.), Average velocity = 7.861(Ft/s)

+++++
 Process from Point/Station 502.000 to Point/Station 502.000
 **** SUBAREA FLOW ADDITION ****

 Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.300 given for subarea
 Time of concentration = 6.66 min.
 Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

```

12478ex100yrD.out
(Q=KCIA) is C = 0.282 CA = 0.651
Subarea runoff = 1.474(CFS) for 0.660(Ac.)
Total runoff = 4.846(CFS) Total area = 2.310(Ac.)

++++
Process from Point/Station 502.000 to Point/Station 502.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.300 given for subarea
Time of concentration = 6.66 min.
Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.283 CA = 0.711
Subarea runoff = 0.447(CFS) for 0.200(Ac.)
Total runoff = 5.292(CFS) Total area = 2.510(Ac.)

++++
Process from Point/Station 502.000 to Point/Station 502.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.444(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.300 given for subarea
Time of concentration = 6.66 min.
Rainfall intensity = 7.444(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.284 CA = 0.741
Subarea runoff = 0.223(CFS) for 0.100(Ac.)
Total runoff = 5.516(CFS) Total area = 2.610(Ac.)
End of computations, total study area = 2.610 (Ac.)

```


12478ex100yrE.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN E
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 600.000 to Point/Station 601.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 381.000(Ft.)
Highest elevation = 658.000(Ft.)
Lowest elevation = 532.000(Ft.)
Elevation difference = 126.000(Ft.) Slope = 33.071 %
Top of Initial Area Slope adjusted by User to 33.000 %
Bottom of Initial Area Slope adjusted by User to 33.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 33.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 4.77 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (33.000^{(1/3)})] = 4.77$
The initial area total distance of 381.00 (Ft.) entered leaves a
remaining distance of 281.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.92 minutes
for a distance of 281.00 (Ft.) and a slope of 33.00 %

12478ex100yrE.out

with an elevation difference of 92.73(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.919 Minutes
 $Tt = [(11.9 * 0.0532^3) / (92.73)]^{\wedge}.385 = 0.92$
 Total initial area $Ti = 4.77$ minutes from Figure 3-3 formula plus
 0.92 minutes from the Figure 3-4 formula = 5.69 minutes
 Rainfall intensity (I) = 8.242(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.250$
 Subarea runoff = 1.834(CFS)
 Total initial stream area = 0.890(Ac.)

+++++
 Process from Point/Station 601.000 to Point/Station 602.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.693(CFS)
 Depth of flow = 0.247(Ft.), Average velocity = 4.403(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	5.00	0.00
3	10.00	0.50

 Manning's 'N' friction factor = 0.025

Sub-Channel flow = 2.693(CFS)

'	'	flow top width =	4.946(Ft.)
'	'	velocity =	4.403(Ft/s)
'	'	area =	0.612(Sq.Ft)
'	'	Froude number =	2.206

Upstream point elevation = 532.000(Ft.)
 Downstream point elevation = 506.000(Ft.)
 Flow length = 290.000(Ft.)
 Travel time = 1.10 min.
 Time of concentration = 6.79 min.
 Depth of flow = 0.247(Ft.)
 Average velocity = 4.403(Ft/s)
 Total irregular channel flow = 2.693(CFS)
 Irregular channel normal depth above invert elev. = 0.247(Ft.)
 Average velocity of channel(s) = 4.403(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.260$ $CA = 0.474$
 Subarea runoff = 1.650(CFS) for 0.930(Ac.)
 Total runoff = 3.484(CFS) Total area = 1.820(Ac.)
 Depth of flow = 0.272(Ft.), Average velocity = 4.696(Ft/s)

+++++
 Process from Point/Station 602.000 to Point/Station 602.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Time of concentration = 6.79 min.
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

12478ex100yrE.out
 (Q=KCIA) is C = 0.261 CA = 0.506
 Subarea runoff = 0.238(CFS) for 0.120(Ac.)
 Total runoff = 3.722(CFS) Total area = 1.940(Ac.)

++++
 Process from Point/Station 602.000 to Point/Station 602.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.356(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.270 given for subarea
 Time of concentration = 6.79 min.
 Rainfall intensity = 7.356(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.266 CA = 1.108
 Subarea runoff = 4.429(CFS) for 2.230(Ac.)
 Total runoff = 8.151(CFS) Total area = 4.170(Ac.)
 End of computations, total study area = 4.170 (Ac.)

12478ex100yrF.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 11/04/16

EXISTING CONDITION HYDROLOGY ANALYSIS
OFFSITE BASIN F
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 700.000 to Point/Station 701.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[LOW DENSITY RESIDENTIAL]
(1.0 DU/A or Less)
Impervious value, Ai = 0.100
Sub-Area C Value = 0.320
Initial subarea total flow distance = 271.000(Ft.)
Highest elevation = 584.000(Ft.)
Lowest elevation = 537.300(Ft.)
Elevation difference = 46.700(Ft.) Slope = 17.232 %
Top of Initial Area Slope adjusted by User to 17.000 %
Bottom of Initial Area Slope adjusted by User to 17.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 17.00 %, in a development type of
1.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration = 5.46 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.3200) * (100.000^{.5}) / (17.000^{(1/3)})] = 5.46$
The initial area total distance of 271.00 (Ft.) entered leaves a
remaining distance of 171.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.81 minutes
for a distance of 171.00 (Ft.) and a slope of 17.00 %

12478ex100yrF.out

with an elevation difference of 29.07(Ft.) from the end of the top area
 $Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{\wedge}.385 * 60(\text{min/hr})$
 = 0.810 Minutes
 $Tt = [(11.9 * 0.0324^3) / (29.07)]^{\wedge}.385 = 0.81$
 Total initial area $Ti = 5.46$ minutes from Figure 3-3 formula plus
 0.81 minutes from the Figure 3-4 formula = 6.27 minutes
 Rainfall intensity (I) = 7.741(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is $C = 0.320$
 Subarea runoff = 1.982(CFS)
 Total initial stream area = 0.800(Ac.)

+++++
 Process from Point/Station 701.000 to Point/Station 702.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 3.061(CFS)
 Depth of flow = 0.283(Ft.), Average velocity = 3.822(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :
 Point number 'X' coordinate 'Y' coordinate
 1 0.00 0.50
 2 5.00 0.00
 3 10.00 0.50
 Manning's 'N' friction factor = 0.025

 Sub-Channel flow = 3.061(CFS)
 ' ' flow top width = 5.660(Ft.)
 ' ' velocity = 3.822(Ft/s)
 ' ' area = 0.801(Sq.Ft)
 ' ' Froude number = 1.791

Upstream point elevation = 537.300(Ft.)
 Downstream point elevation = 522.000(Ft.)
 Flow length = 271.000(Ft.)
 Travel time = 1.18 min.
 Time of concentration = 7.45 min.
 Depth of flow = 0.283(Ft.)
 Average velocity = 3.822(Ft/s)
 Total irregular channel flow = 3.061(CFS)
 Irregular channel normal depth above invert elev. = 0.283(Ft.)
 Average velocity of channel(s) = 3.822(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 6.925(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.320 given for subarea
 Rainfall intensity = 6.925(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is $C = 0.320$ CA = 0.589
 Subarea runoff = 2.096(CFS) for 1.040(Ac.)
 Total runoff = 4.078(CFS) Total area = 1.840(Ac.)
 Depth of flow = 0.315(Ft.), Average velocity = 4.106(Ft/s)

+++++
 Process from Point/Station 702.000 to Point/Station 702.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 6.925(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.320 given for subarea
 Time of concentration = 7.45 min.
 Rainfall intensity = 6.925(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

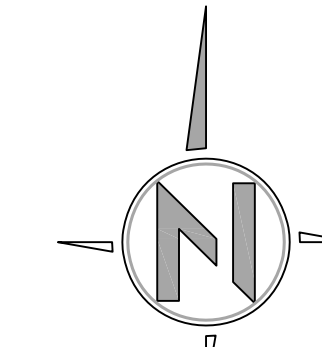
12478ex100yrF.out
 (Q=KCIA) is C = 0.320 CA = 0.669
 Subarea runoff = 0.554(CFS) for 0.250(Ac.)
 Total runoff = 4.632(CFS) Total area = 2.090(Ac.)
 End of computations, total study area = 2.090 (Ac.)



LEGEND

- HYDROLOGY NODE
- SUB-BASIN BOUNDARY
- EXISTING STORM DRAIN
- EXISTING CONTOUR
- FLOW DIRECTION
- FLOW PATH
- SPOT ELEVATION
- NODE/CONTOUR ELEVATION
- FLOW LENGTH
- ANALYSIS/EXIT POINT
- SOIL TYPE BOUNDARY
- SUB-BASIN MARKER & AREA (AC)
- EXIST. ASPHALT PAVEMENT

NOTES:
1. OFFSITE BASINS ARE ANALYZED AT THE EXISTING CULVERT LOCATIONS
2. Q GIVEN CORRESPOND TO 100-YR FREQUENCY STORM
3. ONSITE HYDROLOGY ANALYSIS IS SEPARATED FROM OFFSITE ANALYSIS. Q TOTAL (QT) AT THE OUTFALL TO EXISTING CREEK IS OBTAINED BY DIRECTLY ADDING THE ONSITE AND OFFSITE FLOWS.
4. SITE IS COMPOSED OF SOIL TYPE B
5. Vp = FLOW VELOCITY AT THE PIPE OUTLET



25 0 50 100
SCALE IN FEET
1 inch = 50 ft.

HYDROLOGY MAP FOR
SVBF TEMPLE
EXISTING CONDITION
REV. DATE: NOV., 2016

ATTACHMENT C:

Proposed Conditions Runoff Coefficient Calculations
Proposed Condition Hydrology/Hydraulic Calculations

Proposed Conditions Hydrology Map

Runoff Coefficient Calculation (Proposed Condition)

Project: SVBF Temple

Soil Type: B per Soil Map in Attachment D

C = $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$

Cp= 0.25 (per table 3-1, County of San Diego Hydrology Manual, Soil Class B)

Basin #	Area (Acres)		%imp	*Runoff Coef. (C)	**Equivalent Land Use (from Table 3-1)
	Total Area (ac)	Imp. Area (Ai)			
A	8.57	3.650	43	0.53	Medium Density 10.9 DU/A or Less (C=0.54)
B	0.66	0.000	0	0.25	Undisturbed Natural (C=0.25)
C	0.96	0.043	4	0.28	Undisturbed Natural (C=0.25)
Total	10.19				

Notes:

*The composite runoff coefficient (C) is calculated for the site by using the following equation: $0.90 \times (\% \text{ Impervious}) + C_p \times (1 - \% \text{ Impervious})$; where $C_p = 0.25$ per Table 3-1 of the County of San Diego Hydrology Manual. The composite runoff coefficients are used in the CivilD software for all downstream basins.

**Closest land use type selected from Table 3-1 of the hydrology manual to assign for initial basin. The composite C value cannot be entered as input for initial basin analysis. Coefficient for basin A is closer to 0.54 (MDR, 10.9 DU/AC or LESS) whereas, basin B & C have values closer to 0.25 (Undisturbed Natural).

Runoff coefficients for offsite drainage areas (D, E, & F) remain the same in the proposed condition. Please refer to appendix B for calculations

ONSITE DRAINAGE BASINS A, B, & C

12478PR100yr1.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/17/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 1
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 100.000 to Point/Station 101.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[MEDIUM DENSITY RESIDENTIAL]
(10.9 DU/A or Less)
Impervious value, Ai = 0.450
Sub-Area C Value = 0.540
Initial subarea total flow distance = 66.000(Ft.)
Highest elevation = 467.420(Ft.)
Lowest elevation = 466.100(Ft.)
Elevation difference = 1.320(Ft.) Slope = 2.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 80.00 (Ft)
for the top area slope value of 2.00 %, in a development type of
10.9 DU/A or Less
In Accordance With Table 3-2
Initial Area Time of Concentration = 6.90 minutes
(for slope value of 2.00 %)
Rainfall intensity (I) = 7.278(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
Subarea runoff = 0.747(CFS)
Total initial stream area = 0.190(Ac.)

+++++
Page 1

12478PR100yr1.out
 Process from Point/Station 101.000 to Point/Station 102.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 2.410(CFS)
 Depth of flow = 0.263(Ft.), Average velocity = 3.492(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :
 Point number 'X' coordinate 'Y' coordinate
 1 0.00 0.50
 2 5.00 0.00
 3 10.00 0.50
 Manning's 'N' friction factor = 0.016

Sub-Channel flow = 2.410(CFS)
 flow top width = 5.254(Ft.)
 velocity = 3.492(Ft/s)
 area = 0.690(Sq.Ft)
 Froude number = 1.698

Upstream point elevation = 466.100(Ft.)
 Downstream point elevation = 464.800(Ft.)
 Flow length = 61.000(Ft.)
 Travel time = 0.29 min.
 Time of concentration = 7.19 min.
 Depth of flow = 0.263(Ft.)
 Average velocity = 3.492(Ft/s)
 Total irregular channel flow = 2.410(CFS)
 Irregular channel normal depth above invert elev. = 0.263(Ft.)
 Average velocity of channel(s) = 3.492(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 7.086(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Rainfall intensity = 7.086(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.567
 Subarea runoff = 3.271(CFS) for 0.860(Ac.)
 Total runoff = 4.018(CFS) Total area = 1.050(Ac.)
 Depth of flow = 0.318(Ft.), Average velocity = 3.968(Ft/s)

+++++
 Process from Point/Station 102.000 to Point/Station 103.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 464.800(Ft.)
 Downstream point/station elevation = 462.000(Ft.)
 Pipe length = 12.00(Ft.) Slope = 0.2333 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.018(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 4.018(CFS)
 Normal flow depth in pipe = 4.51(In.)
 Flow top width inside pipe = 9.00(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.11(Ft/s)
 Travel time through pipe = 0.01 min.
 Time of concentration (TC) = 7.20 min.

+++++
 Process from Point/Station 103.000 to Point/Station 103.000
 **** SUBAREA FLOW ADDITION ****

12478PR100yr1.out
Rainfall intensity (I) = 7.079(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 7.20 min.
Rainfall intensity = 7.079(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 0.886
Subarea runoff = 2.251(CFS) for 0.590(Ac.)
Total runoff = 6.269(CFS) Total area = 1.640(Ac.)

+++++
Process from Point/Station 103.000 to Point/Station 103.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.079(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 7.20 min.
Rainfall intensity = 7.079(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.091
Subarea runoff = 1.453(CFS) for 0.380(Ac.)
Total runoff = 7.722(CFS) Total area = 2.020(Ac.)

+++++
Process from Point/Station 103.000 to Point/Station 104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 461.000(Ft.)
Downstream point/station elevation = 460.860(Ft.)
Pipe length = 35.50(Ft.) Slope = 0.0039 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.722(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 7.722(CFS)
Normal flow depth in pipe = 13.90(In.)
Flow top width inside pipe = 19.87(In.)
Critical Depth = 12.35(In.)
Pipe flow velocity = 4.57(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 7.33 min.

+++++
Process from Point/Station 104.000 to Point/Station 105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 460.860(Ft.)
Downstream point/station elevation = 458.360(Ft.)
Pipe length = 250.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.722(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 7.722(CFS)
Normal flow depth in pipe = 11.47(In.)
Flow top width inside pipe = 17.31(In.)
Critical Depth = 12.92(In.)
Pipe flow velocity = 6.50(Ft/s)
Travel time through pipe = 0.64 min.
Time of concentration (TC) = 7.97 min.

+++++
Process from Point/Station 105.000 to Point/Station 106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 458.360(Ft.)
 Downstream point/station elevation = 455.000(Ft.)
 Pipe length = 214.00(Ft.) Slope = 0.0157 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 11.72(In.)
 Flow top width inside pipe = 12.40(In.)
 Critical Depth = 13.21(In.)
 Pipe flow velocity = 7.51(Ft/s)
 Travel time through pipe = 0.48 min.
 Time of concentration (TC) = 8.45 min.

++++++
 Process from Point/Station 106.000 to Point/Station 107.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 455.000(Ft.)
 Downstream point/station elevation = 454.450(Ft.)
 Pipe length = 53.00(Ft.) Slope = 0.0104 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 11.32(In.)
 Flow top width inside pipe = 17.39(In.)
 Critical Depth = 12.92(In.)
 Pipe flow velocity = 6.59(Ft/s)
 Travel time through pipe = 0.13 min.
 Time of concentration (TC) = 8.58 min.

++++++
 Process from Point/Station 107.000 to Point/Station 108.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 454.450(Ft.)
 Downstream point/station elevation = 440.000(Ft.)
 Pipe length = 91.50(Ft.) Slope = 0.1579 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.722(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 7.722(CFS)
 Normal flow depth in pipe = 6.32(In.)
 Flow top width inside pipe = 11.98(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.41(Ft/s)
 Travel time through pipe = 0.08 min.
 Time of concentration (TC) = 8.66 min.

++++++
 Process from Point/Station 108.000 to Point/Station 108.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 1
 Stream flow area = 2.020(Ac.)
 Runoff from this stream = 7.722(CFS)
 Time of concentration = 8.66 min.
 Rainfall intensity = 6.283(In/Hr)
 Program is now starting with Main Stream No. 2

 Process from Point/Station 110.000 to Point/Station 111.000
 **** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 [MEDIUM DENSITY RESIDENTIAL]
 (10.9 DU/A or Less)
 Impervious value, Ai = 0.450
 Sub-Area C Value = 0.540
 Initial subarea total flow distance = 62.000(Ft.)
 Highest elevation = 467.420(Ft.)
 Lowest elevation = 466.180(Ft.)
 Elevation difference = 1.240(Ft.) Slope = 2.000 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 80.00 (Ft)
 for the top area slope value of 2.00 %, in a development type of
 10.9 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration = 7.16 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{1.5} / (\% slope^{1/3})]$
 $TC = [1.8 * (1.1 - 0.5400) * (80.000^{1.5}) / (2.000^{1/3})] = 7.16$
 Rainfall intensity (I) = 7.109(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
 Subarea runoff = 1.113(CFS)
 Total initial stream area = 0.290(Ac.)

 Process from Point/Station 111.000 to Point/Station 111.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 7.109(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 7.16 min.
 Rainfall intensity = 7.109(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.302
 Subarea runoff = 1.036(CFS) for 0.270(Ac.)
 Total runoff = 2.150(CFS) Total area = 0.560(Ac.)

 Process from Point/Station 111.000 to Point/Station 112.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 463.000(Ft.)
 Downstream point/station elevation = 461.480(Ft.)
 Pipe length = 152.00(Ft.) Slope = 0.0100 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.150(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 2.150(CFS)
 Normal flow depth in pipe = 6.73(In.)
 Flow top width inside pipe = 11.91(In.)
 Critical Depth = 7.52(In.)
 Pipe flow velocity = 4.75(Ft/s)
 Travel time through pipe = 0.53 min.
 Time of concentration (TC) = 7.69 min.

 Process from Point/Station 112.000 to Point/Station 113.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 461.480(Ft.)
 Downstream point/station elevation = 459.000(Ft.)
 Pipe length = 84.00(Ft.) Slope = 0.0295 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.150(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 2.150(CFS)
 Normal flow depth in pipe = 5.85(In.)
 Flow top width inside pipe = 8.59(In.)
 Critical Depth = 7.92(In.)
 Pipe flow velocity = 7.07(Ft/s)
 Travel time through pipe = 0.20 min.
 Time of concentration (TC) = 7.89 min.

 Process from Point/Station 113.000 to Point/Station 113.000
 ***** SUBAREA FLOW ADDITION *****

Rainfall intensity (I) = 6.676(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 7.89 min.
 Rainfall intensity = 6.676(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.637
 Subarea runoff = 2.104(CFS) for 0.620(Ac.)
 Total runoff = 4.254(CFS) Total area = 1.180(Ac.)

 Process from Point/Station 113.000 to Point/Station 114.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 459.000(Ft.)
 Downstream point/station elevation = 453.200(Ft.)
 Pipe length = 127.00(Ft.) Slope = 0.0457 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.254(CFS)
 Nearest computed pipe diameter = 12.00(In.)
 Calculated individual pipe flow = 4.254(CFS)
 Normal flow depth in pipe = 6.41(In.)
 Flow top width inside pipe = 11.97(In.)
 Critical Depth = 10.42(In.)
 Pipe flow velocity = 9.96(Ft/s)
 Travel time through pipe = 0.21 min.
 Time of concentration (TC) = 8.10 min.

 Process from Point/Station 114.000 to Point/Station 114.000
 ***** SUBAREA FLOW ADDITION *****

Rainfall intensity (I) = 6.563(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 8.10 min.
 Rainfall intensity = 6.563(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.864
 Subarea runoff = 1.416(CFS) for 0.420(Ac.)
 Total runoff = 5.670(CFS) Total area = 1.600(Ac.)

+++++
 Process from Point/Station 114.000 to Point/Station 114.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
 Stream flow area = 1.600(Ac.)
 Runoff from this stream = 5.670(CFS)
 Time of concentration = 8.10 min.
 Rainfall intensity = 6.563(In/Hr)

+++++
 Process from Point/Station 120.000 to Point/Station 121.000
 **** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 [MEDIUM DENSITY RESIDENTIAL]
 (10.9 DU/A or Less)
 Impervious value, Ai = 0.450
 Sub-Area C Value = 0.540
 Initial subarea total flow distance = 85.000(Ft.)
 Highest elevation = 465.000(Ft.)
 Lowest elevation = 462.500(Ft.)
 Elevation difference = 2.500(Ft.) Slope = 2.941 %
 Top of Initial Area Slope adjusted by User to 3.000 %
 INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
 The maximum overland flow distance is 90.00 (Ft)
 for the top area slope value of 3.00 %, in a development type of
 10.9 DU/A or Less
 In Accordance With Figure 3-3
 Initial Area Time of Concentration = 6.63 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{1.5} / (\% slope^{1/3})]$
 $TC = [1.8 * (1.1 - 0.5400) * (90.000^{1.5}) / (3.000^{1/3})] = 6.63$
 Rainfall intensity (I) = 7.467(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.540
 Subarea runoff = 0.968(CFS)
 Total initial stream area = 0.240(Ac.)

+++++
 Process from Point/Station 121.000 to Point/Station 122.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.199(CFS)
 Depth of flow = 0.126(Ft.), Average velocity = 1.522(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	0.50
2	0.12	0.00
3	40.00	0.40

 Manning's 'N' friction factor = 0.016

Sub-Channel flow = 1.199(CFS)
 flow top width = 12.551(Ft.)
 velocity = 1.522(Ft/s)
 area = 0.788(Sq.Ft)
 Froude number = 1.070

12478PR100yr1.out

Upstream point elevation = 462.500(Ft.)
 Downstream point elevation = 458.500(Ft.)
 Flow length = 368.000(Ft.)
 Travel time = 4.03 min.
 Time of concentration = 10.66 min.
 Depth of flow = 0.126(Ft.)
 Average velocity = 1.522(Ft/s)
 Total irregular channel flow = 1.199(CFS)
 Irregular channel normal depth above invert elev. = 0.126(Ft.)
 Average velocity of channel(s) = 1.522(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 5.497(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Rainfall intensity = 5.497(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.248
 Subarea runoff = 0.398(CFS) for 0.220(Ac.)
 Total runoff = 1.365(CFS) Total area = 0.460(Ac.)
 Depth of flow = 0.132(Ft.), Average velocity = 1.572(Ft/s)

+++++
 Process from Point/Station 122.000 to Point/Station 123.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 455.000(Ft.)
 Downstream point/station elevation = 454.600(Ft.)
 Pipe length = 36.00(Ft.) Slope = 0.0111 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 1.365(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 1.365(CFS)
 Normal flow depth in pipe = 5.99(In.)
 Flow top width inside pipe = 8.49(In.)
 Critical Depth = 6.46(In.)
 Pipe flow velocity = 4.37(Ft/s)
 Travel time through pipe = 0.14 min.
 Time of concentration (TC) = 10.80 min.

+++++
 Process from Point/Station 123.000 to Point/Station 123.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.452(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 10.80 min.
 Rainfall intensity = 5.452(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 0.632
 Subarea runoff = 2.079(CFS) for 0.710(Ac.)
 Total runoff = 3.444(CFS) Total area = 1.170(Ac.)

+++++
 Process from Point/Station 123.000 to Point/Station 123.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.452(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 10.80 min.
 Rainfall intensity = 5.452(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area

12478PR100yr1.out
(Q=KCIA) is C = 0.540 CA = 0.724
Subarea runoff = 0.500(CFS) for 0.170(Ac.)
Total runoff = 3.945(CFS) Total area = 1.340(Ac.)

++++
Process from Point/Station 123.000 to Point/Station 124.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 454.600(Ft.)
Downstream point/station elevation = 453.780(Ft.)
Pipe length = 82.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.945(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.945(CFS)
Normal flow depth in pipe = 8.47(In.)
Flow top width inside pipe = 14.87(In.)
Critical Depth = 9.64(In.)
Pipe flow velocity = 5.52(Ft/s)
Travel time through pipe = 0.25 min.
Time of concentration (TC) = 11.05 min.

++++
Process from Point/Station 124.000 to Point/Station 124.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.373(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 11.05 min.
Rainfall intensity = 5.373(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.091
Subarea runoff = 1.916(CFS) for 0.680(Ac.)
Total runoff = 5.861(CFS) Total area = 2.020(Ac.)

++++
Process from Point/Station 124.000 to Point/Station 124.000
**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.373(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.540 given for subarea
Time of concentration = 11.05 min.
Rainfall intensity = 5.373(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540 CA = 1.264
Subarea runoff = 0.928(CFS) for 0.320(Ac.)
Total runoff = 6.789(CFS) Total area = 2.340(Ac.)

++++
Process from Point/Station 124.000 to Point/Station 114.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 453.780(Ft.)
Downstream point/station elevation = 452.350(Ft.)
Pipe length = 143.00(Ft.) Slope = 0.0100 Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.789(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.789(CFS)
Normal flow depth in pipe = 10.54(In.)
Flow top width inside pipe = 17.74(In.)

12478PR100yr1.out
 Critical Depth = 12.11(In.)
 Pipe flow velocity = 6.32(Ft/s)
 Travel time through pipe = 0.38 min.
 Time of concentration (TC) = 11.42 min.

+++++
 Process from Point/Station 114.000 to Point/Station 114.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 2.340(Ac.)
 Runoff from this stream = 6.789(CFS)
 Time of concentration = 11.42 min.
 Rainfall intensity = 5.258(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	5.670	8.10	6.563
2	6.789	11.42	5.258
Qmax(1) =			
	1.000 *	1.000 *	5.670) +
	1.000 *	0.709 *	6.789) + = 10.484
Qmax(2) =			
	0.801 *	1.000 *	5.670) +
	1.000 *	1.000 *	6.789) + = 11.331

Total of 2 streams to confluence:
 Flow rates before confluence point:
 5.670 6.789
 Maximum flow rates at confluence using above data:
 10.484 11.331
 Area of streams before confluence:
 1.600 2.340
 Results of confluence:
 Total flow rate = 11.331(CFS)
 Time of concentration = 11.423 min.
 Effective stream area after confluence = 3.940(Ac.)

+++++
 Process from Point/Station 114.000 to Point/Station 115.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 452.350(Ft.)
 Downstream point/station elevation = 450.220(Ft.)
 Pipe length = 66.00(Ft.) Slope = 0.0323 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 11.331(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 11.331(CFS)
 Normal flow depth in pipe = 11.98(In.)
 Flow top width inside pipe = 12.04(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 10.78(Ft/s)
 Travel time through pipe = 0.10 min.
 Time of concentration (TC) = 11.52 min.

+++++
 Process from Point/Station 115.000 to Point/Station 115.000
 Page 10

**** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.228(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 11.52 min.
 Rainfall intensity = 5.228(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 2.322
 Subarea runoff = 0.807(CFS) for 0.360(Ac.)
 Total runoff = 12.138(CFS) Total area = 4.300(Ac.)

++++++
 Process from Point/Station 115.000 to Point/Station 116.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 450.220(Ft.)
 Downstream point/station elevation = 448.000(Ft.)
 Pipe length = 74.00(Ft.) Slope = 0.0300 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 12.138(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 12.138(CFS)
 Normal flow depth in pipe = 10.76(In.)
 Flow top width inside pipe = 17.65(In.)
 Critical Depth = 15.83(In.)
 Pipe flow velocity = 11.03(Ft/s)
 Travel time through pipe = 0.11 min.
 Time of concentration (TC) = 11.64 min.

++++++
 Process from Point/Station 116.000 to Point/Station 116.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.195(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea
 Time of concentration = 11.64 min.
 Rainfall intensity = 5.195(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.540 CA = 2.479
 Subarea runoff = 0.738(CFS) for 0.290(Ac.)
 Total runoff = 12.876(CFS) Total area = 4.590(Ac.)

++++++
 Process from Point/Station 116.000 to Point/Station 108.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 441.000(Ft.)
 Downstream point/station elevation = 440.000(Ft.)
 Pipe length = 67.00(Ft.) Slope = 0.0149 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 12.876(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 12.876(CFS)
 Normal flow depth in pipe = 12.52(In.)
 Flow top width inside pipe = 20.61(In.)
 Critical Depth = 16.03(In.)
 Pipe flow velocity = 8.61(Ft/s)
 Travel time through pipe = 0.13 min.
 Time of concentration (TC) = 11.77 min.

12478PR100yr1.out

Process from Point/Station 108.000 to Point/Station 108.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
 Stream flow area = 4.590(Ac.)
 Runoff from this stream = 12.876(CFS)
 Time of concentration = 11.77 min.
 Rainfall intensity = 5.158(In/Hr)
 Summary of stream data:

Stream No.	Flow rate (CFS)	TC (min)	Rainfall Intensity (In/Hr)
1	7.722	8.66	6.283
2	12.876	11.77	5.158

Qmax(1) =

$$1.000 * 1.000 * 7.722 + 1.000 * 0.736 * 12.876 = 17.204$$

Qmax(2) =

$$0.821 * 1.000 * 7.722 + 1.000 * 1.000 * 12.876 = 19.215$$

Total of 2 main streams to confluence:
 Flow rates before confluence point:
 7.722 12.876
 Maximum flow rates at confluence using above data:
 17.204 19.215
 Area of streams before confluence:
 2.020 4.590

Results of confluence:
 Total flow rate = 19.215(CFS)
 Time of concentration = 11.766 min.
 Effective stream area after confluence = 6.610(Ac.)

+++++
 Process from Point/Station 108.000 to Point/Station 109.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 440.000(Ft.)
 Downstream point/station elevation = 435.000(Ft.)
 Pipe length = 61.00(Ft.) Slope = 0.0820 Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 19.215(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 19.215(CFS)
 Normal flow depth in pipe = 10.45(In.)
 Flow top width inside pipe = 17.76(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 18.05(Ft/s)
 Travel time through pipe = 0.06 min.
 Time of concentration (TC) = 11.82 min.

+++++
 Process from Point/Station 109.000 to Point/Station 109.000
 **** SUBAREA FLOW ADDITION ****

Rainfall intensity (I) = 5.142(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.540 given for subarea

```

                                12478PR100yr1.out
Time of concentration =      11.82 min.
Rainfall intensity =      5.142(In/Hr) for a  100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.540  CA =      4.649
Subarea runoff =      4.693(CFS) for      2.000(Ac.)
Total runoff =      23.908(CFS)  Total area =      8.610(Ac.)
End of computations, total study area =      8.610 (Ac.)

```

12478pr100yr2.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/16/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 2
SVBF TEMPLE
ONSITE BASIN

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 200.000 to Point/Station 201.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 135.000(Ft.)
Highest elevation = 450.000(Ft.)
Lowest elevation = 432.000(Ft.)
Elevation difference = 18.000(Ft.) Slope = 13.333 %
Top of Initial Area Slope adjusted by User to 13.000 %
Bottom of Initial Area Slope adjusted by User to 13.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 13.00 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 6.51 minutes
 $TC = [1.8 * (1.1 - C) * \text{distance}(\text{Ft.})^{.5} / (\% \text{ slope}^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (13.000^{(1/3)})] = 6.51$
The initial area total distance of 135.00 (Ft.) entered leaves a
remaining distance of 35.00 (Ft.)
Using Figure 3-4, the travel time for this distance is 0.26 minutes
for a distance of 35.00 (Ft.) and a slope of 13.00 %
with an elevation difference of 4.55(Ft.) from the end of the top area

12478pr100yr2.out

$Tt = [11.9 * \text{length}(\text{Mi})^3 / (\text{elevation change}(\text{Ft.}))]^{.385} * 60(\text{min/hr})$
 = 0.265 Minutes
 $Tt = [(11.9 * 0.0066^3) / (4.55)]^{.385} = 0.26$
 Total initial area $Ti = 6.51$ minutes from Figure 3-3 formula plus
 0.26 minutes from the Figure 3-4 formula = 6.77 minutes
 Rainfall intensity (I) = 7.366(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area ($Q=KCIA$) is $C = 0.250$
 Subarea runoff = 1.160(CFS)
 Total initial stream area = 0.630(Ac.)
 End of computations, total study area = 0.630 (Ac.)

12478PR100yr3.out

San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2012 Version 7.9

Rational method hydrology program based on
San Diego County Flood Control Division 2003 hydrology manual
Rational Hydrology Study Date: 03/17/17

PROPOSED CONDITION HYDROLOGY ANALYSIS
EXIT POINT 3
SVBF TEMPLE

***** Hydrology Study Control Information *****

Program License Serial Number 6116

Rational hydrology study storm event year is 100.0
English (in-lb) input data Units used

Map data precipitation entered:
6 hour, precipitation(inches) = 3.400
24 hour precipitation(inches) = 6.000
P6/P24 = 56.7%
San Diego hydrology manual 'C' values used

+++++
Process from Point/Station 300.000 to Point/Station 301.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
[UNDISTURBED NATURAL TERRAIN]
(Permanent Open Space)
Impervious value, Ai = 0.000
Sub-Area C Value = 0.250
Initial subarea total flow distance = 86.000(Ft.)
Highest elevation = 480.000(Ft.)
Lowest elevation = 472.000(Ft.)
Elevation difference = 8.000(Ft.) Slope = 9.302 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of 9.30 %, in a development type of
Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration = 7.27 minutes
 $TC = [1.8 * (1.1 - C) * distance(Ft.)^{.5} / (% slope^{(1/3)})]$
 $TC = [1.8 * (1.1 - 0.2500) * (100.000^{.5}) / (9.302^{(1/3)})] = 7.27$
Rainfall intensity (I) = 7.033(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.250
Subarea runoff = 0.176(CFS)
Total initial stream area = 0.100(Ac.)

 Process from Point/Station 301.000 to Point/Station 302.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 0.404(CFS)
 Depth of flow = 0.253(Ft.), Average velocity = 6.319(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	1.00	0.00
3	2.00	1.00

Manning's 'N' friction factor = 0.013

 Sub-Channel flow = 0.404(CFS)
 ' ' flow top width = 0.506(Ft.)
 ' ' velocity = 6.319(Ft/s)
 ' ' area = 0.064(Sq.Ft)
 ' ' Froude number = 3.131

Upstream point elevation = 472.000(Ft.)
 Downstream point elevation = 450.000(Ft.)
 Flow length = 288.000(Ft.)
 Travel time = 0.76 min.
 Time of concentration = 8.03 min.
 Depth of flow = 0.253(Ft.)
 Average velocity = 6.319(Ft/s)
 Total irregular channel flow = 0.404(CFS)
 Irregular channel normal depth above invert elev. = 0.253(Ft.)
 Average velocity of channel(s) = 6.319(Ft/s)
 Adding area flow to channel
 Rainfall intensity (I) = 6.597(In/Hr) for a 100.0 year storm
 User specified 'C' value of 0.280 given for subarea
 Rainfall intensity = 6.597(In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for total area
 (Q=KCIA) is C = 0.272 CA = 0.098
 Subarea runoff = 0.469(CFS) for 0.260(Ac.)
 Total runoff = 0.645(CFS) Total area = 0.360(Ac.)
 Depth of flow = 0.301(Ft.), Average velocity = 7.101(Ft/s)

 Process from Point/Station 302.000 to Point/Station 303.000
 **** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel = 1.174(CFS)
 Depth of flow = 0.371(Ft.), Average velocity = 8.533(Ft/s)
 ***** Irregular Channel Data *****

 Information entered for subchannel number 1 :

Point number	'X' coordinate	'Y' coordinate
1	0.00	1.00
2	1.00	0.00
3	2.00	1.00

Manning's 'N' friction factor = 0.013

 Sub-Channel flow = 1.174(CFS)
 ' ' flow top width = 0.742(Ft.)
 ' ' velocity = 8.533(Ft/s)
 ' ' area = 0.138(Sq.Ft)
 ' ' Froude number = 3.492

```

                                12478PR100yr3.out
Upstream point elevation = 450.000(Ft.)
Downstream point elevation = 428.000(Ft.)
Flow length = 263.000(Ft.)
Travel time = 0.51 min.
Time of concentration = 8.55 min.
Depth of flow = 0.371(Ft.)
Average velocity = 8.533(Ft/s)
Total irregular channel flow = 1.174(CFS)
Irregular channel normal depth above invert elev. = 0.371(Ft.)
Average velocity of channel(s) = 8.533(Ft/s)
Adding area flow to channel
Rainfall intensity (I) = 6.339(In/Hr) for a 100.0 year storm
User specified 'C' value of 0.280 given for subarea
Rainfall intensity = 6.339(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.277 CA = 0.263
Subarea runoff = 1.022(CFS) for 0.590(Ac.)
Total runoff = 1.667(CFS) Total area = 0.950(Ac.)
Depth of flow = 0.423(Ft.), Average velocity = 9.315(Ft/s)
End of computations, total study area = 0.950 (Ac.)

```


DRAINAGE AREAS AND COEFFICIENT OF RUNOFF
FOR OFFSITE BASINS DO NOT CHANGE IN THE
PROPOSED CONDITION
(REFER TO APPENDIX B FOR OFFSITE
HYDROLOGY ANALYSIS)

HYDRAULIC ANALYSIS

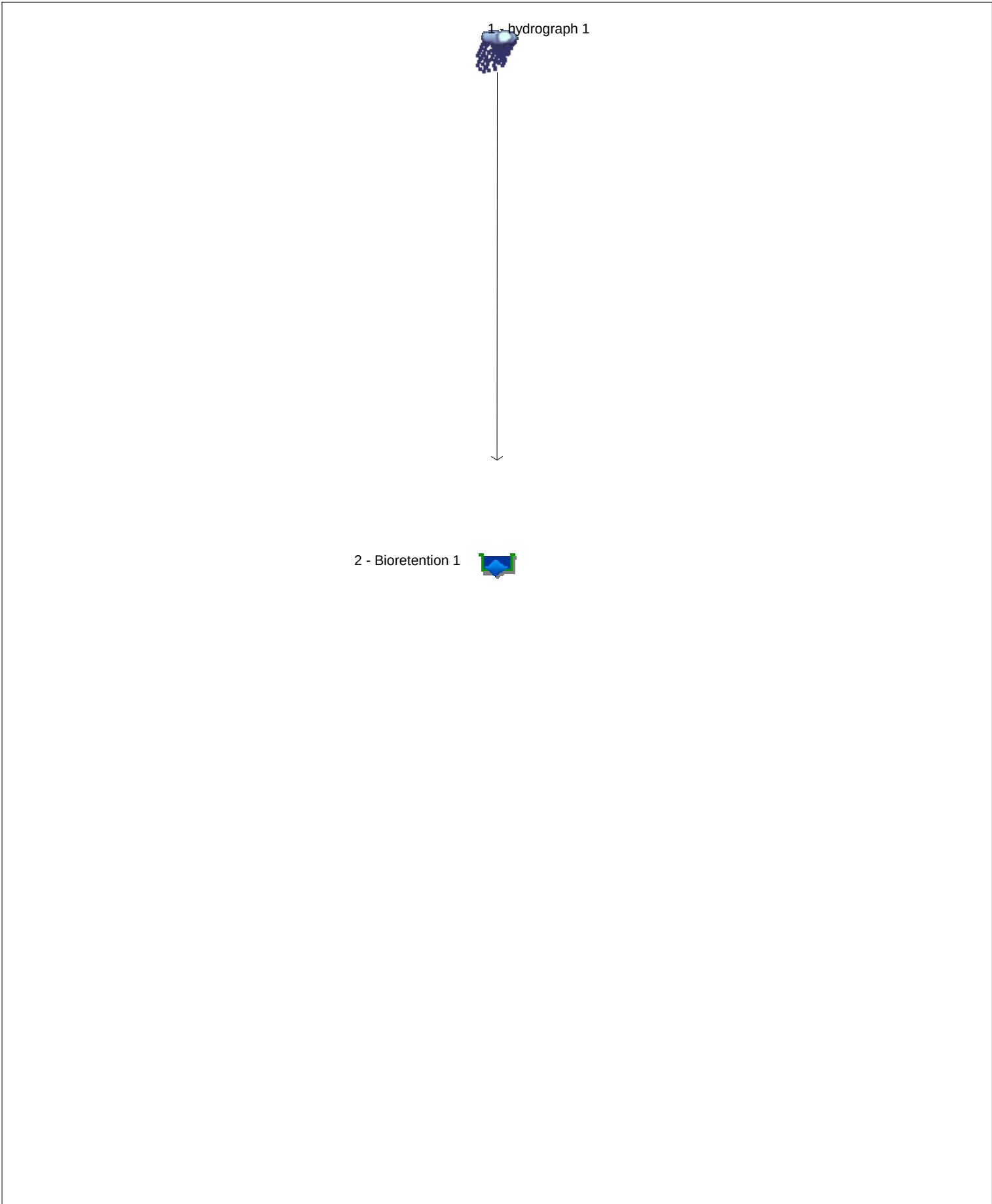
RUN DATE 3/17/2017
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 7 MIN.
6 HOUR RAINFALL 3.4 INCHES
BASIN AREA 2.02 ACRES
RUNOFF COEFFICIENT 0.54
PEAK DISCHARGE 7.7 CFS

Detention Basin -1 Analysis (BMP #1)

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 7	DISCHARGE (CFS) = 0.2
TIME (MIN) = 14	DISCHARGE (CFS) = 0.2
TIME (MIN) = 21	DISCHARGE (CFS) = 0.2
TIME (MIN) = 28	DISCHARGE (CFS) = 0.2
TIME (MIN) = 35	DISCHARGE (CFS) = 0.2
TIME (MIN) = 42	DISCHARGE (CFS) = 0.2
TIME (MIN) = 49	DISCHARGE (CFS) = 0.3
TIME (MIN) = 56	DISCHARGE (CFS) = 0.3
TIME (MIN) = 63	DISCHARGE (CFS) = 0.3
TIME (MIN) = 70	DISCHARGE (CFS) = 0.3
TIME (MIN) = 77	DISCHARGE (CFS) = 0.3
TIME (MIN) = 84	DISCHARGE (CFS) = 0.3
TIME (MIN) = 91	DISCHARGE (CFS) = 0.3
TIME (MIN) = 98	DISCHARGE (CFS) = 0.3
TIME (MIN) = 105	DISCHARGE (CFS) = 0.3
TIME (MIN) = 112	DISCHARGE (CFS) = 0.3
TIME (MIN) = 119	DISCHARGE (CFS) = 0.3
TIME (MIN) = 126	DISCHARGE (CFS) = 0.3
TIME (MIN) = 133	DISCHARGE (CFS) = 0.4
TIME (MIN) = 140	DISCHARGE (CFS) = 0.4
TIME (MIN) = 147	DISCHARGE (CFS) = 0.4
TIME (MIN) = 154	DISCHARGE (CFS) = 0.4
TIME (MIN) = 161	DISCHARGE (CFS) = 0.4
TIME (MIN) = 168	DISCHARGE (CFS) = 0.5
TIME (MIN) = 175	DISCHARGE (CFS) = 0.5
TIME (MIN) = 182	DISCHARGE (CFS) = 0.5
TIME (MIN) = 189	DISCHARGE (CFS) = 0.6
TIME (MIN) = 196	DISCHARGE (CFS) = 0.6
TIME (MIN) = 203	DISCHARGE (CFS) = 0.7
TIME (MIN) = 210	DISCHARGE (CFS) = 0.8
TIME (MIN) = 217	DISCHARGE (CFS) = 0.9
TIME (MIN) = 224	DISCHARGE (CFS) = 1.1
TIME (MIN) = 231	DISCHARGE (CFS) = 1.6
TIME (MIN) = 238	DISCHARGE (CFS) = 2.4
TIME (MIN) = 245	DISCHARGE (CFS) = 7.7
TIME (MIN) = 252	DISCHARGE (CFS) = 1.2
TIME (MIN) = 259	DISCHARGE (CFS) = 0.8
TIME (MIN) = 266	DISCHARGE (CFS) = 0.7
TIME (MIN) = 273	DISCHARGE (CFS) = 0.5
TIME (MIN) = 280	DISCHARGE (CFS) = 0.5
TIME (MIN) = 287	DISCHARGE (CFS) = 0.4
TIME (MIN) = 294	DISCHARGE (CFS) = 0.4
TIME (MIN) = 301	DISCHARGE (CFS) = 0.4
TIME (MIN) = 308	DISCHARGE (CFS) = 0.3
TIME (MIN) = 315	DISCHARGE (CFS) = 0.3
TIME (MIN) = 322	DISCHARGE (CFS) = 0.3
TIME (MIN) = 329	DISCHARGE (CFS) = 0.3
TIME (MIN) = 336	DISCHARGE (CFS) = 0.3
TIME (MIN) = 343	DISCHARGE (CFS) = 0.2
TIME (MIN) = 350	DISCHARGE (CFS) = 0.2
TIME (MIN) = 357	DISCHARGE (CFS) = 0.2
TIME (MIN) = 364	DISCHARGE (CFS) = 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

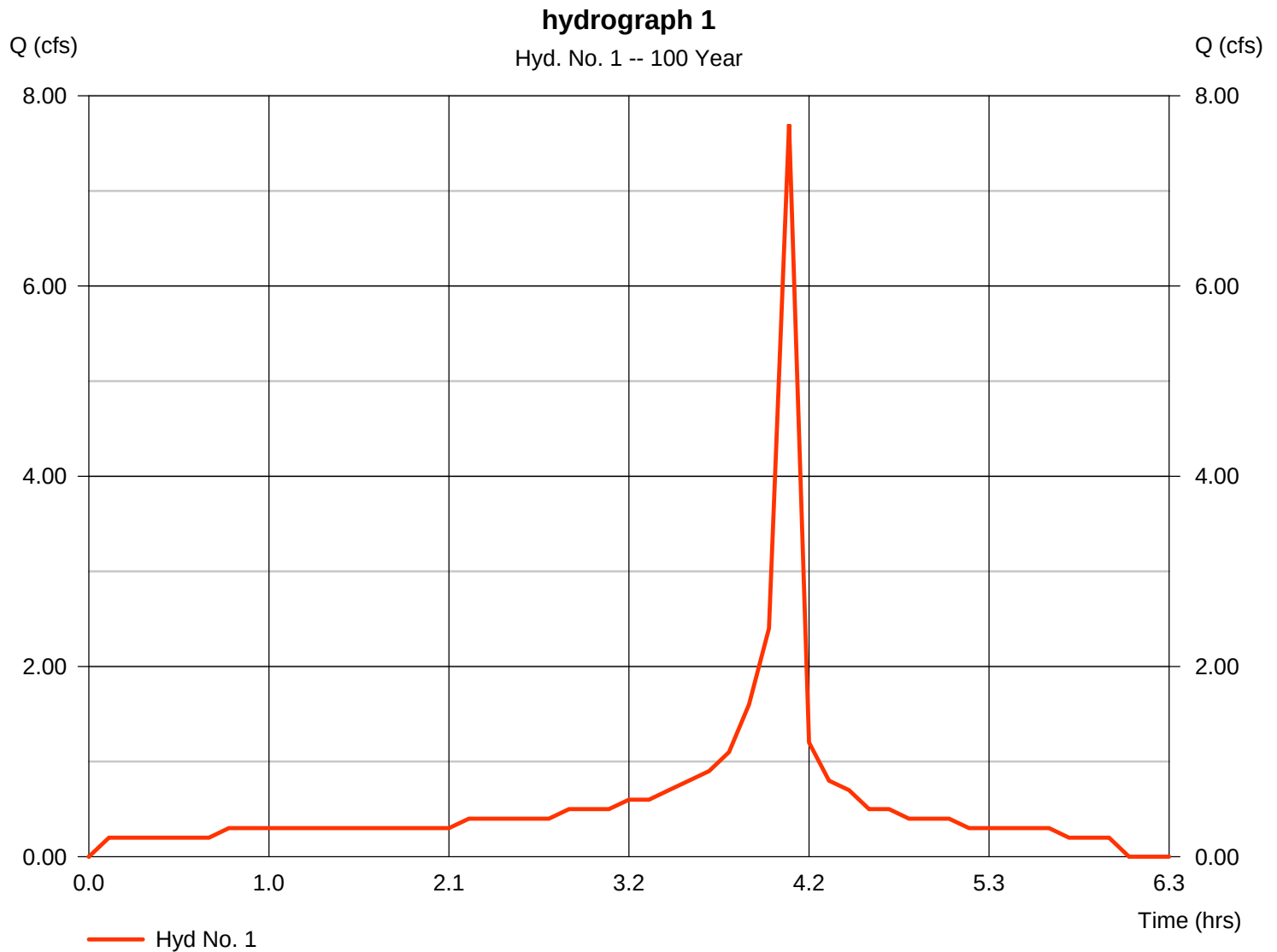
Friday, 03 / 17 / 2017

Hyd. No. 1

hydrograph 1

Hydrograph type = Manual
 Storm frequency = 100 yrs
 Time interval = 7 min

Peak discharge = 7.700 cfs
 Time to peak = 4.08 hrs
 Hyd. volume = 13,314 cuft



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

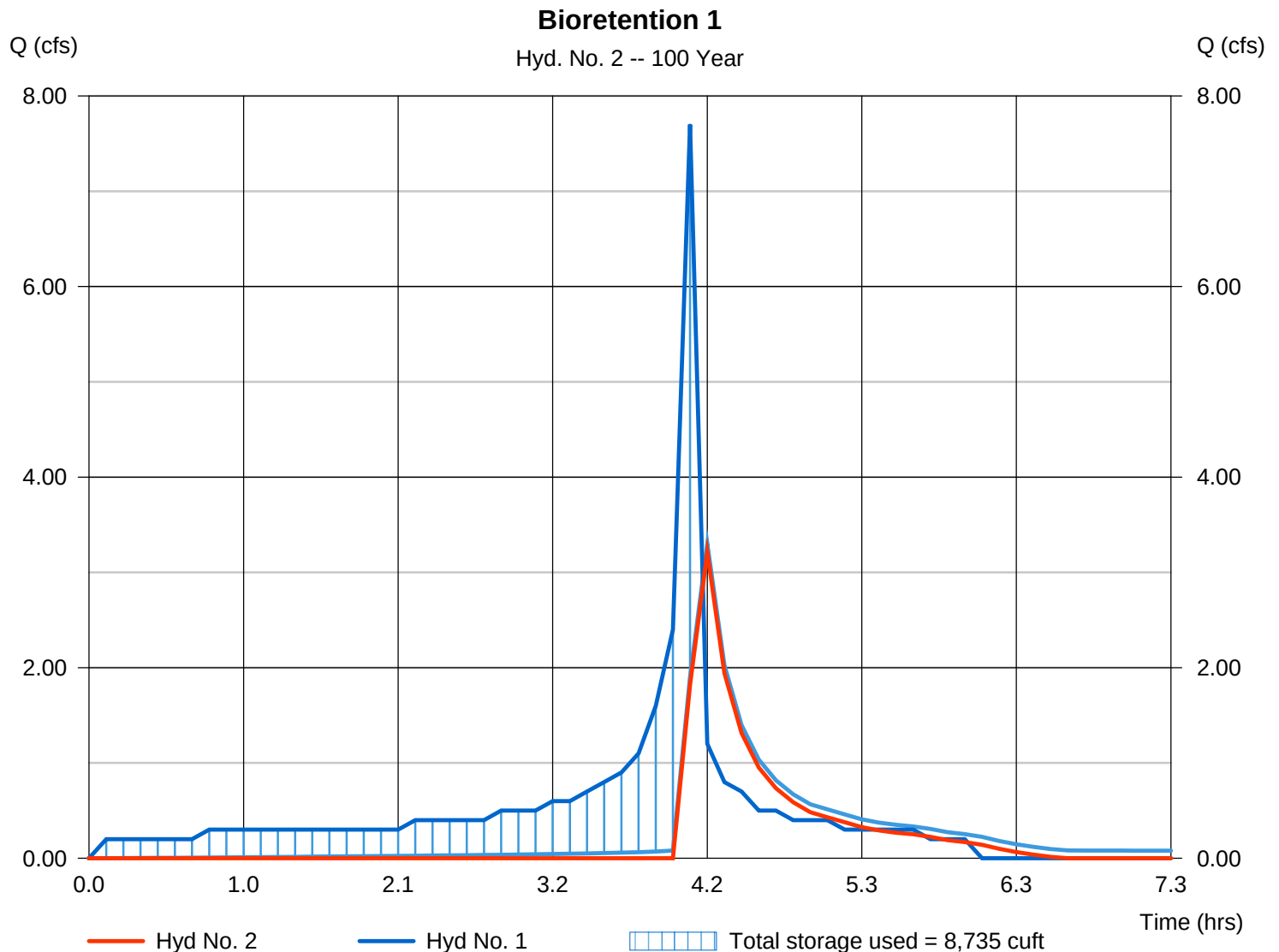
Friday, 03 / 17 / 2017

Hyd. No. 2

Bioretention 1

Hydrograph type	= Reservoir	Peak discharge	= 3.215 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.20 hrs
Time interval	= 7 min	Hyd. volume	= 5,853 cuft
Inflow hyd. No.	= 1 - hydrograph 1	Max. Elevation	= 463.41 ft
Reservoir name	= Detention Basin 1	Max. Storage	= 8,735 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

4

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 1 - Detention Basin 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 462.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	462.00	5,790	0	0
1.00	463.00	6,787	6,289	6,289
1.50	463.50	7,290	3,519	9,808

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 12.00	Inactive	Inactive	Inactive
Span (in)	= 12.00	3.00	8.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 461.00	462.50	27.00	0.00
Length (ft)	= 63.00	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	0.30	0.60
Multi-Stage	= n/a	Yes	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 4.71	Inactive	Inactive	Inactive
Crest El. (ft)	= 463.00	463.34	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= 1	Rect	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	462.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	6,289	463.00	2.67 ic	0.00	0.00	---	0.00	0.00	---	---	0.082	---	0.082
1.50	9,808	463.50	4.94 ic	0.00	0.00	---	4.94 s	0.00	---	---	0.088	---	5.024

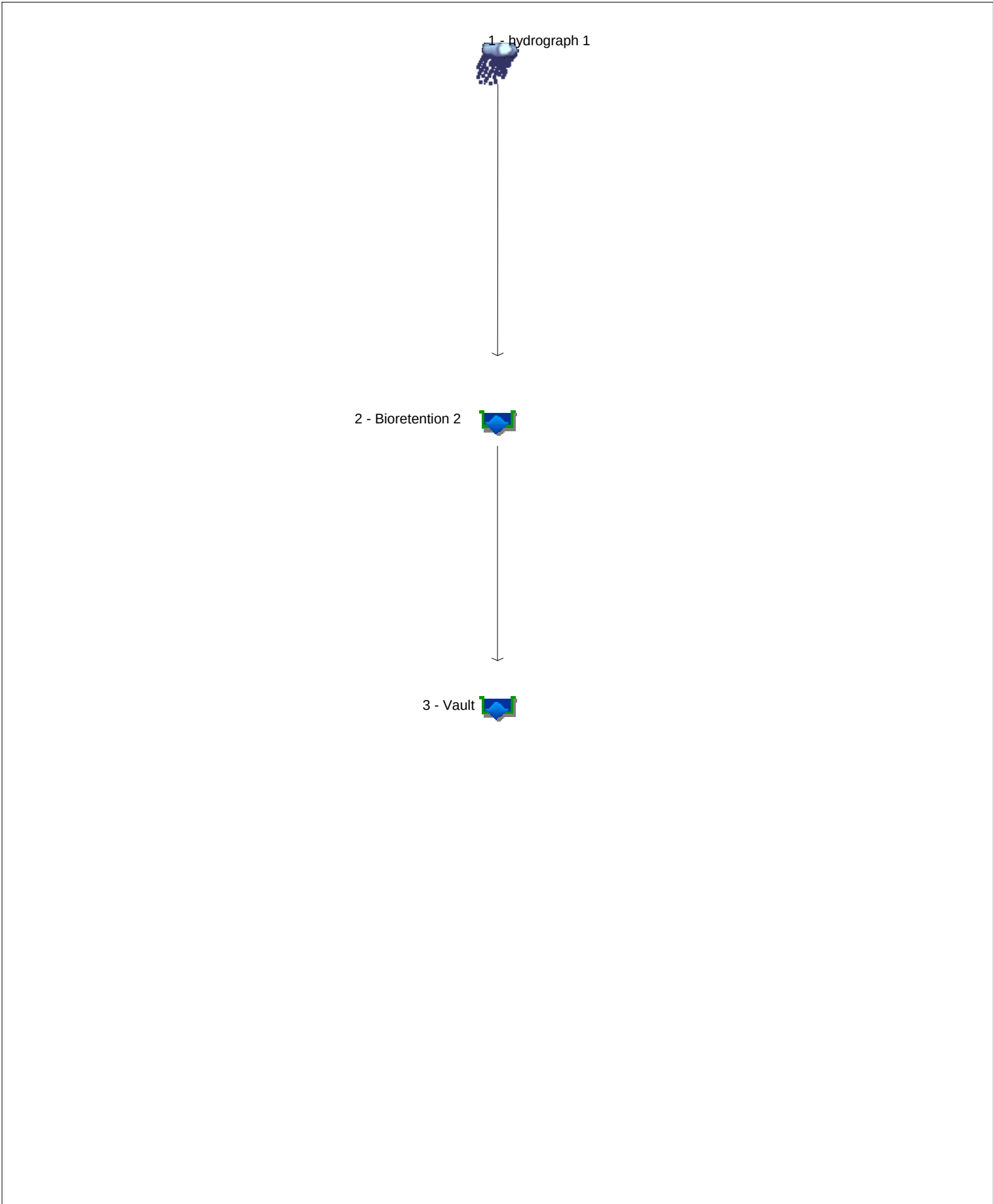
RUN DATE 3/17/2017
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 11 MIN.
6 HOUR RAINFALL 3.4 INCHES
BASIN AREA 4.59 ACRES
RUNOFF COEFFICIENT 0.54
PEAK DISCHARGE 12.87 CFS

Detention Basin -2 Analysis (BMPs 2 & 3)

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 11	DISCHARGE (CFS) = 0.5
TIME (MIN) = 22	DISCHARGE (CFS) = 0.5
TIME (MIN) = 33	DISCHARGE (CFS) = 0.5
TIME (MIN) = 44	DISCHARGE (CFS) = 0.5
TIME (MIN) = 55	DISCHARGE (CFS) = 0.6
TIME (MIN) = 66	DISCHARGE (CFS) = 0.6
TIME (MIN) = 77	DISCHARGE (CFS) = 0.6
TIME (MIN) = 88	DISCHARGE (CFS) = 0.6
TIME (MIN) = 99	DISCHARGE (CFS) = 0.7
TIME (MIN) = 110	DISCHARGE (CFS) = 0.7
TIME (MIN) = 121	DISCHARGE (CFS) = 0.7
TIME (MIN) = 132	DISCHARGE (CFS) = 0.8
TIME (MIN) = 143	DISCHARGE (CFS) = 0.8
TIME (MIN) = 154	DISCHARGE (CFS) = 0.9
TIME (MIN) = 165	DISCHARGE (CFS) = 1
TIME (MIN) = 176	DISCHARGE (CFS) = 1
TIME (MIN) = 187	DISCHARGE (CFS) = 1.2
TIME (MIN) = 198	DISCHARGE (CFS) = 1.3
TIME (MIN) = 209	DISCHARGE (CFS) = 1.6
TIME (MIN) = 220	DISCHARGE (CFS) = 1.8
TIME (MIN) = 231	DISCHARGE (CFS) = 2.6
TIME (MIN) = 242	DISCHARGE (CFS) = 4.2
TIME (MIN) = 253	DISCHARGE (CFS) = 12.87
TIME (MIN) = 264	DISCHARGE (CFS) = 2.1
TIME (MIN) = 275	DISCHARGE (CFS) = 1.4
TIME (MIN) = 286	DISCHARGE (CFS) = 1.1
TIME (MIN) = 297	DISCHARGE (CFS) = 0.9
TIME (MIN) = 308	DISCHARGE (CFS) = 0.8
TIME (MIN) = 319	DISCHARGE (CFS) = 0.7
TIME (MIN) = 330	DISCHARGE (CFS) = 0.7
TIME (MIN) = 341	DISCHARGE (CFS) = 0.6
TIME (MIN) = 352	DISCHARGE (CFS) = 0.6
TIME (MIN) = 363	DISCHARGE (CFS) = 0.5
TIME (MIN) = 374	DISCHARGE (CFS) = 0

Watershed Model Schematic

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

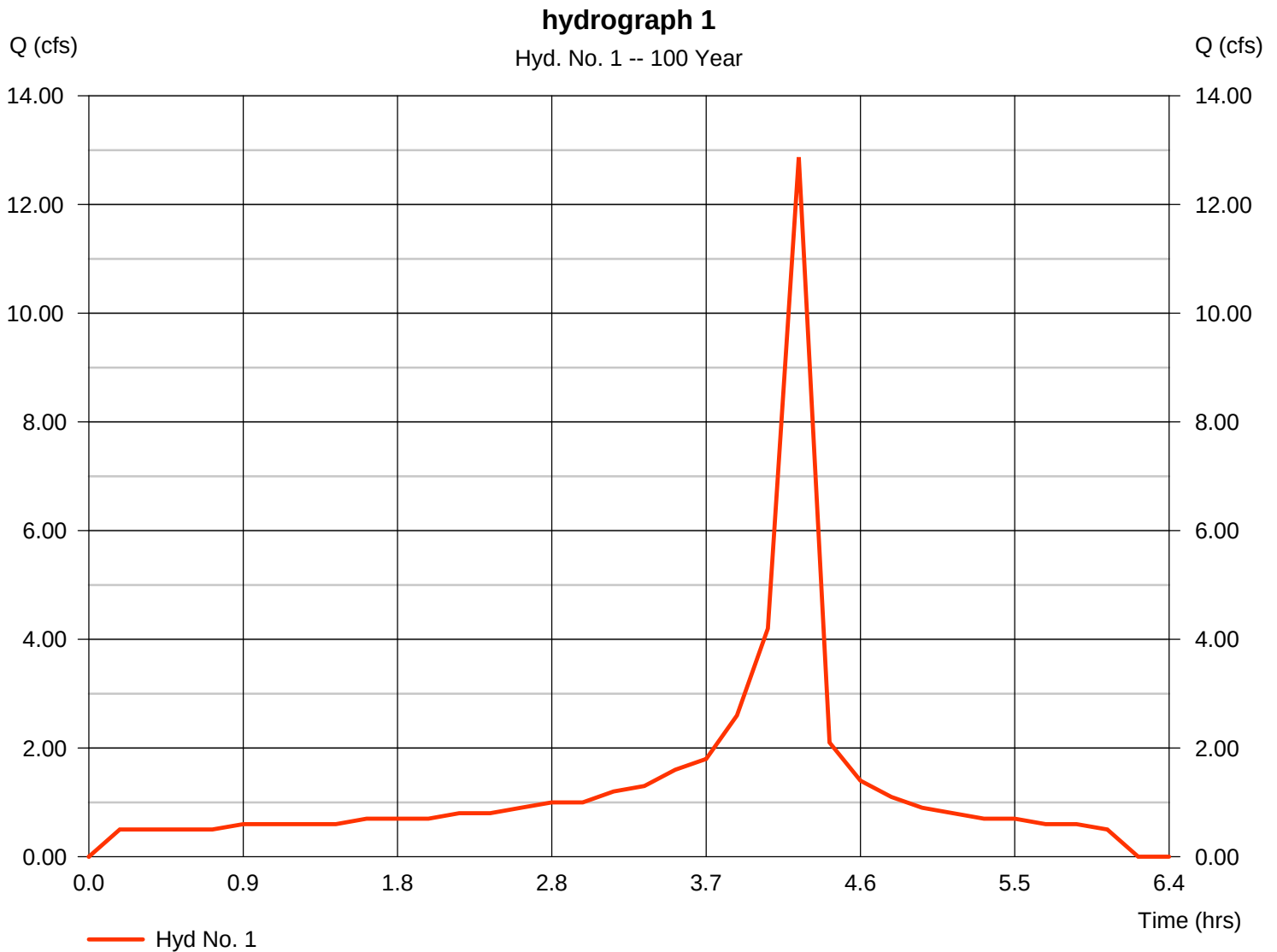
Friday, 03 / 17 / 2017

Hyd. No. 1

hydrograph 1

Hydrograph type = Manual
Storm frequency = 100 yrs
Time interval = 11 min

Peak discharge = 12.87 cfs
Time to peak = 4.22 hrs
Hyd. volume = 30,340 cuft



Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

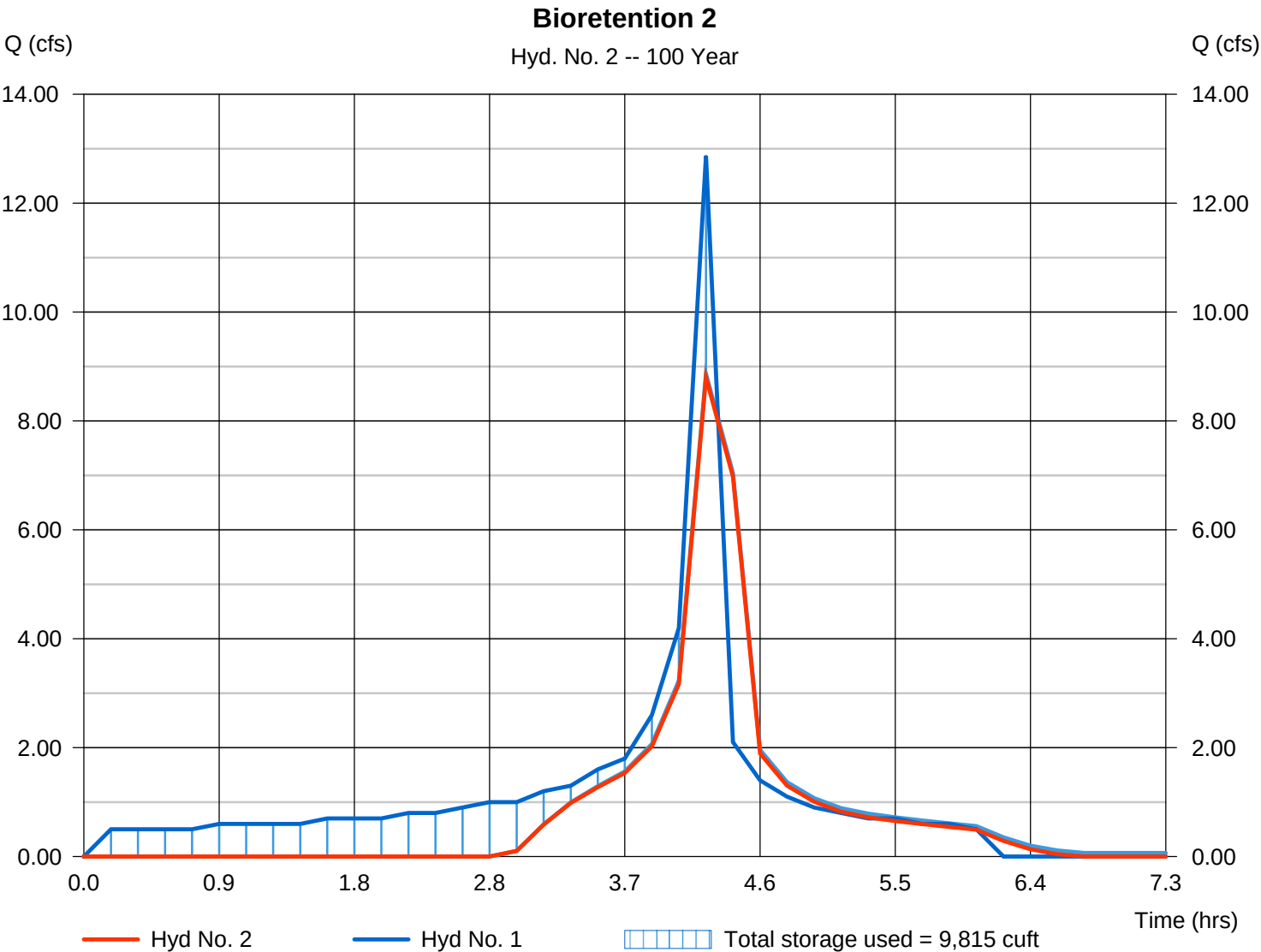
Friday, 03 / 17 / 2017

Hyd. No. 2

Bioretention 2

Hydrograph type	= Reservoir	Peak discharge	= 8.797 cfs
Storm frequency	= 100 yrs	Time to peak	= 4.22 hrs
Time interval	= 11 min	Hyd. volume	= 22,398 cuft
Inflow hyd. No.	= 1 - hydrograph 1	Max. Elevation	= 450.70 ft
Reservoir name	= Bioretention 2	Max. Storage	= 9,815 cuft

Storage Indication method used. Exfiltration extracted from Outflow.



Pond Report

4

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 1 - Bioretention 2

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 449.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	449.00	5,900	0	0
1.00	450.00	6,860	6,380	6,380
1.50	450.70	7,940	3,700	10,080

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 30.00	Inactive	Inactive	Inactive
Span (in)	= 30.00	1.70	8.00	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 449.00	449.00	27.00	0.00
Length (ft)	= 63.00	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	0.30	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.85	Inactive	Inactive	Inactive
Crest El. (ft)	= 450.00	442.20	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)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	449.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	6,380	450.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.083	---	0.083
1.50	10,080	450.70	11.96 ic	0.00	0.00	---	11.95 s	0.00	---	---	0.096	---	12.04

Hydrograph Report

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

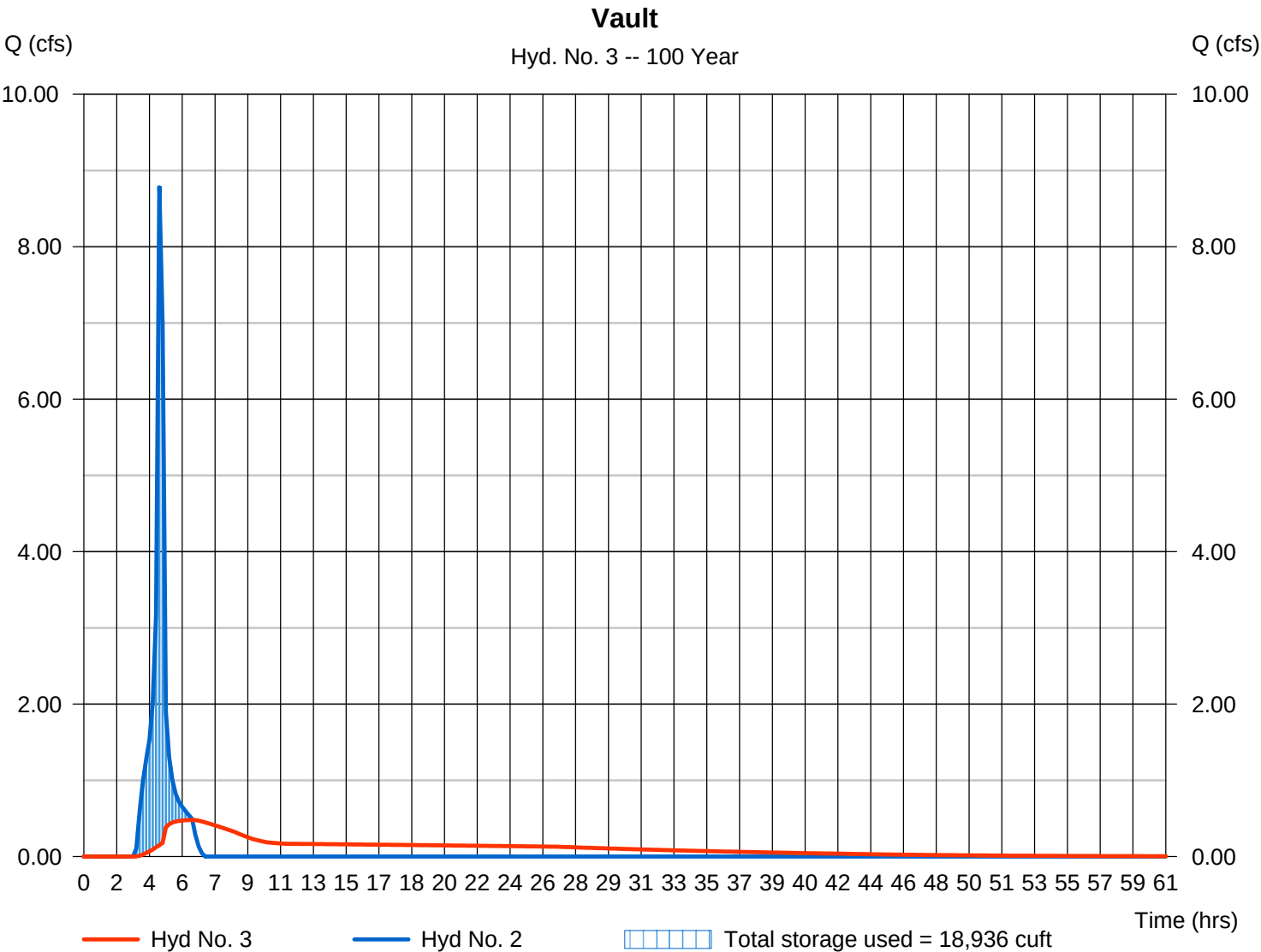
Friday, 03 / 17 / 2017

Hyd. No. 3

Vault

Hydrograph type	= Reservoir	Peak discharge	= 0.479 cfs
Storm frequency	= 100 yrs	Time to peak	= 6.05 hrs
Time interval	= 11 min	Hyd. volume	= 22,369 cuft
Inflow hyd. No.	= 2 - Bioretention 2	Max. Elevation	= 443.46 ft
Reservoir name	= Vault 1	Max. Storage	= 18,936 cuft

Storage Indication method used. Outflow includes exfiltration.



Pond Report

6

Hydraflow Hydrographs Extension for AutoCAD® Civil 3D® 2015 by Autodesk, Inc. v10.4

Friday, 03 / 17 / 2017

Pond No. 2 - Vault 1

Pond Data

Contours -User-defined contour areas. Average end area method used for volume calculation. Beginning Elevation = 440.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	440.00	5,475	0	0
1.00	441.00	5,475	5,475	5,475
2.00	442.00	5,475	5,475	10,950
3.00	443.00	5,475	5,475	16,425
4.00	444.00	5,475	5,475	21,900
5.00	445.00	5,475	5,475	27,375
5.20	445.20	5,475	1,095	28,470

Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 24.00	1.59	5.10	Inactive
Span (in)	= 24.00	1.59	5.10	0.00
No. Barrels	= 1	1	1	0
Invert El. (ft)	= 440.00	440.00	442.50	0.00
Length (ft)	= 60.00	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	0.30	0.60
Multi-Stage	= n/a	Yes	Yes	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 7.85	Inactive	Inactive	Inactive
Crest El. (ft)	= 445.00	442.20	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)	= 0.520 (by Contour)			
TW Elev. (ft)	= 0.00			

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

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	440.00	0.00	0.00	0.00	---	0.00	0.00	---	---	0.000	---	0.000
1.00	5,475	441.00	0.06 ic	0.06 ic	0.00	---	0.00	0.00	---	---	0.066	---	0.129
2.00	10,950	442.00	0.09 ic	0.09 ic	0.00	---	0.00	0.00	---	---	0.066	---	0.157
3.00	16,425	443.00	0.29 ic	0.11 ic	0.18 ic	---	0.00	0.00	---	---	0.066	---	0.360
4.00	21,900	444.00	0.52 ic	0.13 ic	0.39 ic	---	0.00	0.00	---	---	0.066	---	0.581
5.00	27,375	445.00	0.69 ic	0.14 ic	0.52 ic	---	0.00	0.00	---	---	0.066	---	0.726
5.20	28,470	445.20	3.03 ic	0.14 ic	0.54 ic	---	2.34	0.00	---	---	0.066	---	3.083

Channel Report

Offsite Culvert 1

Circular

Diameter (ft) = 1.00

Invert Elev (ft) = 10.00

Slope (%) = 3.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 0.22

Highlighted

Depth (ft) = 0.13

Q (cfs) = 0.220

Area (sqft) = 0.06

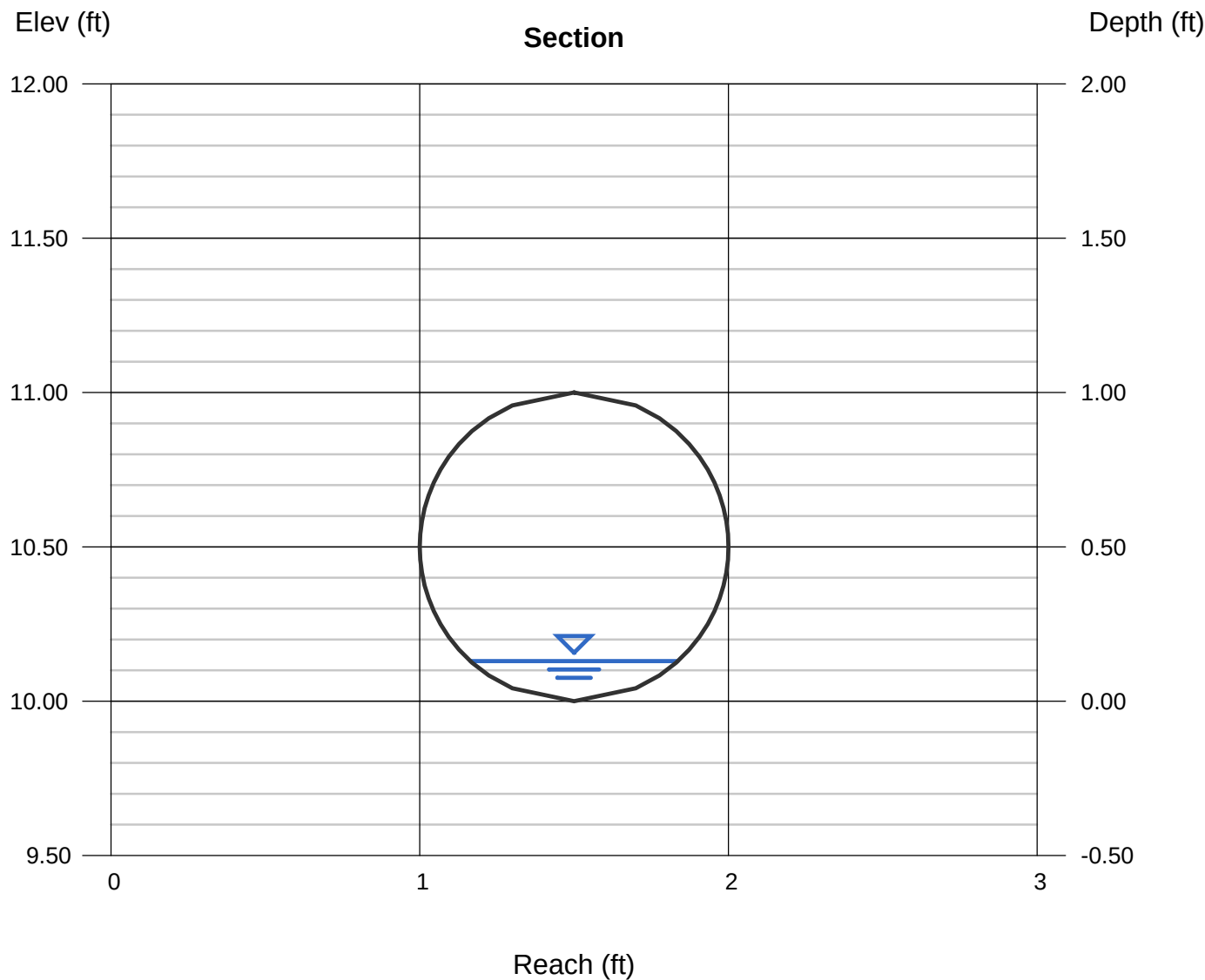
Velocity (ft/s) = 3.64

Wetted Perim (ft) = 0.74

Crit Depth, Yc (ft) = 0.20

Top Width (ft) = 0.67

EGL (ft) = 0.34



Channel Report

Offsite Culvert 2

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 5.30

Highlighted

Depth (ft) = 0.62

Q (cfs) = 5.300

Area (sqft) = 0.69

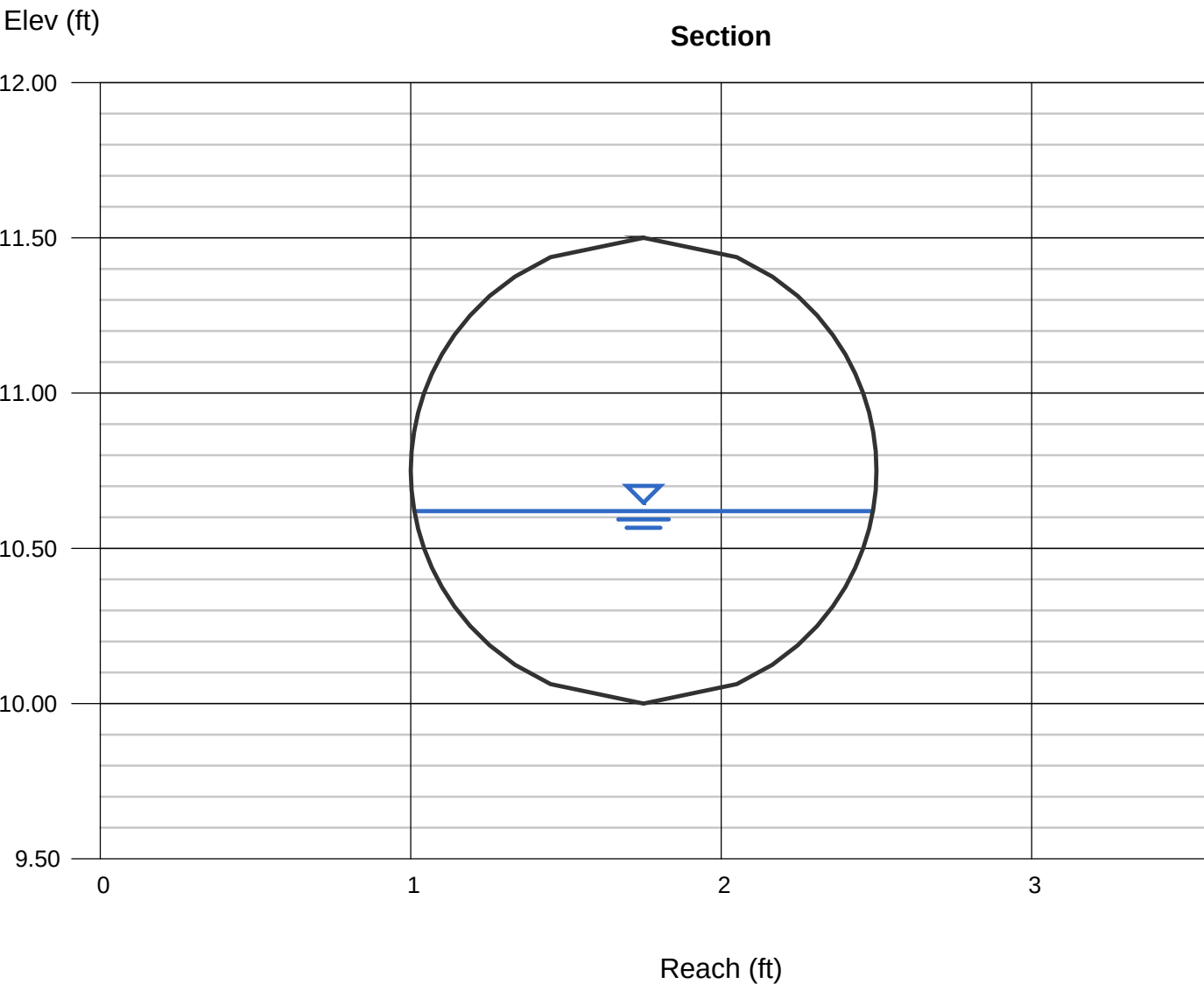
Velocity (ft/s) = 7.64

Wetted Perim (ft) = 2.10

Crit Depth, Yc (ft) = 0.89

Top Width (ft) = 1.48

EGL (ft) = 1.53



Channel Report

Offsite Culvert 3

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 8.15

Highlighted

Depth (ft) = 0.80

Q (cfs) = 8.150

Area (sqft) = 0.96

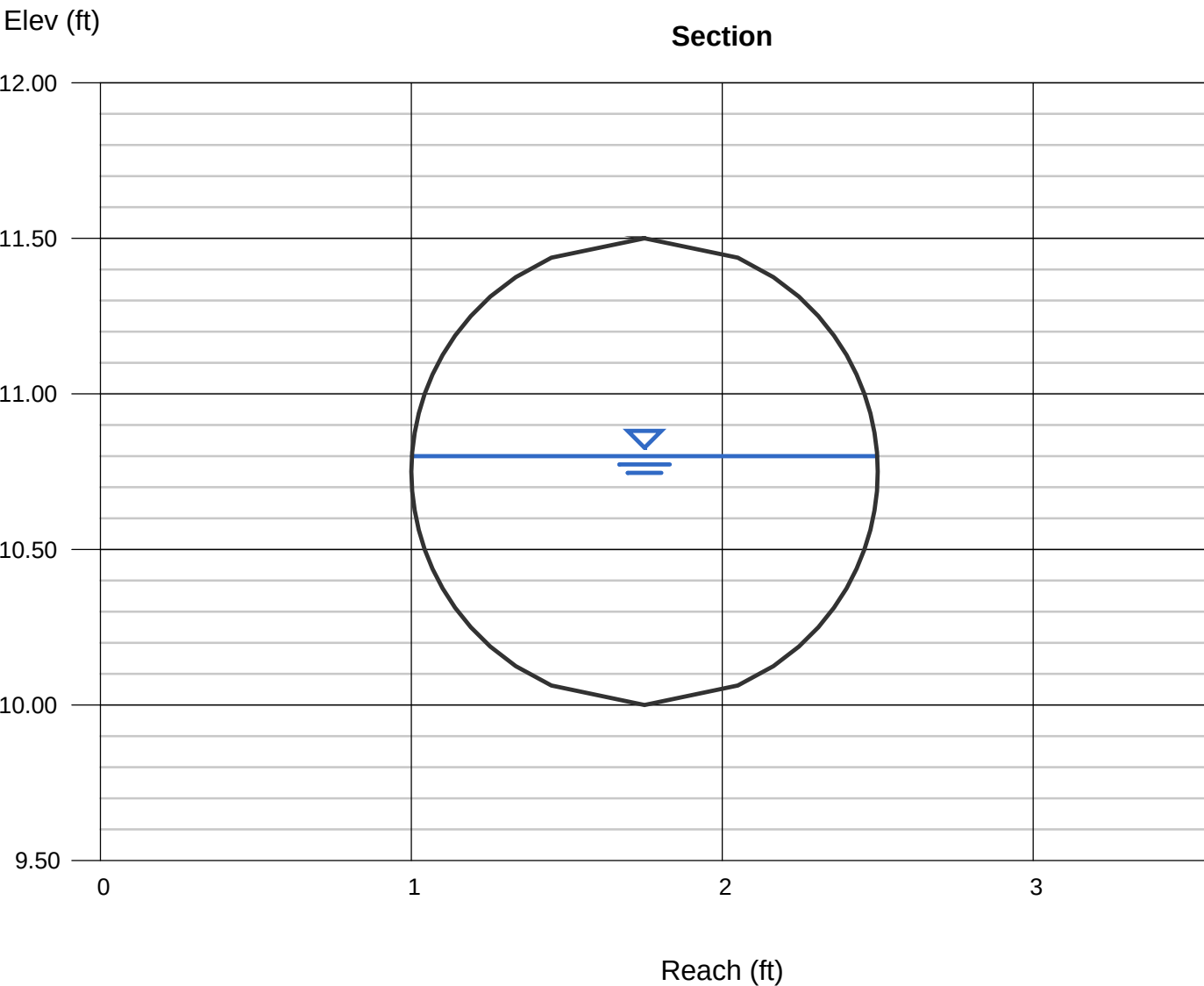
Velocity (ft/s) = 8.48

Wetted Perim (ft) = 2.46

Crit Depth, Yc (ft) = 1.11

Top Width (ft) = 1.50

EGL (ft) = 1.92



Channel Report

Offsite Culvert 4

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 2.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 4.63

Highlighted

Depth (ft) = 0.58

Q (cfs) = 4.630

Area (sqft) = 0.63

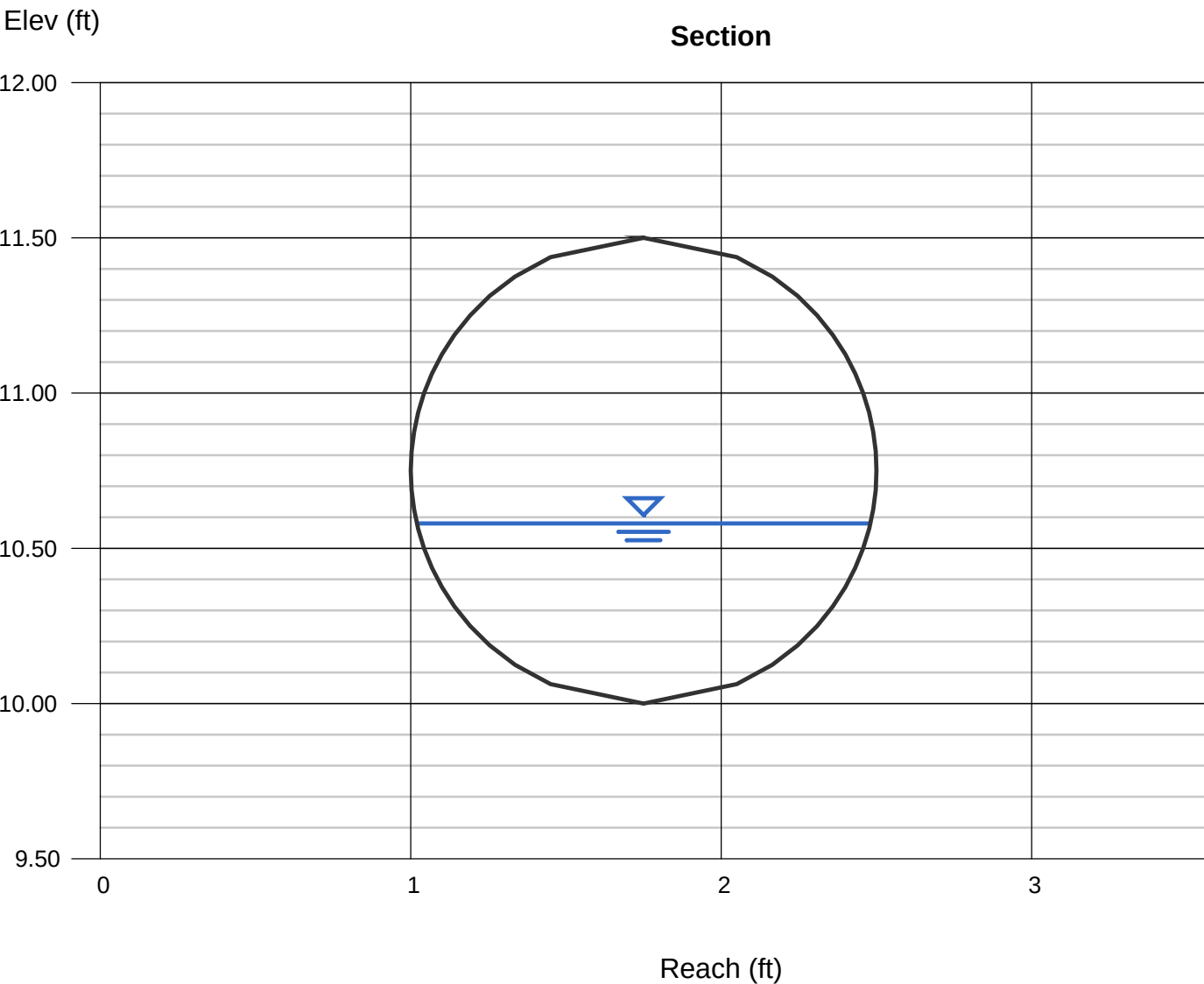
Velocity (ft/s) = 7.30

Wetted Perim (ft) = 2.02

Crit Depth, Yc (ft) = 0.83

Top Width (ft) = 1.46

EGL (ft) = 1.41



Channel Report

Outlet 1-pipe

Circular

Diameter (ft) = 2.50

Invert Elev (ft) = 10.00

Slope (%) = 1.80

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 33.64

Highlighted

Depth (ft) = 1.42

Q (cfs) = 33.64

Area (sqft) = 2.89

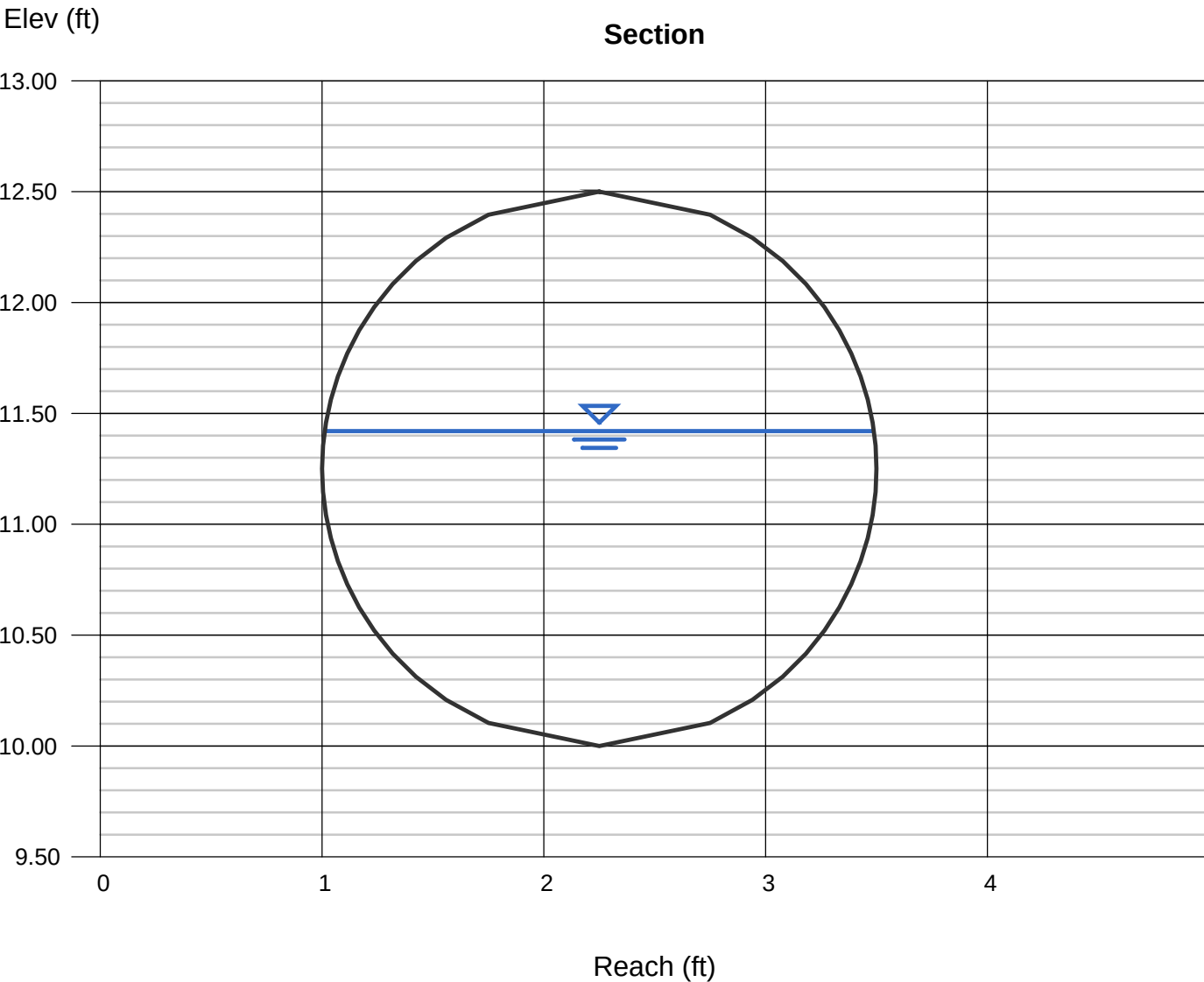
Velocity (ft/s) = 11.65

Wetted Perim (ft) = 4.27

Crit Depth, Yc (ft) = 1.98

Top Width (ft) = 2.48

EGL (ft) = 3.53



Channel Report

Outlet 1-riprap

Trapezoidal

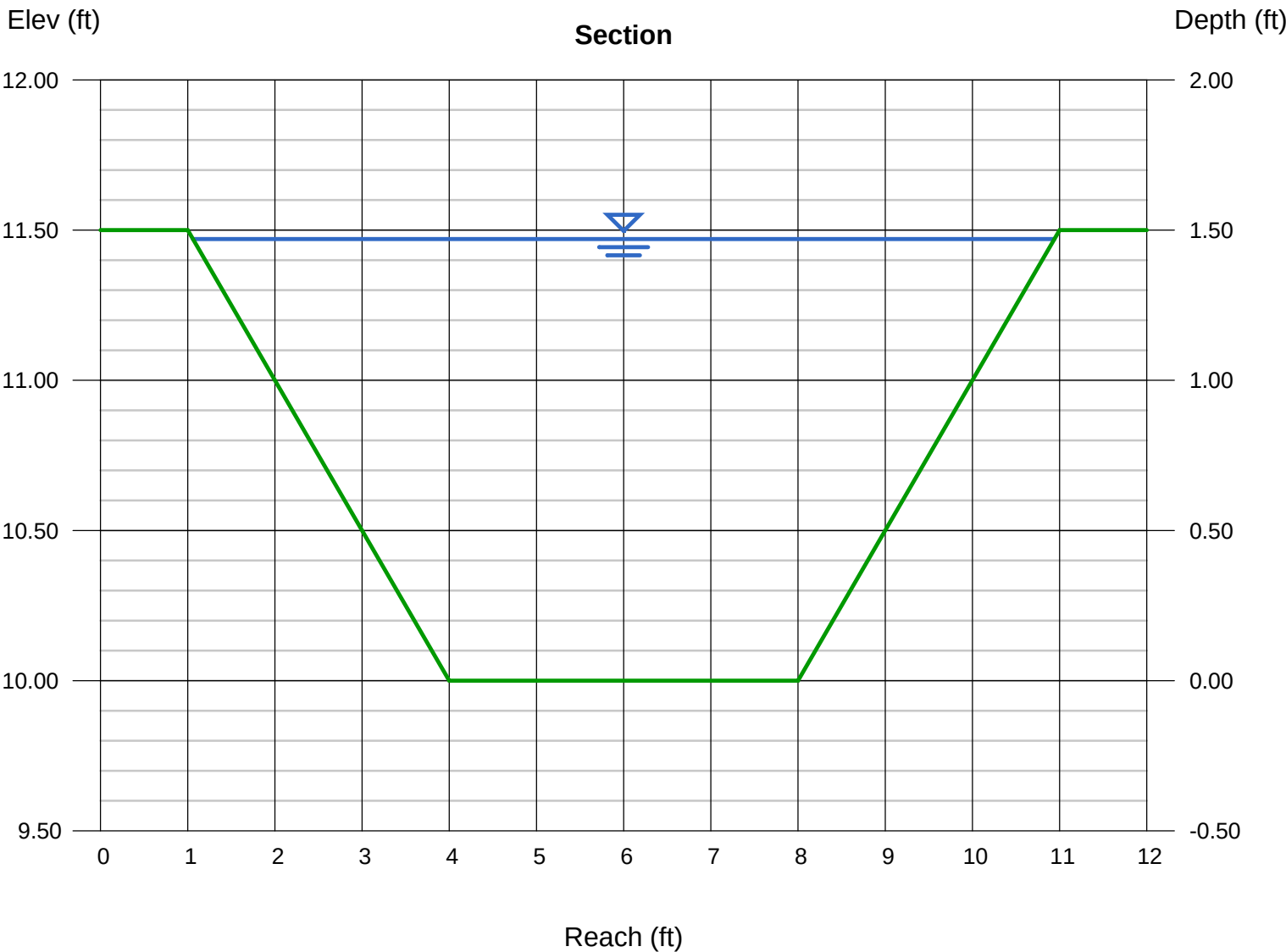
Bottom Width (ft) = 4.00
Side Slopes (z:1) = 2.00, 2.00
Total Depth (ft) = 1.50
Invert Elev (ft) = 10.00
Slope (%) = 1.00
N-Value = 0.044

Highlighted

Depth (ft) = 1.47
Q (cfs) = 33.64
Area (sqft) = 10.20
Velocity (ft/s) = 3.30
Wetted Perim (ft) = 10.57
Crit Depth, Yc (ft) = 1.08
Top Width (ft) = 9.88
EGL (ft) = 1.64

Calculations

Compute by: Known Q
Known Q (cfs) = 33.64



Channel Report

Outlet 2-pipe

Circular

Diameter (ft) = 1.50

Invert Elev (ft) = 10.00

Slope (%) = 4.00

N-Value = 0.013

Calculations

Compute by: Known Q

Known Q (cfs) = 5.30

Highlighted

Depth (ft) = 0.52

Q (cfs) = 5.300

Area (sqft) = 0.54

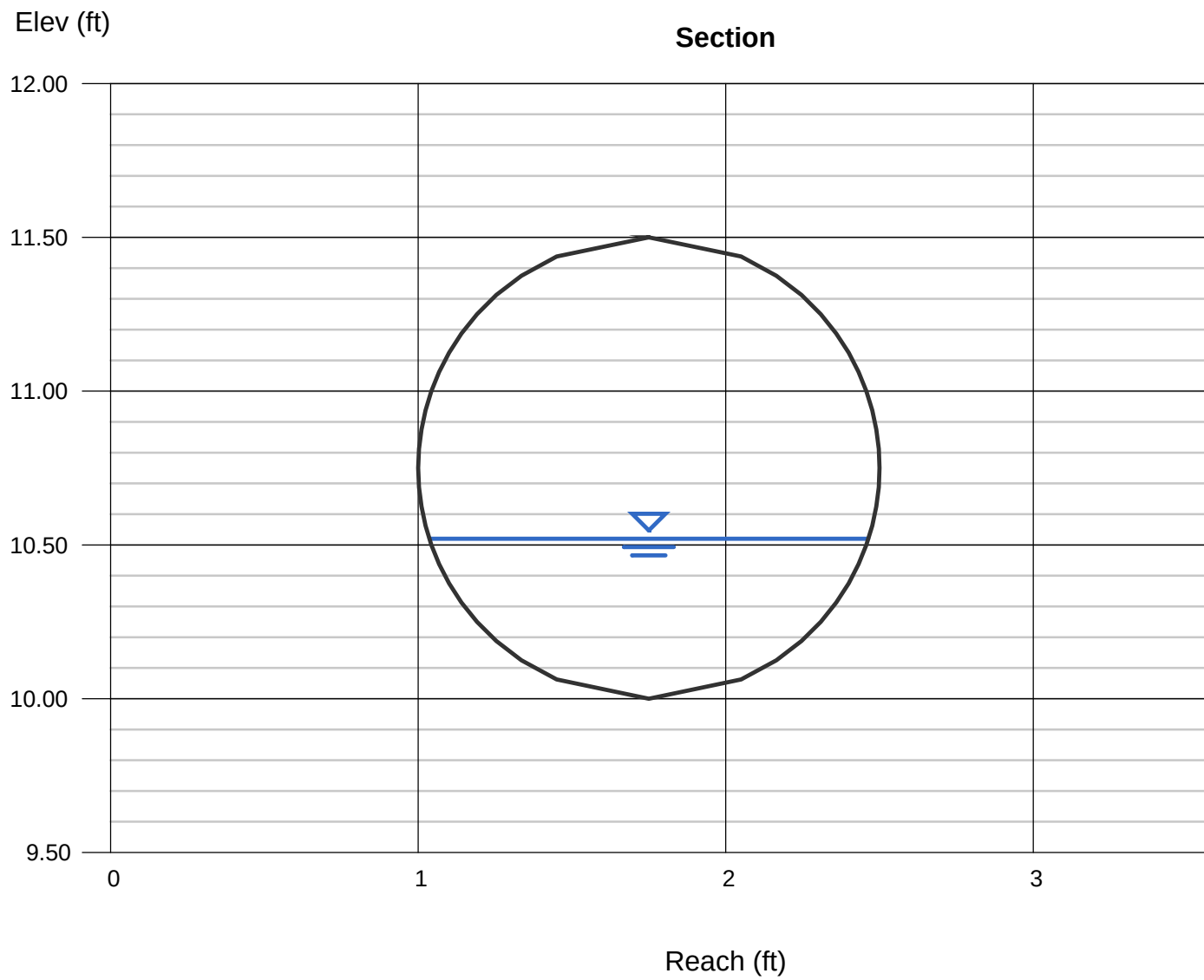
Velocity (ft/s) = 9.73

Wetted Perim (ft) = 1.89

Crit Depth, Yc (ft) = 0.89

Top Width (ft) = 1.43

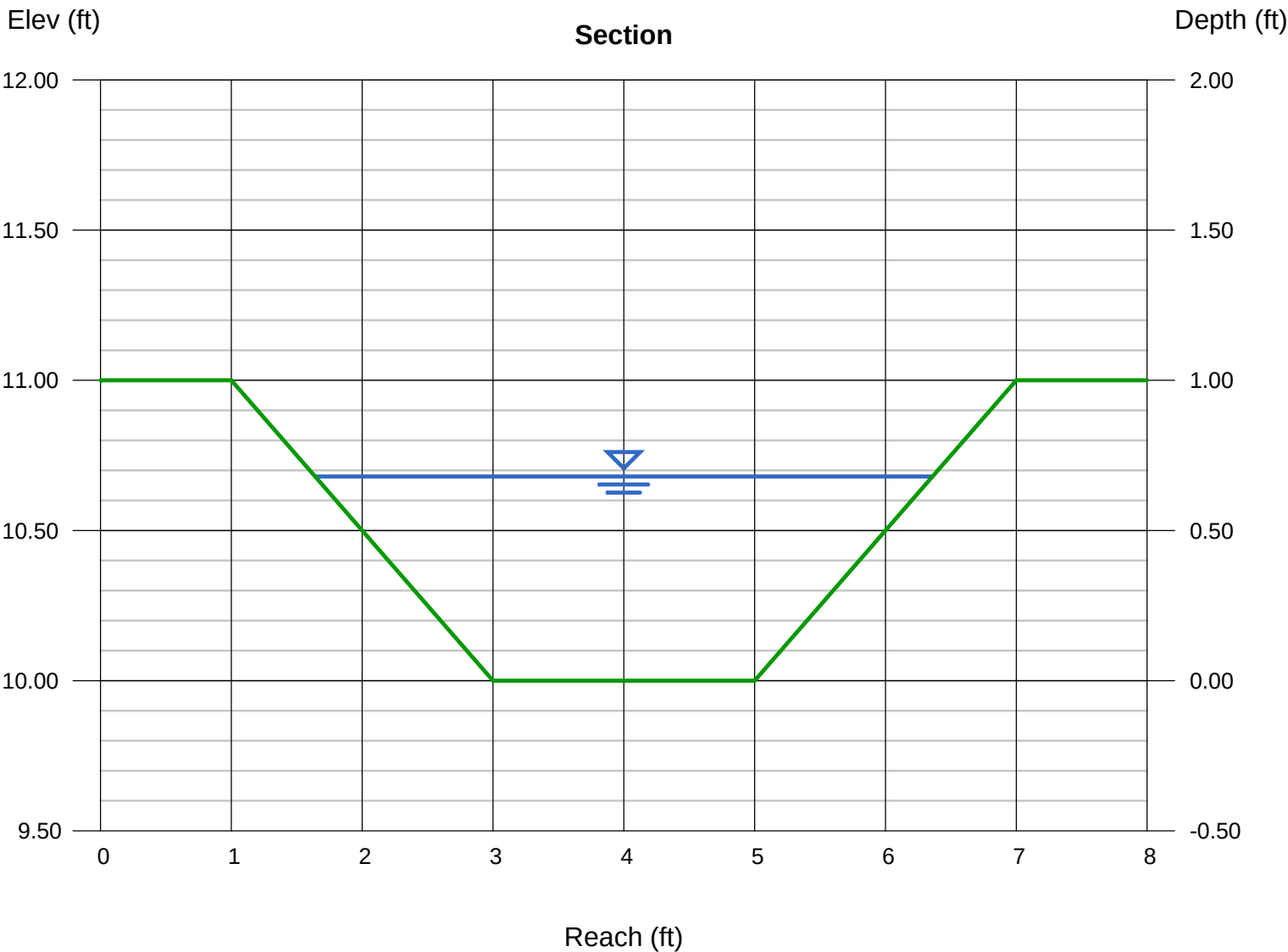
EGL (ft) = 1.99



Channel Report

Outlet 2-riprap

Trapezoidal		Highlighted	
Bottom Width (ft)	= 2.00	Depth (ft)	= 0.68
Side Slopes (z:1)	= 2.00, 2.00	Q (cfs)	= 5.300
Total Depth (ft)	= 1.00	Area (sqft)	= 2.28
Invert Elev (ft)	= 10.00	Velocity (ft/s)	= 2.32
Slope (%)	= 1.00	Wetted Perim (ft)	= 5.04
N-Value	= 0.037	Crit Depth, Yc (ft)	= 0.51
Calculations		Top Width (ft)	= 4.72
Compute by:		EGL (ft)	= 0.76
Known Q (cfs)			
		Known Q	
		= 5.30	



Channel Report

Outlet 3-riprap

Trapezoidal

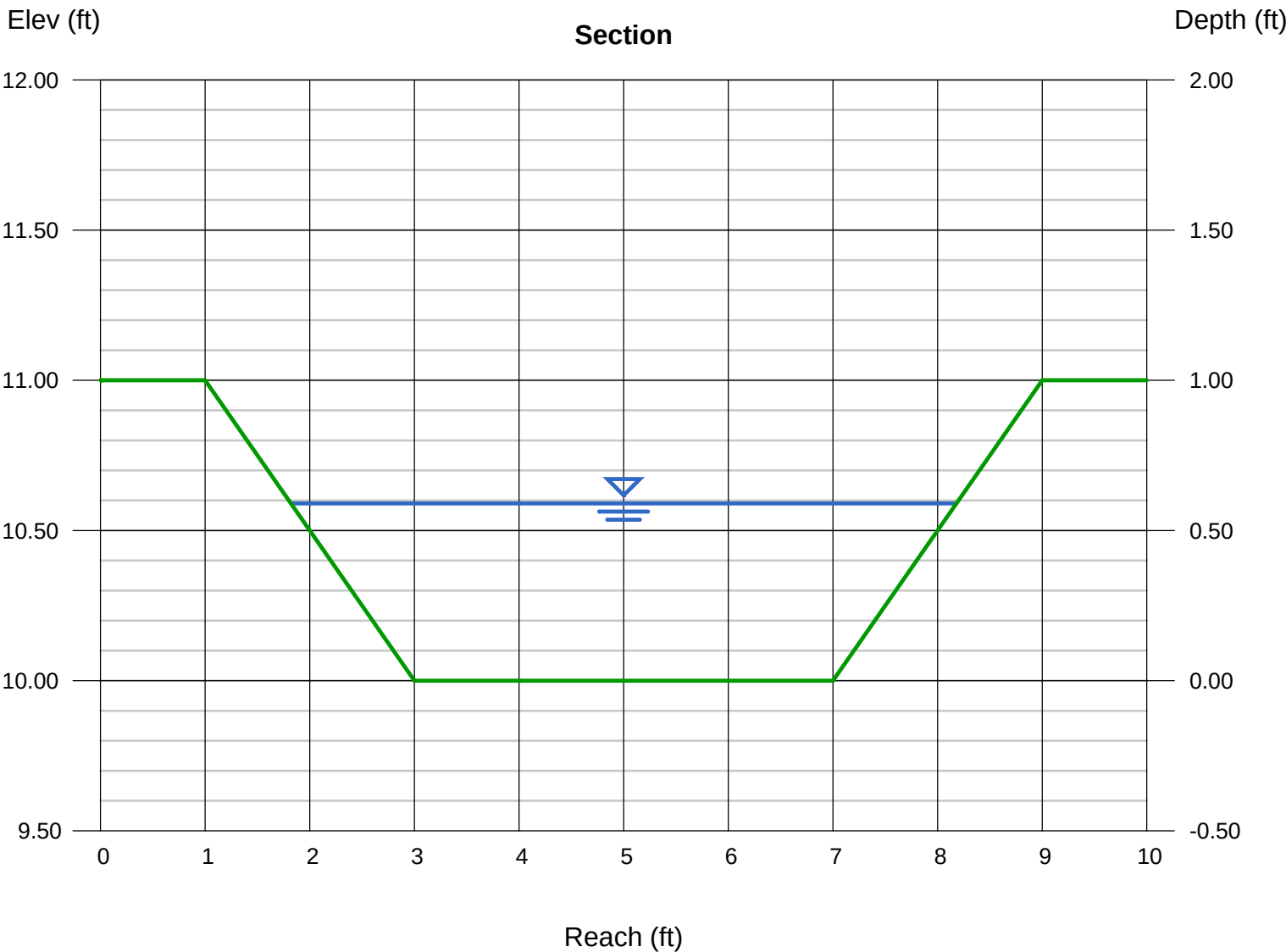
Bottom Width (ft)	= 4.00
Side Slopes (z:1)	= 2.00, 2.00
Total Depth (ft)	= 1.00
Invert Elev (ft)	= 10.00
Slope (%)	= 1.00
N-Value	= 0.037

Highlighted

Depth (ft)	= 0.59
Q (cfs)	= 7.200
Area (sqft)	= 3.06
Velocity (ft/s)	= 2.36
Wetted Perim (ft)	= 6.64
Crit Depth, Yc (ft)	= 0.44
Top Width (ft)	= 6.36
EGL (ft)	= 0.68

Calculations

Compute by:	Known Q
Known Q (cfs)	= 7.20





100-YR FLOODPLAIN ANALYSIS



WATERSHED BASED ON STREAMSTATS

StreamStats Version 3.0

Flow Statistics Ungaged Site Report

Date: Wed June 1, 2016 4:16:39 PM GMT-7

Study Area: California

NAD 1983 Latitude: 33.0964 (33 05 47)

NAD 1983 Longitude: -117.0254 (-117 01 32)

Drainage Area: 0.4 mi²

Peak-Flow Basin Characteristics			
100% 2012 5113 Region 5 South Coast (0.4 mi ²)			
Parameter	Value	Regression Equation Valid Range	
		Min	Max
Drainage Area (square miles)	0.4	0.04	850
Mean Annual Precipitation (inches)	14.8	10	45

Peak-Flow Statistics						
Statistic	Value	Unit	Prediction Error (percent)	Equivalent years of record	90-Percent Prediction Interval	
					Min	Max
PK2	14.8	ft ³ /s	130		2.55	85.8
PK5	39.6	ft ³ /s	83		11.3	139
PK10	57.2	ft ³ /s	64		20.6	159
PK25	77	ft ³ /s	52		32.8	181
PK50	91.4	ft ³ /s	48		41.4	202
PK100	105	ft ³ /s	47		47.5	233
PK200	120	ft ³ /s	48		53.5	269
PK500	135	ft ³ /s	52		57	319

#<http://pubs.usgs.gov/sir/2012/5113/#>

Gotvald, A.J., Barth, N.A., Veilleux, A.G., and Parrett, Charles, 2012, Methods for determining magnitude and frequency of floods in California, based on data through water year 2006: U.S. Geological Survey Scientific Investigations Report 2012-5113, 38 p., 1 pl.

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U.S. Department of the Interior | U.S. Geological Survey

URL: http://streamstatsags.cr.usgs.gov/v3_beta/FTreport.htm

Page Contact Information: [StreamStats Help](#)

Page Last Modified: 11/24/2015 11:32:58 (Web1)

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Prop_Condn_100yr.rep

HEC-RAS Version 4.1.0 Jan 2010
U.S. Army Corps of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

```

X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X      X      X      X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X          X      X      X      X      X
X      X  X          X      X      X      X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXX

```

PROJECT DATA

Project Title: Prop_Condn_100yr
Project File : Prop_Condn_100yr.prj
Run Date and Time: 11/9/2016 3:24:01 PM

Project in English units

Project Description:
Proposed Condition Analysis

PLAN DATA

Plan Title: Plan 01
Plan File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.p01

Geometry Title: 100_Peak
Geometry File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.g01

Flow Title : Peak Data
Flow File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.f01

Plan Summary Information:

Number of:	Cross Sections	=	23	Multiple Openings	=	0
	Culverts	=	0	Inline Structures	=	0
	Bridges	=	0	Lateral Structures	=	0

Computational Information

Water surface calculation tolerance	=	0.01
Critical depth calculation tolerance	=	0.01
Maximum number of iterations	=	20
Maximum difference tolerance	=	0.3
Flow tolerance factor	=	0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Prop_Condn_100yr.rep

FLOW DATA

Flow Title: Peak Data
Flow File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.f01

Flow Data (cfs)

```
*****
* River      Reach      RS      *      Q-100yr      1.5 X Q-100yr *
* Cl_Creek_Prop Cl_Creek_Prop 1100.00 *      90.4      135.6 *
* Cl_Creek_Prop Cl_Creek_Prop 400      *      41.9      62.85 *
*****
```

Boundary Conditions

```
*****
* River      Reach      Profile      *      Upstream
* Downstream *
*****
* Cl_Creek_Prop Cl_Creek_Prop Q-100yr      *
Normal S = 0.036 *
* Cl_Creek_Prop Cl_Creek_Prop 1.5 X Q-100yr *
Normal S = 0.036 *
*****
*****
```

GEOMETRY DATA

Geometry Title: 100_Peak
Geometry File : C:\Users\mgc\Documents\HEC Data\HEC-RAS\SVBF
Temple\Prop_condition\Prop_Condn_100yr.g01

CROSS SECTION

RIVER: Cl_Creek_Prop
REACH: Cl_Creek_Prop RS: 1100.00

INPUT

Description:

Station Elevation Data		num=	113	Station Elevation Data		num=	113
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	478.92	759995	4788.52	0004	476.07	78709991	476
14.45	474	18.48999	472.64	20.45999	472	24.39	470.82
29.55	469.26	29.59999	469.25	33.97	468	34.02	467.98
34.16	467.95	40.14999	466.44	41.19	466.45	41.92	466.33
42.31	466.31	42.55	466.33	42.94	466.39	43.62	466.48
48.44	466.69	49.39	466.78	52.3	467	55.34999	467.24
59.86	467.86	60.64999	467.9	60.97	467.94	61.31	468
66.7	469.35	69.14	470	82.34999	471.26	85.48	471.41
90.19	471.63	90.56	471.65	90.89	471.67	91.19	471.68
94.05	471.71	95.59999	471.67	95.97	471.69	96.50999	471.72
98.41	471.66	98.58	471.67	99.02	471.67	99.31	471.68
128.8	471.05	129.67	471.04	130.01	471.04	130.61	471.02
134.31	470.98	134.67	470.98	152.24	471.14	156.91	471.29

Prop_Condn_100yr.rep

168.5	471.67	169.08	471.7	169.36	471.72	169.46	471.72	169.63	471.73
170.22	471.74	170.59	471.75	171.66	471.78	175.05	471.81	175.33	471.82
175.36	471.82	175.39	471.82	176.55	472.41	177.36	472.82	177.46	472.87
177.6	472.94	177.68	472.94	179.22	472.94	179.42	472.74	179.74	472.45
180.62	472.54	181.27	472.61	191.39	472.93	204.51	473.5	204.6	473.6
205.05	474.02	206.35	474.08	206.54	474.09	207.29	474.28	213.1	475.77
216.19	474.48	219.24	473.18	222.07	472.98	223.05	472.94	223.45	472.91
224.84	472.85	226.21	472.76	230.57	472.51	235.68	472.08	236.15	472.05
236.64	472	240.1	471.55	241.38	471.39	243.91	471	245.78	470.8
252.33	470	253.44	469.23	254.7	468.49				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	29.55	.02	59.86	.02

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
29.55	59.86	51.79	50	43.58	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 468.05 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.39 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 467.66 * Reach Len. (ft)   * 51.79 * 50.00 *
43.58 *
* Crit W.S. (ft)      * 467.66 * Flow Area (sq ft) *          * 17.98 *
*
* E.G. Slope (ft/ft)  * 0.006628 * Area (sq ft)      *          * 17.98 *
*
* Q Total (cfs)       * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)      * 23.51 * Top Width (ft)    *          * 23.51 *
*
* Vel Total (ft/s)    * 5.03 * Avg. Vel. (ft/s)  *          * 5.03 *
*
* Max Chl Dpth (ft)   * 1.35 * Hydr. Depth (ft)  *          * 0.76 *
*
* Conv. Total (cfs)   * 1110.4 * Conv. (cfs)       *          * 1110.4 *
*
* Length Wtd. (ft)    * 50.01 * Wetted Per. (ft)  *          * 23.74 *
*
* Min Ch El (ft)      * 466.31 * Shear (lb/sq ft)  *          * 0.31 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 254.70 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.31 * Cum Volume (acre-ft) * 0.01 * 0.35 *
0.06 *
* C & E Loss (ft)     * 0.04 * Cum SA (acres)     * 0.05 * 0.48 *
0.06 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

Prop_Condn_100yr.rep
 water surface came back below critical depth. This indicates that there is
 not a valid subcritical answer. The program
 defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 468.40 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.48 * Wt. n-Val.        *          * 0.020 *
0.020 *
* W.S. Elev (ft)      * 467.92 * Reach Len. (ft)   * 51.79 * 50.00 *
43.58 *
* Crit W.S. (ft)      * 467.92 * Flow Area (sq ft) *          * 24.34 *
0.05 *
* E.G. Slope (ft/ft)  * 0.006086 * Area (sq ft)      *          * 24.34 *
0.05 *
* Q Total (cfs)       * 135.60 * Flow (cfs)        *          * 135.55 *
0.05 *
* Top Width (ft)      * 26.48 * Top Width (ft)    *          * 25.56 *
0.92 *
* Vel Total (ft/s)    * 5.56 * Avg. Vel. (ft/s)  *          * 5.57 *
0.86 *
* Max Chl Dpth (ft)   * 1.61 * Hydr. Depth (ft)  *          * 0.95 *
0.06 *
* Conv. Total (cfs)   * 1738.1 * Conv. (cfs)       *          * 1737.5 *
0.6 *
* Length Wtd. (ft)    * 49.97 * Wetted Per. (ft)  *          * 25.83 *
0.92 *
* Min Ch El (ft)      * 466.31 * Shear (lb/sq ft)  *          * 0.36 *
0.02 *
* Alpha              * 1.00 * Stream Power (lb/ft s) * 254.70 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.28 * Cum Volume (acre-ft) * 0.02 * 0.48 *
0.07 *
* C & E Loss (ft)     * 0.05 * Cum SA (acres)     * 0.06 * 0.52 *
0.07 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 1050

INPUT

Description:

Station Elevation Data num= 122
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

Prop_Condn_100yr.rep

0	4811.359985	480.312.119995	4805.320007	478.79	6.98999	478
8.859985	477.0210.60999	47611.57999	475.49	14.94	47417.14999	473.03
19.60999	47221.72998	471.0524.32999	47027.64999	468.6530.16998		468
35.68999	466.9239.31999	466.21	40.34	46642.31999	465.58	49.34
52.47	463.755.32999	463.5860.29999	463.25	60.67	463.2263.28999	463.09
65.03999	463.04	70.72	463.01	72.23	462.97	73.62
77.75	462.94	78.34	462.96	82.2	463.1483.39999	463.1684.64999
90.73999	463.5	93.14	463.6293.82999	463.65	94.45	463.68
102.12	464.05	102.59	464.08	105.56	464.28	106.97
108.13	464.46	111.4	464.77	115.34	465.12	120.16
130.4	467.07	135.79	468	137.08	468.16	137.65
139.51	468.22	140.69	468.21	143.03	468.15	144.27
147.75	467.9	148.49	467.86	148.71	467.87	154.83
159.72	468.12	170.67	468.01	170.73	468.01	170.76
170.78	468.01	170.91	468.01	174.51	468.01	181.49
189.35	468.12	190.09	468.13	191.23	467.57	194.2
195.74	466.12	196.21	465.67	196.26	465.63	196.38
201.48	465.89	220.41	466.39	220.43	466.41	220.9
222.4	466.94	225.01	467.77	225.25	467.86	225.94
229.62	466.91	230.87	466.72	232.81	466.54	234.65
238.92	465.31	240.08	465	242.07	463.49	242.95
246.79	462	246.8	462	252.08	462	253.68
264.15	462	264.84	462	267.39	462	267.45
272.75	462.94	273.01	463	278.87	464.04	283.9
289.01	465.11	289.9	465.22			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0260.29999	.0290.73999	.02		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

60.2999990.73999	50.18	50	49.43	.1	.3
------------------	-------	----	-------	----	----

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
111.4	289.9	464.77	T

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 464.03	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.27	* Wt. n-Val.	* 0.020	* 0.020
0.020				
* W.S. Elev (ft)	* 463.76	* Reach Len. (ft)	* 50.18	* 50.00
49.43				
* Crit W.S. (ft)	* 463.76	* Flow Area (sq ft)	* 2.04	* 19.84
0.67				
* E.G. Slope (ft/ft)	* 0.005879	* Area (sq ft)	* 2.04	* 19.84
50.87				
* Q Total (cfs)	* 90.40	* Flow (cfs)	* 4.50	* 84.95
0.95				
* Top Width (ft)	* 79.69	* Top Width (ft)	* 8.41	* 30.44
40.85				
* Vel Total (ft/s)	* 4.01	* Avg. Vel. (ft/s)	* 2.21	* 4.28
1.43				
* Max Chl Dpth (ft)	* 1.76	* Hydr. Depth (ft)	* 0.24	* 0.65
0.13				
* Conv. Total (cfs)	* 1179.0	* Conv. (cfs)	* 58.7	* 1107.9
12.4				
* Length Wtd. (ft)	* 50.01	* Wetted Per. (ft)	* 8.42	* 30.46
5.31				
* Min Ch El (ft)	* 462.93	* Shear (lb/sq ft)	* 0.09	* 0.24

Prop_Condn_100yr.rep

```

0.05 *
* Alpha *      1.09 * Stream Power (lb/ft s) * 289.90 * 0.00 *
0.00 *
* Frctn Loss (ft) *      0.30 * Cum Volume (acre-ft) * 0.01 * 0.33 *
0.03 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) * 0.04 * 0.45 *
0.04 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 464.27 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.33 * Wt. n-Val. * 0.020 * 0.020 *
0.020 *
* W.S. Elev (ft) * 463.94 * Reach Len. (ft) * 50.18 * 50.00 *
49.43 *
* Crit W.S. (ft) * 463.94 * Flow Area (sq ft) * 3.77 * 25.49 *
2.01 *
* E.G. Slope (ft/ft) * 0.005209 * Area (sq ft) * 3.77 * 25.49 *
58.93 *
* Q Total (cfs) * 135.60 * Flow (cfs) * 10.32 * 121.37 *
3.91 *
* Top Width (ft) * 86.85 * Top Width (ft) * 10.34 * 30.44 *
46.07 *
* Vel Total (ft/s) * 4.34 * Avg. Vel. (ft/s) * 2.73 * 4.76 *
1.94 *
* Max Chl Dpth (ft) * 1.94 * Hydr. Depth (ft) * 0.36 * 0.84 *
0.22 *
* Conv. Total (cfs) * 1878.8 * Conv. (cfs) * 143.0 * 1681.6 *
54.2 *
* Length Wtd. (ft) * 50.01 * Wetted Per. (ft) * 10.37 * 30.46 *
9.24 *
* Min Ch El (ft) * 462.93 * Shear (lb/sq ft) * 0.12 * 0.27 *
0.07 *
* Alpha * 1.12 * Stream Power (lb/ft s) * 289.90 * 0.00 *
0.00 *
* Frctn Loss (ft) * 0.26 * Cum Volume (acre-ft) * 0.02 * 0.45 *
0.04 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.05 * 0.49 *
0.05 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Prop_Condn_100yr.rep

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop

REACH: CL_Creek_Prop

RS: 1000

INPUT

Description:

Station Elevation Data num= 114

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4783.620026	476.3	4.26001	4764.670013	475.88.400024	474			
10.18002	473.1312.56003	47214.27002	471.1316.70001	47019.15002	468.86				
20.90002	468	22.66	467.1425.09003	46629.90002	464.230.52002	464			
32.54001	463.3536.60001	46239.10001	461.2	39.66	461.1340.34003	461.1			
42.74002	460.5645.22002	460.5748.07001	460.6250.82001	460.3350.96002	460.32				
52.12001	460.3754.01001	460.355.63002	460.4156.46002	460.4557.72002	460.44				
59.24002	460.4261.95001	460.3663.49002	460.366.22002	460.1769.68001	460				
71.38002	459.9376.10002	459.7780.69002	459.7182.40001	459.7485.97002	459.83				
89.98001	46093.23001	460.1998.28001	460.5599.71002	460.66	108.83	461.3			
111.43	461.5	118.44	462	129.52	462.96	140.33	464	145.29	464.39
146.5	464.45	146.59	464.46	152.17	464.88	154.69	465.09	155.89	465.21
156.44	465.29	156.83	465.41	156.99	465.42	157.2	465.42	157.54	465.42
158.19	465.41	158.43	465.4	158.9	465.35	161.17	465.17	161.72	465.14
162.46	465.13	163.68	465.14	164	465.14	165.53	465.17	167.72	465.13
169.32	465.12	175.98	465.1	181.5	465.23	194.8	465.42	195.51	465.42
196.94	465.43	199.56	464.2	200.69	463.66	201.03	463.65	202.23	463.63
202.51	463.38	202.76	463.14	203.59	463.2	204.33	463.27	216.99	463.49
227.78	463.68	228.08	463.95	228.3	464.18	229.19	464.2	229.86	464.21
233.58	464.02	233.9	464	234.61	463.87	239.49	463	241.59	462.31
242.54	462	244.88	462	249.4	462	253.95	462	257.6	462
261.77	462.95	261.9	462.98	261.99	463	266	464.19	270.76	465.64
271.21	465.35	271.5	465.15	275.22	465.21	277.38	465.25	285.07	465.37
292.96	465.51	294.92	465.54	298.28	465.59	299.64	465.62		

Manning's n Values

num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0266.22002	.0298.28001	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
66.2200298.28001			48.69	50	48.85	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 460.84	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.25	* Wt. n-Val.	* 0.020	* 0.020	*
0.020 *					
* W.S. Elev (ft)	* 460.58	* Reach Len. (ft)	* 48.69	* 50.00	*
48.85 *					
* Crit W.S. (ft)	* 460.58	* Flow Area (sq ft)	* 3.88	* 19.72	*
0.01 *					

Prop_Condn_100yr.rep					
* E.G. Slope (ft/ft)	* 0.006057	* Area (sq ft)	*	3.88	* 19.72 *
0.01 *					
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	7.96	* 82.44 *
0.00 *					
* Top Width (ft)	* 53.51	* Top Width (ft)	*	21.04	* 32.06 *
0.41 *					
* Vel Total (ft/s)	* 3.83	* Avg. Vel. (ft/s)	*	2.05	* 4.18 *
0.37 *					
* Max Chl Dpth (ft)	* 0.87	* Hydr. Depth (ft)	*	0.18	* 0.62 *
0.02 *					
* Conv. Total (cfs)	* 1161.5	* Conv. (cfs)	*	102.3	* 1059.2 *
0.0 *					
* Length Wtd. (ft)	* 49.83	* Wetted Per. (ft)	*	21.07	* 32.09 *
0.42 *					
* Min Ch El (ft)	* 459.71	* Shear (lb/sq ft)	*	0.07	* 0.23 *
0.01 *					
* Alpha	* 1.11	* Stream Power (lb/ft s)	*	299.64	* 0.00 *
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	*	0.01	* 0.31 *
0.00 *					
* C & E Loss (ft)	* 0.00	* Cum SA (acres)	*	0.03	* 0.41 *
0.01 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 461.04	* Element	*	Left OB	* Channel *
Right OB *					
* Vel Head (ft)	* 0.29	* Wt. n-Val.	*	0.020	* 0.020 *
0.020 *					
* W.S. Elev (ft)	* 460.76	* Reach Len. (ft)	*	48.69	* 50.00 *
48.85 *					
* Crit W.S. (ft)	* 460.76	* Flow Area (sq ft)	*	8.03	* 25.34 *
0.28 *					
* E.G. Slope (ft/ft)	* 0.005107	* Area (sq ft)	*	8.03	* 25.34 *
0.28 *					
* Q Total (cfs)	* 135.60	* Flow (cfs)	*	20.32	* 114.96 *
0.33 *					
* Top Width (ft)	* 59.23	* Top Width (ft)	*	24.36	* 32.06 *
2.81 *					
* Vel Total (ft/s)	* 4.03	* Avg. Vel. (ft/s)	*	2.53	* 4.54 *
1.15 *					
* Max Chl Dpth (ft)	* 1.05	* Hydr. Depth (ft)	*	0.33	* 0.79 *
0.10 *					
* Conv. Total (cfs)	* 1897.4	* Conv. (cfs)	*	284.3	* 1608.6 *
4.6 *					
* Length Wtd. (ft)	* 49.78	* Wetted Per. (ft)	*	24.41	* 32.09 *
2.82 *					

```

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* Min Ch El (ft)      * 459.71 * Shear (lb/sq ft)      * 0.10 * 0.25 *
  0.03 *
* Alpha              * 1.13 * Stream Power (lb/ft s) * 299.64 * 0.00 *
  0.00 *
* Frctn Loss (ft)    * 0.29 * Cum Volume (acre-ft)   * 0.01 * 0.42 *
  0.01 *
* C & E Loss (ft)    * 0.00 * Cum SA (acres)         * 0.03 * 0.46 *
  0.02 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 950

INPUT

Description:

Station Elevation Data			num= 137								
Sta	Elev		Sta	Elev		Sta	Elev		Sta	Elev	
0	475.831	0.19989	475.411	850006		474.934	790009		4745.869995	473.52	
9.119995	472	10.72	471.3	13.53		470	16.91		468.38	17.75	468
19.97998	466.9822	0.07001	46624.82001			464.726	25998		46432.79001	462.01	
32.82999	462	32.84	46239.13998			46046.69998			458.56	50.22	458
52.25998	457.8955	1.9998	457.7958	23999		457.7358	29999		457.7361	54999	457.69
68.39999	457.6371	0.3999	457.62	72.75		457.63	73.72		457.65	74.87	457.7
74.97	457.69	75.37	457.6675	64999		457.6477	39999		457.7	86.81	458
91.98999	458.41	100.57	459.08	108.61		460	110.02		460.48	111.97	460.87
118.11	462	121.38	462.38	121.79		462.41	123.25		462.52	124.3	462.57
126.04	462.66	126.66	462.71	127.44		462.8	128.51		462.98	130.17	463.29
131	463.42	133.5	464	137.05		464	138.48		464	138.64	464
139.25	464	140.08	464	140.56		464	140.74		464	142.85	464
144.54	464	147.11	463.81	150.93		463.69	156.12		463.52	158.04	463.49
159.38	463.46	164.78	463.38	165.15		463.39	166.21		463.38	168.24	463.35
169.09	463.34	172.32	463.22	179.09		463.01	179.96		462.99	180.84	462.98
182.19	462.99	183.96	463.02	190.55		463.16	191.12		463.16	191.28	463.16
196.84	463.26	197.85	463.28	201.28		463.34	201.39		463.34	201.84	463.15
202.76	463.14	203.56	463.13	203.65		463.04	204.11		462.63	205.61	462.75
205.85	462.77	223.93	463.1	231.24		463.23	232.31		463.44	233.73	463.63
233.92	463.82	234.23	464.13	234.64		464.13	234.81		464.13	235.64	464.14
235.91	464.14	236.77	464.15	237.54		464.15	238.27		464.16	238.98	464.17
239.69	464.18	240.42	464.19	241.19		464.21	242.02		464.23	242.95	464.26
244.01	464.3	245.03	464.34	245.27		464.35	246.85		464.41	248.23	464.46
248.44	464.47	261.66	465.14	271.73		465.28	272.76		465.31	273.1	465.31
273.69	464.84	273.7	464.83	273.98		464.83	274.5		464.85	274.58	464.85
277.97	464.93	279.63	464.98	291.13		465.26	299.26		465.51	304.3	465.64
306.81	465.72	309.28	465.8	310.75		465.84	314.56		465.81	315.41	465.75
318.22	465.79	323.9	465.88								

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Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0258.29999	.0291.98999	.02		

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

58.2999991.98999 49.87 50 49.98 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 458.59	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (ft)	* 0.26	* Wt. n-Val.	* 0.020	* 0.020	*
* W.S. Elev (ft)	* 458.33	* Reach Len. (ft)	* 49.87	* 50.00	*
49.98					
* Crit W.S. (ft)	* 458.33	* Flow Area (sq ft)	* 4.30	* 17.84	*
*					
* E.G. Slope (ft/ft)	* 0.007193	* Area (sq ft)	* 4.30	* 17.84	*
*					
* Q Total (cfs)	* 90.40	* Flow (cfs)	* 15.26	* 75.14	*
*					
* Top Width (ft)	* 42.76	* Top Width (ft)	* 10.13	* 32.63	*
*					
* Vel Total (ft/s)	* 4.08	* Avg. Vel. (ft/s)	* 3.55	* 4.21	*
*					
* Max Chl Dpth (ft)	* 0.71	* Hydr. Depth (ft)	* 0.42	* 0.55	*
*					
* Conv. Total (cfs)	* 1065.9	* Conv. (cfs)	* 179.9	* 886.0	*
*					
* Length Wtd. (ft)	* 49.99	* Wetted Per. (ft)	* 10.16	* 32.65	*
*					
* Min Ch El (ft)	* 457.62	* Shear (lb/sq ft)	* 0.19	* 0.25	*
*					
* Alpha	* 1.01	* Stream Power (lb/ft s)	* 323.90	* 0.00	*
0.00					
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	* 0.00	* 0.29	*
0.00					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	* 0.01	* 0.37	*
0.01					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 458.82	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (ft)	* 0.33	* Wt. n-Val.	* 0.020	* 0.020	*
0.020					
* W.S. Elev (ft)	* 458.49	* Reach Len. (ft)	* 49.87	* 50.00	*
49.98					
* Crit W.S. (ft)	* 458.49	* Flow Area (sq ft)	* 6.06	* 23.36	*

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0.04 *					
* E.G. Slope (ft/ft)	*0.006692	* Area (sq ft)	*	6.06	* 23.36 *
0.04 *					
* Q Total (cfs)	* 135.60	* Flow (cfs)	*	24.41	* 111.16 *
0.03 *					
* Top Width (ft)	* 45.90	* Top Width (ft)	*	11.17	* 33.69 *
1.04 *					
* Vel Total (ft/s)	* 4.60	* Avg. Vel. (ft/s)	*	4.03	* 4.76 *
0.72 *					
* Max Chl Dpth (ft)	* 0.87	* Hydr. Depth (ft)	*	0.54	* 0.69 *
0.04 *					
* Conv. Total (cfs)	* 1657.6	* Conv. (cfs)	*	298.4	* 1358.8 *
0.4 *					
* Length Wtd. (ft)	* 49.99	* Wetted Per. (ft)	*	11.21	* 33.72 *
1.04 *					
* Min Ch El (ft)	* 457.62	* Shear (lb/sq ft)	*	0.23	* 0.29 *
0.02 *					
* Alpha	* 1.01	* Stream Power (lb/ft s)	*	323.90	* 0.00 *
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	*	0.00	* 0.39 *
0.01 *					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	0.01	* 0.42 *
0.02 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 900

INPUT

Description:

Station Elevation Data		num=	130				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	473.051	0.19989	473.013	1.60004	472.923	1.880005	472.944
7.429993	472	10.54999	470.621	12.01001	470	15.51001	468.441
17.60001	467.59	21.66	466	23.76999	465.162	26.76001	464
32.20001	462	35.60999	461.093	38.26001	460.36	39.5	460
46.35999	458	51.35001	457.525	1.73001	457.48	56.87	457
58.76999	456.865	59.51999	456.860	1.7999	456.736	1.50999	456.62
63.25	456.51	64.05	456.48	64.87	456.47	65.77	456.46
68.34	456.44	68.5	456.44	68.84	456.446	9.14999	456.456
69.53999	456.47	69.75	456.45	70.23	456.47	73.84	456.587
75.97	456.65	76.2	456.687	6.39999	456.767	6.42999	456.91
77.24001	457.06	80.36	457.368	3.45999	457.58	85.28	457.7
95.5	459.029	6.31999	459.12	97.06	459.23	98.34	459.4
99.33	459.49	100.2	459.51	100.46	459.52	104.33	459.93
104.8	460	106.45	460.38	109.63	461.23	112.37	462
117.94	464	119.35	464.13	140.75	466	146.1	466.17
147.68	466.21	150.58	466.25	150.79	466.25	150.99	466.25
151.52	466.24	151.92	466.24	159.03	466.09	163.39	466
							168.42
							465.71

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170.82	465.5	173.62	465.29	187.28	464	189.37	463.66	190.5	463.48
191.49	463.32	197.05	462.46	197.41	462.61	197.41	462.62	197.7	462.61
199.21	462.6	199.35	462.48	199.81	462.1	200.2	462.13	201.61	462.23
204.76	462.29	207.74	462.35	217.86	462.53	228.96	462.73	230.09	462.82
230.76	462.86	231.66	462.9	232.73	462.95	233.83	462.99	241.61	463.41
244.15	463.5	246.62	463.57	248.88	463.64	252.59	463.84	255.29	463.93
255.89	463.94	258.49	464.03	260.85	464.11	261.65	464.13	263.82	464.21
264.7	464.23	289.47	464.83	295.84	464.98	296.08	465.21	296.34	465.48
296.8	465.48	297.93	465.48	299.01	465.48	300.37	465.48	317.03	466.14

Manning's n Values		num= 3	
Sta	n Val	Sta	n Val
0	.0251	35001	.02
		85.28	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	51.35001	85.28		51.65	50	49.46	.1
							.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 457.80	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.33	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 457.47	* Reach Len. (ft)	* 51.65	* 50.00	*
49.46 *					
* Crit W.S. (ft)	* 457.47	* Flow Area (sq ft)	*	* 19.62	*
* E.G. Slope (ft/ft)	* 0.006838	* Area (sq ft)	*	* 19.62	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 29.99	* Top Width (ft)	*	* 29.99	*
* Vel Total (ft/s)	* 4.61	* Avg. Vel. (ft/s)	*	* 4.61	*
* Max Chl Dpth (ft)	* 1.03	* Hydr. Depth (ft)	*	* 0.65	*
* Conv. Total (cfs)	* 1093.2	* Conv. (cfs)	*	* 1093.2	*
* Length Wtd. (ft)	* 49.97	* Wetted Per. (ft)	*	* 30.22	*
* Min Ch El (ft)	* 456.44	* Shear (lb/sq ft)	*	* 0.28	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 317.03	* 0.00	*
0.00 *					
* Frctn Loss (ft)	* 0.33	* Cum Volume (acre-ft)	* 0.00	* 0.26	*
0.00 *					
* C & E Loss (ft)	* 0.02	* Cum SA (acres)	* 0.00	* 0.34	*
0.01 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

CROSS SECTION OUTPUT Profile #1.5 X 0-100yr

```
Warning: The energy equation could not be balanced within the specified number of
iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and
previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set
equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.
```

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22.21002	470.2324.51001	470.1126.43002	470	26.47	47030.02002	469.8
32.71002	469.76 33.28	469.77 33.81	469.8	34.06	469.79 39.34	468
43.49002	466.0143.51001	46643.54001	465.98	43.56	465.97 43.72	465.93
46.04001	465.2249.04001	464.3549.68002	464.1850.20001		46455.74002	462.04
55.84	46261.27002	460.22 61.97	46064.11002		459.368.20001	458
70.03	457.3974.35001	45676.17001	455.8476.58002		455.8478.17001	455.74
82.81	455.4486.64001	455.18 87.97	455.1189.29001		455.0590.52002	455.02
91.60001	45593.02002	454.9995.95001	454.97 96.22		454.97 96.78	454.97
97.13	454.9697.29001	454.96 100.72	455.14 103.62		455.28 106.75	455.41
107.96	455.43 109	455.45 110.01	455.46 110.95		455.43 111.33	455.33
112.15	455.37 117.35	455.63 124.2	456 132.55		457.24 137.59	458
142.3	459.3 143.74	459.68 145.41	460 146.58		460.33 147.93	460.56
156.72	462 171.79	463.26 172.72	463.33 173.45		463.37 176.31	463.63
178.73	463.76 180.99	464 181.21	464 186.06		464.1 190.3	464.18
195.4	464.26 196.78	464.28 198.18	464.28 199.97		464.28 201.9	464.27
203.56	464.25 204.63	464.23 205.18	464.2 205.58		464.16 207.3	464.06
209.09	464 210.24	463.92 216.3	463.56 216.35		463.54 216.36	463.53
216.38	463.52 216.44	463.48 217.07	463.2 219.5		462.1 220.07	462.09
221.15	462.07 221.37	461.87 221.69	461.58 222.43		461.64 223.34	461.71
229.66	461.82 236.5	461.94 242.51	462.05 248.15		462.15 248.47	463.47
248.71	464.52 253.87	464.08 254.44	464 258.02		464 271.57	464
278.55	464 282.14	464 283.03	464.01 283.06		464.01 283.09	464.01
283.12	464.01 283.14	464.01 283.17	464.01 283.2		464.01 283.24	464.01
283.27	464.01 283.31	464.01 284.58	464.02 285.01		464.03 296.17	464.18
299.32	464.25 304.28	464.36 309	464.45 314.5		464.58 318.88	464.67
323.08	464.76 340.86	465.16 341.9	465.19 343.56		465.21 343.69	465.21
344.5	465.25 344.59	465.17 345.16	464.75 357.57		465 363.86	465.13
367.01	465.2					

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0278	109	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	78.17001	109		48.06 50	50.3		.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 456.11	* Element	* Left OB	* Channel	* *				
Right OB									
* Vel Head (ft)	* 0.27	* Wt. n-Val.	* 0.020	* 0.020	* *				
0.020									
* W.S. Elev (ft)	* 455.84	* Reach Len. (ft)	* 48.06	* 50.00	* *				
50.30									
* Crit W.S. (ft)	* 455.84	* Flow Area (sq ft)	* 0.08	* 18.98	* *				
3.54									
* E.G. Slope (ft/ft)	* 0.006340	* Area (sq ft)	* 0.08	* 18.98	* *				
3.54									
* Q Total (cfs)	* 90.40	* Flow (cfs)	* 0.06	* 81.20	* *				
9.14									
* Top Width (ft)	* 45.14	* Top Width (ft)	* 2.03	* 30.83	* *				
12.28									
* Vel Total (ft/s)	* 4.00	* Avg. Vel. (ft/s)	* 0.71	* 4.28	* *				
2.58									
* Max Chl Dpth (ft)	* 0.88	* Hydr. Depth (ft)	* 0.04	* 0.62	* *				
0.29									
* Conv. Total (cfs)	* 1135.3	* Conv. (cfs)	* 0.8	* 1019.8	* *				
114.8									
* Length Wtd. (ft)	* 50.01	* Wetted Per. (ft)	* 2.03	* 30.86	* *				
12.31									
* Min Ch El (ft)	* 454.96	* Shear (lb/sq ft)	* 0.02	* 0.24	* *				

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```

0.11 *
* Alpha *      1.07 * Stream Power (lb/ft s) * 367.01 * 0.00 *
0.00 *
* Frctn Loss (ft) *      0.33 * Cum Volume (acre-ft) * 0.00 * 0.24 *
0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) * 0.00 * 0.30 *
0.01 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 456.34 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.32 * Wt. n-Val. * 0.020 * 0.020 *
0.020 *
* W.S. Elev (ft) * 456.02 * Reach Len. (ft) * 48.06 * 50.00 *
50.30 *
* Crit W.S. (ft) * 456.02 * Flow Area (sq ft) * 0.64 * 24.60 *
6.09 *
* E.G. Slope (ft/ft) * 0.005495 * Area (sq ft) * 0.64 * 24.60 *
6.09 *
* Q Total (cfs) * 135.60 * Flow (cfs) * 1.06 * 116.48 *
18.06 *
* Top Width (ft) * 50.09 * Top Width (ft) * 3.90 * 30.83 *
15.37 *
* Vel Total (ft/s) * 4.33 * Avg. Vel. (ft/s) * 1.65 * 4.73 *
2.97 *
* Max Chl Dpth (ft) * 1.06 * Hydr. Depth (ft) * 0.16 * 0.80 *
0.40 *
* Conv. Total (cfs) * 1829.2 * Conv. (cfs) * 14.3 * 1571.4 *
243.6 *
* Length Wtd. (ft) * 50.01 * Wetted Per. (ft) * 3.91 * 30.86 *
15.40 *
* Min Ch El (ft) * 454.96 * Shear (lb/sq ft) * 0.06 * 0.27 *
0.14 *
* Alpha * 1.09 * Stream Power (lb/ft s) * 367.01 * 0.00 *
0.00 *
* Frctn Loss (ft) * 0.29 * Cum Volume (acre-ft) * 0.00 * 0.33 *
0.00 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) * 0.00 * 0.34 *
0.01 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

Prop_Condn_100yr.rep

need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop

REACH: CL_Creek_Prop RS: 800

INPUT

Description:

Station Elevation Data		num= 102		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	467.32	3.51001	467.3	4.5	467.35	940002	467.287	100006	467.26		
8.170013	467.239	290009	467.1813	29001	467.1514	79001	467.2415	79001	467.12		
24.80002	466	26.53	465.31	29.69	464	30.97	463.2433	55002	462		
37.15002	460.0537	23001	46037.43002		459.9737	49002	459.9737	54001	459.96		
37.63	459.9541	80002	459.3250	48001	458	64.16	456.1265	21002	456		
77.95001	454.8285	62003	454.1187	24002	45490.36002		453.7390	87003	453.66		
91.12003	453.5795	95001	453.49	101.11	453.54	102.56	453.67	105.64	454		
109.74	454.86	112.11	455.36	114.5	456	116.83	456.75	120.21	458		
133.01	458.84	140.51	459.21	152.62	459.92	154.46	459.95	156.93	459.97		
160.28	459.98	169.43	460	169.44	460	169.45	460	172.07	459.96		
174.28	460	177.61	460.43	179.22	460.6	183.02	461.03	183.77	461.12		
184.38	461.22	184.9	461.33	185.68	461.46	187.36	461.5	187.39	461.49		
190.81	461.84	190.87	461.85	193.15	462	194.1	462.03	196.53	462.02		
197.14	462	202.33	461.81	203.53	461.73	206.55	461.62	210.12	461.44		
210.32	461.43	210.48	461.42	210.64	461.41	210.98	461.56	211.26	461.68		
212.12	461.67	212.88	461.66	213.18	461.37	213.42	461.16	214.41	461.24		
215.03	461.29	229.21	461.54	239.47	461.73	239.77	462.56	240.02	463.33		
242.23	463.39	243.22	463.42	249.6	463.57	261.31	463.86	303.14	464		
303.83	464	305.84	464	318.87	464.16	349.5	464.67	353.15	464.61		
354.34	464.67	356.64	464.78	362.93	465.07	373.63	465.57	373.92	465.34		
374.25	465.08	378.42	465.16								

Manning's n Values		num= 3		Sta n Val		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	95001	.02	109.74	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
77.95001		109.74	50.11	50	49.99	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 454.89	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.35	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 454.54	* Reach Len. (ft)	* 50.11	* 50.00	*
49.99 *					
* Crit W.S. (ft)	* 454.54	* Flow Area (sq ft)	*	* 19.02	*
* E.G. Slope (ft/ft)	* 0.006665	* Area (sq ft)	*	* 19.02	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*

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* Top Width (ft)	*	27.28	* Top Width (ft)	*	27.28 *
* Vel Total (ft/s)	*	4.75	* Avg. Vel. (ft/s)	*	4.75 *
* Max Chl Dpth (ft)	*	1.05	* Hydr. Depth (ft)	*	0.70 *
* Conv. Total (cfs)	*	1107.3	* Conv. (cfs)	*	1107.3 *
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	27.42 *
* Min Ch El (ft)	*	453.49	* Shear (lb/sq ft)	*	0.29 *
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	378.42 *
0.00 *					0.00 *
* Frctn Loss (ft)	*	0.32	* Cum Volume (acre-ft)	*	0.22 *
0.00 *					
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.27 *
0.00 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	455.20	* Element	*	Left OB * Channel *
Right OB *					
* Vel Head (ft)	*	0.42	* Wt. n-Val.	*	0.020 *
* W.S. Elev (ft)	*	454.78	* Reach Len. (ft)	*	50.11 * 50.00 *
49.99 *					
* Crit W.S. (ft)	*	454.78	* Flow Area (sq ft)	*	25.96 *
* E.G. Slope (ft/ft)	*	0.006303	* Area (sq ft)	*	25.96 *
* Q Total (cfs)	*	135.60	* Flow (cfs)	*	135.60 *
* Top Width (ft)	*	30.99	* Top Width (ft)	*	30.99 *
* Vel Total (ft/s)	*	5.22	* Avg. Vel. (ft/s)	*	5.22 *
* Max Chl Dpth (ft)	*	1.29	* Hydr. Depth (ft)	*	0.84 *
* Conv. Total (cfs)	*	1708.0	* Conv. (cfs)	*	1708.0 *
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	31.17 *
* Min Ch El (ft)	*	453.49	* Shear (lb/sq ft)	*	0.33 *
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	378.42 *
0.00 *					0.00 *
* Frctn Loss (ft)	*	0.31	* Cum Volume (acre-ft)	*	0.30 *

Prop_Condn_100yr.rep

```

0.00 *
* C & E Loss (ft)          *      0.01 * Cum SA (acres)          *      *      0.31 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 750

INPUT

Description:

Station Elevation Data		num= 141									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	464.234	870026	464.19	5.27002	464.199	880005	464.12	10.11002	464.12		
13.95001	464.04	15.05002		46417.80002	463.81	21.79001	463.48	22.70001	464		
22.71002	46423.51001		464.09	24.40002		46424.98001	463.77	29.70001	462		
33.72	460.75	34.72	460.44	36.15002	460	37.47	459.61	42.94	458		
44.39001	457.82	48.44	457.48	49.25	457.45	2.35001	457.09	57.35001	456.62		
61.03	456.28	63.53	45665.59003		455.61	68.24002	455.27	70.29001	454.87		
76.69	454	77.95001	453.68	83.94	452.19	84.57001	452	86.16	451.55		
87.52002	451.21	88.41	451.04	90.14001	450.81	92.35001	450.22	92.65002	450.16		
93.31003	450	94.44	449.86	95.71002	449.77	95.95001	449.78	96.72	449.83		
97.64001	450	97.66	450	105.99	451.53	108.21	452	109.36	452.19		
118.79	453.79	119.89	454	121.31	454.31	122.05	454.52	122.45	454.64		
127.02	456	131.95	457.36	135.08	458	136.63	458.08	138.62	458.17		
141.48	458.27	143.17	458.32	144.79	458.35	146.3	458.36	149.04	458.36		
150.1	458.37	151.14	458.39	156.74	458.55	158.24	458.58	162.44	458.66		
163.04	458.67	164.13	458.68	165.26	458.69	165.57	458.7	165.92	458.69		
166.63	458.68	170.46	458.59	171.41	458.56	177.56	458.34	179.13	458.29		
180.75	458.25	182.09	458.23	191.3	458.6	192.05	458.76	192.75	459.04		
192.79	459.12	193.65	459.39	193.85	459.38	195.88	460	196.32	460		
196.96	460.07	198.22	460.16	198.87	460.24	199.89	460.29	202.03	460.35		
203.45	460.42	207.38	460.65	210.11	460.86	210.63	460.89	211.35	460.92		
212.28	460.94	213.22	460.96	214.39	460.99	214.72	460.99	215.19	460.98		
218.34	460.9	218.92	460.88	219.66	460.86	220.36	460.85	220.61	460.84		
221.02	461.04	221.41	461.23	221.65	461.22	222.97	461.2	223.09	461.08		
223.48	460.7	223.87	460.73	225.04	460.83	230.05	460.91	248.35	461.23		
248.66	461.66	248.86	461.94	249.68	461.96	251.08	462	254.66	462.11		
265.38	462.42	279.91	463	292.55	463.66	301.93	463.9	305.96	464		
309.63	464.09	312.42	464.18	323.15	464.44	324.02	464.47	324.25	464.47		
324.61	464.48	325.71	464.5	337.3	464.5	340.59	464.5	348.72	464.5		
378.42	464.5										

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	95001	.02	109.36	.02

Prop_Condn_100yr.rep

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 77.95001 109.36 50.12 50 50.04 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

```
*****
* E.G. Elev (ft)      * 451.87 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.45 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 451.42 * Reach Len. (ft) * 50.12 * 50.00 *
50.04 *
* Crit W.S. (ft)      * 451.42 * Flow Area (sq ft) *      * 16.71 *
*
* E.G. Slope (ft/ft)  * 0.006300 * Area (sq ft)    *      * 16.71 *
*
* Q Total (cfs)       * 90.40 * Flow (cfs)      *      * 90.40 *
*
* Top Width (ft)      * 18.71 * Top Width (ft)   *      * 18.71 *
*
* Vel Total (ft/s)    * 5.41 * Avg. Vel. (ft/s) *      * 5.41 *
*
* Max Chl Dpth (ft)   * 1.65 * Hydr. Depth (ft) *      * 0.89 *
*
* Conv. Total (cfs)   * 1138.9 * Conv. (cfs)     *      * 1138.9 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 19.02 *
*
* Min Ch El (ft)      * 449.77 * Shear (lb/sq ft) *      * 0.35 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 378.42 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.32 * Cum Volume (acre-ft) *      * 0.20 *
0.00 *
* C & E Loss (ft)     * 0.00 * Cum SA (acres)    *      * 0.24 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 452.27 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.55 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 451.73 * Reach Len. (ft) * 50.12 * 50.00 *
50.04 *
* Crit W.S. (ft)      * 451.73 * Flow Area (sq ft) *      * 22.86 *
*
*****
```

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                                Prop_Condn_100yr.rep
* E.G. Slope (ft/ft)      *0.005969 * Area (sq ft)      *      *      22.86 *
* Q Total (cfs)          * 135.60 * Flow (cfs)      *      *      135.60 *
* Top Width (ft)         * 21.37 * Top Width (ft)   *      *      21.37 *
* Vel Total (ft/s)       * 5.93 * Avg. Vel. (ft/s) *      *      5.93 *
* Max Chl Dpth (ft)      * 1.96 * Hydr. Depth (ft) *      *      1.07 *
* Conv. Total (cfs)      * 1755.1 * Conv. (cfs)      *      *      1755.1 *
* Length Wtd. (ft)       * 50.00 * Wetted Per. (ft) *      *      21.76 *
* Min Ch El (ft)         * 449.77 * Shear (lb/sq ft) *      *      0.39 *
* Alpha 0.00 *          * 1.00 * Stream Power (lb/ft s) * 378.42 *      0.00 *
* Frctn Loss (ft)        * 0.30 * Cum Volume (acre-ft) *      *      0.27 *
* C & E Loss (ft)        * 0.01 * Cum SA (acres)    *      *      0.28 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 700

INPUT

Description:

Station Elevation Data		num= 148									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	461.383.490021	461.373.600006	461.384.130005	461.44.570007	461.41						
5.110016	461.395.810028	461.35 6.77002	461.2710.11002	460.9313.73001	460.84						
14.29001	461.1114.59003	461.1619.02002	46024.48001	458.2225.12003	458.01						
25.16	45825.27002	457.9732.29001	45642.87003	454.92 44.69	454.77						
47.09003	454.650.06003	454.3352.29001	454.23 54.47	454.1656.24002	454.13						
59.09003	454.1460.08002	454.1162.90002	454 66.91	453.4769.83002	452						
72.42001	450.672.85001	450.3973.11002	450.3 73.53	450.2173.80002	450.15						
74.37003	45074.81003	449.8977.58002	448.99 78.75	448.6179.87003	448						
81.19	447.27 82.44	446.7883.46002	446.3384.77002	44685.74002	445.9						
90.30002	445.5790.65002	445.55 90.91	445.52 93.03	445.395.74002	444.91						
95.95001	444.996.46002	444.91 97.22	445.1299.20001	446 101.51	447.39						
103.07	448 106.43	449.6 107.52	450 108.99	450.47 109.23	450.55						
112.37	452 131.06	453.5 132.83	453.65 136.04	454 138.28	454.41						
138.98	454.5 139.13	454.51 139.55	454.56 141.26	454.8 150.7	456						
157.33	456.45 158.8	456.57 159.26	456.6 159.8	456.62 160.48	456.63						

Prop_Condn_100yr.rep

161.32	456.64	163.4	456.64	165.29	456.62	166.16	456.61	175.97	456.34
185.89	456.04	186.47	456.04	186.52	456.04	186.6	456.04	187.9	456
187.91	456	188.05	456.04	195.45	458	204.5	458.26	204.71	458.26
212.18	458.47	212.65	458.48	218.71	458.98	219.65	459.06	219.74	459.06
219.87	459.06	220.02	459.05	220.31	459.04	220.49	459.03	220.51	459.03
223.07	460.29	223.57	460.53	223.63	460.56	223.82	460.65	223.85	460.66
223.85	460.67	223.86	460.67	223.87	460.67	223.88	460.68	224	460.74
224.02	460.74	225.51	460.71	225.55	460.67	226.02	460.21	226.17	460.22
227.54	460.33	230.94	460.39	250.19	460.7	250.64	461.15	252.13	461.21
254.78	461.23	255.21	460.88	255.4	460.73	262.68	460.78	268.36	460.81
271.55	460.83	275.45	460.86	285.21	460.92	285.68	461.29	285.84	461.42
287.72	461.48	289.98	461.57	295.71	461.79	300.55	462	305.97	462.31
307.02	462.37	318.07	463	319.21	463.11	328.5	463.98	328.69	464
328.7	464	328.72	464	347.49	464.38	349.97	464.43	353.18	464.5
360.44	464.5	367.66	464.5	378.42	464.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0277	58002	.02	108.99	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	77.58002	108.99		49.58	50		.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 447.02	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.49	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 446.54	* Reach Len. (ft)	* 49.58	* 50.00	*
52.14 *					
* Crit W.S. (ft)	* 446.54	* Flow Area (sq ft)	*	* 16.16	*
* E.G. Slope (ft/ft)	* 0.006355	* Area (sq ft)	*	* 16.16	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 17.11	* Top Width (ft)	*	* 17.11	*
* Vel Total (ft/s)	* 5.59	* Avg. Vel. (ft/s)	*	* 5.59	*
* Max Chl Dpth (ft)	* 1.64	* Hydr. Depth (ft)	*	* 0.94	*
* Conv. Total (cfs)	* 1134.0	* Conv. (cfs)	*	* 1134.0	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 17.62	*
* Min Ch El (ft)	* 444.90	* Shear (lb/sq ft)	*	* 0.36	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 378.42	* 0.00	*
0.00 *					
* Frctn Loss (ft)	* 0.31	* Cum Volume (acre-ft)	*	* 0.18	*
0.00 *					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 0.22	*
0.00 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
* E.G. Elev (ft)      * 447.46 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.61 * Wt. n-Val.       *      * 0.020 *
*
* W.S. Elev (ft)      * 446.85 * Reach Len. (ft)  * 49.58 * 50.00 *
52.14 *
* Crit W.S. (ft)      * 446.85 * Flow Area (sq ft) *      * 21.71 *
*
* E.G. Slope (ft/ft)  * 0.005926 * Area (sq ft)     *      * 21.71 *
*
* Q Total (cfs)       * 135.60 * Flow (cfs)       *      * 135.60 *
*
* Top Width (ft)      * 18.36 * Top Width (ft)   *      * 18.36 *
*
* Vel Total (ft/s)    * 6.25 * Avg. Vel. (ft/s) *      * 6.25 *
*
* Max Chl Dpth (ft)   * 1.95 * Hydr. Depth (ft) *      * 1.18 *
*
* Conv. Total (cfs)   * 1761.5 * Conv. (cfs)      *      * 1761.5 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 19.02 *
*
* Min Ch El (ft)      * 444.90 * Shear (lb/sq ft) *      * 0.42 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 378.42 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.29 * Cum Volume (acre-ft) *      * 0.25 *
0.00 *
* C & E Loss (ft)     * 0.01 * Cum SA (acres)     *      * 0.25 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop

REACH: Cl_Creek_Prop

RS: 650

INPUT

Description:

Station Elevation Data num= 138

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	458	.02	458	.06	458.6400146	457.875730011	456.63		

Prop_Condn_100yr.rep

8.610016	4569.460022	455.7916.61002	45419.89001	453.16	25.25	452
32.64001	451.8239.02002	451.6741.21002	451.6342.42001	451.6243.45001		451.61
45.67001	451.5746.26001	451.5746.56003	451.5746.79001	451.58	47	451.6
50.80002	451.5755.54001	451.5356.27002	451.5357.20001	451.54	64.41	451.59
67.14001	451.6168.24002	451.6376.49002	451.882.86002	451.8686.55002		452
87.15002	452.34 92.25	45293.64001	452 95.44	451.496.49002		451.05
99.62003	450 101.27	449.44 101.91	449.15 104.02	448 104.68		447.63
106.44	446.52 107.24	446 109.86	444.28 110.29	444 112.2		444
114.24	444 114.91	444 115.91	444.34 121.17	446 123.57		447.54
124.32	448 127.08	449.79 127.46	450 128.91	450.14 132.01		450.43
135.22	450.7 138.05	450.87 139.08	450.95 141.04	451.12 141.82		451.19
144.92	451.47 149.76	452 161.4	453.42 162.93	453.59 166.55		454
169.82	454.22 170.96	454.28 171.72	454.3 172.18	454.29 172.64		454.25
173.23	454.2 175.3	454.06 176.36	454 179.73	453.5 179.82		453.44
180.09	453.41 180.62	453.46 185.62	454 192.97	455.82 194		456
195.18	456.17 195.89	456.41 196.36	456.49 198.01	456.67 199.51		456.79
200.12	456.83 201.41	456.87 202.47	456.88 203.84	456.89 206.8		456.87
207.99	456.85 209.07	456.83 210.25	456.78 211.77	456.71 219.97		456.3
223.43	456.13 226.84	457.8 231.83	460.27 232.9	460.25 233.32		460.24
233.7	459.86 233.82	459.74 235.03	459.84 235.32	459.87 239.5		459.93
257.83	460.2 259.28	460.31 263.66	460.48 270.83	460.78 271.73		460.79
271.77	460.79 272.1	460.42 272.21	460.29 274.33	460.3 296		460.44
296.63	460.44 297.37	460.45 298.17	460.46 312.14	460.55 312.82		460.55
320.42	460.61 321.01	460.61 323.18	460.63 329.77	460.67 330.12		460.95
330.39	461.17 333.74	461.35 337.69	461.57 341.7	461.8 345.06		462
351.92	462.59 356.68	463 363.66	463.42 370.62	464 371.58		464.03
375.28	464.12 378.16	464.17 390.64	464.31			

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.0296.49002	.02	128.91	.02	

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff	Contr.	Expan.
	96.49002	128.91	49.04	50	50.64	.1	.3	

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 446.30	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.59	* Wt. n-Val.	*	* 0.020	*

* W.S. Elev (ft)	* 445.71	* Reach Len. (ft)	* 49.04	* 50.00	*
50.64 *					
* Crit W.S. (ft)	* 445.71	* Flow Area (sq ft)	*	* 14.65	*

* E.G. Slope (ft/ft)	*0.006097	* Area (sq ft)	*	* 14.65	*

* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*

* Top Width (ft)	* 12.57	* Top Width (ft)	*	* 12.57	*

* Vel Total (ft/s)	* 6.17	* Avg. Vel. (ft/s)	*	* 6.17	*

* Max Chl Dpth (ft)	* 1.71	* Hydr. Depth (ft)	*	* 1.17	*

* Conv. Total (cfs)	* 1157.8	* Conv. (cfs)	*	* 1157.8	*

* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 13.35	*

* Min Ch El (ft)	* 444.00	* Shear (lb/sq ft)	*	* 0.42	*

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) * 390.64 *      0.00 *
  0.00 *
* Frctn Loss (ft) *      0.32 * Cum Volume (acre-ft) *      *      0.16 *
  0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) *      *      0.21 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 446.82 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.71 * Wt. n-Val. *      * 0.020 *
*
* W.S. Elev (ft) * 446.11 * Reach Len. (ft) * 49.04 * 50.00 *
50.64 *
* Crit W.S. (ft) * 446.11 * Flow Area (sq ft) *      * 20.03 *
*
* E.G. Slope (ft/ft) * 0.005770 * Area (sq ft) *      * 20.03 *
*
* Q Total (cfs) * 135.60 * Flow (cfs) *      * 135.60 *
*
* Top Width (ft) * 14.27 * Top Width (ft) *      * 14.27 *
*
* Vel Total (ft/s) * 6.77 * Avg. Vel. (ft/s) *      * 6.77 *
*
* Max Chl Dpth (ft) * 2.11 * Hydr. Depth (ft) *      * 1.40 *
*
* Conv. Total (cfs) * 1785.2 * Conv. (cfs) *      * 1785.2 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 15.24 *
*
* Min Ch El (ft) * 444.00 * Shear (lb/sq ft) *      * 0.47 *
*
* Alpha      * 1.00 * Stream Power (lb/ft s) * 390.64 * 0.00 *
  0.00 *
* Frctn Loss (ft) * 0.30 * Cum Volume (acre-ft) *      * 0.22 *
  0.00 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) *      * 0.24 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Prop_Condn_100yr.rep

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 600

INPUT

Description:

Station Elevation Data			num=	185							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

0	449.562.799988		449.273.419983		449.25	4.22998		449.255.289978		449.29	
6.5	449.368.539978		449.498.819977		449.59.269989		449.529.369995		449.52		
9.609985	449.529.709991		449.5210.43997		449.5810.71997		449.5910.95999		449.6		
11.19998	449.6111.45999		449.6112.16998		449.615.12997		449.58	19.84	449.45		
21.59	449.4123.42999		449.3825.31998		449.3827.22998		449.432.46997		449.49		
40.85999	449.4741.81998		449.4842.93997		449.48	47	449.4648.56998		449.45		
50.29999	449.4652.20999		449.4754.43997		449.4957.19998		449.5360.81998		449.6		
76.65997	449.9178.43997		449.9478.82999		449.9481.65997		45095.72998		450.25		
97.62997	450.2897.67999		450.2897.97998		450.27	98.84	450.26	99.87	450.22		
102.4	450.12	105.04	450	106.07	448.97	107.1	448	108.03	447.12		
109.12	446	109.78	445.37	111.24	444	111.37	443.88	111.65	443.6		
112.82	442.39	113.05	442.12	113.15	442	114.11	441.05	114.14	441.01		
114.23	441.02	114.24	441.02	115.65	441.28	116.28	441.44	116.67	441.6		
116.94	442	117.41	442.19	121.98	444	122.48	444.21	127.11	446		
127.8	446.24	132.22	447.76	132.56	447.87	132.92	448	133.32	448.06		
133.51	448.09	137.29	448.63	141.75	449.18	149.42	450	157.1	450.48		
158.47	450.59	160.38	450.76	161.89	450.9	165.07	451.17	169.58	451.52		
170.95	451.65	174.19	452	174.39	452.05	175.29	452.19	178.52	452.57		
179.1	452.66	181.72	452.98	182.39	453.07	182.89	453.11	183.5	453.15		
183.82	453.16	184.11	453.16	185.02	453.12	185.43	453.1	186.98	453.11		
191.22	453.17	194.97	453.22	197.2	453.23	199.27	453.24	201.24	453.24		
203.18	453.24	205.4	453.22	207.17	453.2	207.8	453.18	208.95	453.13		
209.85	453.09	211.07	453.03	213.51	452.98	214.06	452.96	215.57	452.88		
228.88	459.52	229.53	459.85	230.46	459.83	231.04	459.81	231.05	459.8		
231.54	459.31	231.6	459.32	233.05	459.44	244.66	459.6	255.64	459.75		
257.29	459.77	257.63	459.77	257.98	460.01	258.39	460.28	258.47	460.28		
258.48	460.28	258.74	460.28	262.8	460.31	263.27	459.91	263.39	459.81		
270.07	459.86	272.53	459.88	273.94	459.89	276.34	459.9	286.84	459.98		
286.93	459.98	287.03	459.98	289.19	460	290.03	460.01	290.35	460.01		
291.2	460.49	291.26	460.52	299.79	460.58	302.23	460.6	302.56	460.43		
303.15	460.11	306.48	460.14	311.65	460.19	316.85	460.23	316.89	460.23		
317.14	460.23	317.54	460.57	317.74	460.73	318.83	460.74	321.32	460.77		
321.72	460.44	321.92	460.27	326.21	460.31	329.47	460.33	332.58	460.35		
337.49	460.39	348.71	460.49	348.92	460.7	349.22	460.99	356.71	461.69		
359.79	462	364.59	462.67	365.92	462.84	366.18	462.86	368.25	463		
368.88	463	370.61	463.79	371.03	464	371.48	464	371.89	464		
378.79	464.3	383.21	464.47	383.28	464.48	384	464.5	386.11	464.5		

Manning's n Values			num=	3	
Sta	n Val	Sta	n Val	Sta	n Val

0	.0297.67999	.02	127.8	.02	

Bank	Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
	97.67999	127.8	49.43	50	49.19	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 444.36 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.71 * Wt. n-Val.   *      * 0.020 *
*
* W.S. Elev (ft)      * 443.65 * Reach Len. (ft) * 49.43 * 50.00 *
49.19 *
* Crit W.S. (ft)      * 443.65 * Flow Area (sq ft) *      * 13.34 *
*
* E.G. Slope (ft/ft)  * 0.006605 * Area (sq ft)    *      * 13.34 *
*
* Q Total (cfs)       * 90.40 * Flow (cfs)      *      * 90.40 *
*
* Top Width (ft)      * 9.49 * Top Width (ft)   *      * 9.49 *
*
* Vel Total (ft/s)    * 6.78 * Avg. Vel. (ft/s) *      * 6.78 *
*
* Max Chl Dpth (ft)   * 2.64 * Hydr. Depth (ft) *      * 1.41 *
*
* Conv. Total (cfs)   * 1112.4 * Conv. (cfs)     *      * 1112.4 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 11.22 *
*
* Min Ch El (ft)      * 441.01 * Shear (lb/sq ft) *      * 0.49 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 386.11 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.32 * Cum Volume (acre-ft) *      * 0.15 *
0.00 *
* C & E Loss (ft)     * 0.02 * Cum SA (acres)    *      * 0.19 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
* E.G. Elev (ft)      * 444.98 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.84 * Wt. n-Val.   *      * 0.020 *
*
* W.S. Elev (ft)      * 444.14 * Reach Len. (ft) * 49.43 * 50.00 *
49.19 *
* Crit W.S. (ft)      * 444.14 * Flow Area (sq ft) *      * 18.45 *
*
* E.G. Slope (ft/ft)  * 0.006298 * Area (sq ft)    *      * 18.45 *
*
* Q Total (cfs)       * 135.60 * Flow (cfs)      *      * 135.60 *
*

```

```

Prop_Condn_100yr.rep
* Top Width (ft)      * 11.23 * Top Width (ft)      *      * 11.23 *
* Vel Total (ft/s)    * 7.35 * Avg. Vel. (ft/s)    *      * 7.35 *
* Max Chl Dpth (ft)   * 3.13 * Hydr. Depth (ft)    *      * 1.64 *
* Conv. Total (cfs)    * 1708.7 * Conv. (cfs)          *      * 1708.7 *
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)     *      * 13.25 *
* Min Ch El (ft)       * 441.01 * Shear (lb/sq ft)     *      * 0.55 *
* Alpha                * 1.00 * Stream Power (lb/ft s) * 386.11 * 0.00 *
0.00
* Frctn Loss (ft)      * 0.30 * Cum Volume (acre-ft) *      * 0.20 *
0.00
* C & E Loss (ft)      * 0.02 * Cum SA (acres)        *      * 0.22 *
0.00
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 550

INPUT

Description:

Station Elevation Data			num=	154			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	453.696	429993	453.936	890015	453.946	970001	453.947
7.080017	453.947	130005	453.94	7.23999	453.957	290009	453.957
7.350006	453.957	380005	453.957	420013	453.957	580017	453.928
8.410004	453.93	10.5	453.5	13.84	452.8615	76001	452.4517
17.73999	45218	32001	451.8625	67999	45031	79999	448.52
37.09	447.948	23999	447.5852	54999	447.4854	51999	447.4456
58.54001	447.41	58.94	447.41	59.09	447.41	59.12	447.4259
59.73001	447.5760	26001	447.6	61	447.6161	92999	447.61
73.23001	447.5278	32001	447.588	35001	447.4990	07001	447.48
100.02	447.43	102	447.4	106.61	447.37	107.8	447.36
114.54	447.43	115.29	447.43	124.42	447.56	131.4	447.61
148.99	447.96	150.25	448	151.48	448	151.96	448
155.93	447.39	158.34	446.43	158.9	446.21	159.46	446
164.19	444.17	164.59	444	166.13	443.35	168	442.41
170.55	441.2	173.01	440	174.11	439.46	177.28	438
178.87	438	180.43	438	183.24	439.5	184.11	440
187.85	442	189.24	442.77	191.21	443.73	191.84	444
192.36	444.18	195.53	444.89	199.3	445.78	200.46	446
222.18	448	224.48	448.16	224.54	448.17	228.59	448.46

Prop_Condn_100yr.rep

229.48	448.54	231.2	448.61	235.04	448.71	237.2	448.75	241.42	448.81
247.89	448.83	248.54	448.82	250.99	448.85	251.76	448.82	252.42	448.83
264.7	448.98	268.21	449	269.58	449.02	269.86	449.02	271.8	449.08
272.69	449.1	277.02	449.25	283.93	452.68	297.37	459.39	298.15	459.38
298.88	459.36	299.15	459.09	299.38	458.86	300.26	458.93	300.89	458.99
313.23	459.16	322.52	459.28	323.52	459.3	323.55	459.3	323.83	459.6
324.04	459.8	324.46	459.8	326.22	459.65	329.26	459.85	330.52	459.86
330.81	459.71	331.5	459.37	335.61	459.41	337.7	459.43	343.63	459.5
345.13	459.51	379.1	459.86	384.53	459.91	388.45	459.95	390.36	459.96
390.51	460.09	390.94	460.46	391.12	460.46	391.56	460.47	391.91	460.47
397.3	460.54	397.61	460.25	397.83	460.04	412.08	460.19	415.32	460.22
423.61	460.32	423.93	460.62	424.15	460.81	424.44	460.84		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	160.02	.02	191.85	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	160.02	191.85		49.94	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)          * 440.62 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.65 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 439.97 * Reach Len. (ft)   * 49.94 * 50.00 *
50.00 *
* Crit W.S. (ft)          * 439.97 * Flow Area (sq ft) *          * 14.00 *
*
* E.G. Slope (ft/ft)      * 0.006097 * Area (sq ft)      *          * 14.00 *
*
* Q Total (cfs)           * 90.40 * Flow (cfs)        *          * 90.40 *
*
* Top Width (ft)          * 10.98 * Top Width (ft)    *          * 10.98 *
*
* Vel Total (ft/s)        * 6.46 * Avg. Vel. (ft/s)  *          * 6.46 *
*
* Max Chl Dpth (ft)       * 1.97 * Hydr. Depth (ft)  *          * 1.27 *
*
* Conv. Total (cfs)       * 1157.7 * Conv. (cfs)       *          * 1157.7 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)  *          * 11.92 *
*
* Min Ch El (ft)          * 438.00 * Shear (lb/sq ft)  *          * 0.45 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.31 * Cum Volume (acre-ft) *          * 0.13 *
0.00 *
* C & E Loss (ft)         * 0.02 * Cum SA (acres)     *          * 0.18 *
0.00 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is

Prop_Condn_100yr.rep
 not a valid subcritical answer. The program
 defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft)      * 441.18 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.77 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 440.41 * Reach Len. (ft)   * 49.94 * 50.00 *
50.00 *
* Crit W.S. (ft)      * 440.41 * Flow Area (sq ft) *          * 19.25 *
*
* E.G. Slope (ft/ft)  * 0.005812 * Area (sq ft)      *          * 19.25 *
*
* Q Total (cfs)       * 135.60 * Flow (cfs)        *          * 135.60 *
*
* Top Width (ft)      * 12.73 * Top Width (ft)    *          * 12.73 *
*
* Vel Total (ft/s)    * 7.04 * Avg. Vel. (ft/s)  *          * 7.04 *
*
* Max Chl Dpth (ft)   * 2.41 * Hydr. Depth (ft)  *          * 1.51 *
*
* Conv. Total (cfs)   * 1778.7 * Conv. (cfs)       *          * 1778.7 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft)  *          * 13.88 *
*
* Min Ch El (ft)      * 438.00 * Shear (lb/sq ft)  *          * 0.50 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.29 * Cum Volume (acre-ft) *          * 0.18 *
0.00 *
* C & E Loss (ft)     * 0.02 * Cum SA (acres)     *          * 0.21 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 500

INPUT

Description:

Station Elevation Data		num= 132	
Sta	Elev	Sta	Elev
0	446	.01	4462.820007
7.730011	445.7316	.07001	445.6
24.76001	445.6627	.58002	445.6936
51.84	445.78	56.41	445.7765

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81.53	445.62	93.95	001	445.55	98.13	445.51	101.98	445.46	103.28	445.46
104.54	445.46	106.72		445.48	112.94	445.57	116.12	445.61	117.63	445.62
118.45	445.62	125.3		445.57	126.15	445.55	129.34	445.46	142.79	445.24
145.63	445.17	147.02		445.12	147.78	445.11	149.49	445.1	150.16	445.08
150.55	445.05	150.75		445	150.88	444.89	151.12	444.84	157.16	444
160.02	443.12	161.34		442.72	163.66	442	168.92	440.43	169.79	440.18
170.47	440	172.59		439.24	176.12	438	176.83	438	178.87	438
183.05	438	184.15		439.24	184.91	440	188.52	441.54	189.49	442
190.06	442.17	191.42		442.49	197.85	444	202.47	444.4	203.22	444.45
203.99	444.47	211.19		444.98	212.42	444.99	213.39	445.02	214.43	445.08
226.26	445.93	226.4		445.94	227.31	446	248.89	446.35	253.05	446.42
255.8	446.46	256.03		446.46	257.37	446.49	257.66	446.5	257.77	446.5
257.8	446.5	257.82		446.5	257.83	446.5	257.85	446.5	257.93	446.51
258.05	446.51	258.16		446.51	258.29	446.51	258.42	446.51	258.54	446.51
258.69	446.51	258.88		446.51	258.99	446.5	260.09	446.49	260.51	446.49
260.96	446.48	269.83		446.62	276.97	451.01	292.93	458.89	295.67	458.9
296.39	458.88	297.25		458.87	297.52	458.6	297.77	458.36	298.64	458.43
299.32	458.48	312.38		458.63	318.91	458.74	323.04	458.83	330.24	459.24
331.58	459.31	335.33		459.19	337.82	459.19	337.83	459.11	341.91	459.16
341.94	459.26	388.05		460.34	396.6	460.45	398.66	460.47	399.34	460.48
400.03	460.48	400.15		460.49	402.11	460.51	412.84	460.65	412.89	460.65
413.16	460.66	414.42		460.68	416.52	460.71	416.69	460.58	417.15	460.21
418.46	460.23	424.44		460.31						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	160.02	.02	191.42	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	160.02	191.42		49.72	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
*****
* E.G. Elev (ft)          * 440.10 * Element                * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.59 * Wt. n-Val.              *          * 0.020 *
*
* W.S. Elev (ft)          * 439.50 * Reach Len. (ft)        * 49.72 * 50.00 *
49.15 *
* Crit W.S. (ft)          * 439.50 * Flow Area (sq ft)      *          * 14.65 *
*
* E.G. Slope (ft/ft)      * 0.006178 * Area (sq ft)           *          * 14.65 *
*
* Q Total (cfs)           * 90.40 * Flow (cfs)             *          * 90.40 *
*
* Top Width (ft)          * 12.56 * Top Width (ft)         *          * 12.56 *
*
* Vel Total (ft/s)        * 6.17 * Avg. Vel. (ft/s)       *          * 6.17 *
*
* Max Chl Dpth (ft)       * 1.50 * Hydr. Depth (ft)       *          * 1.17 *
*
* Conv. Total (cfs)       * 1150.1 * Conv. (cfs)            *          * 1150.1 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)       *          * 13.49 *
*
* Min Ch El (ft)          * 438.00 * Shear (lb/sq ft)       *          * 0.42 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 424.44 * 0.00 *
0.00 *
* Frctn Loss (ft)        * 0.31 * Cum Volume (acre-ft)   *          * 0.12 *
0.00 *

```

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* C & E Loss (ft)	* 0.00	* Cum SA (acres)	* 0.17
0.00			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 440.62	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.72	* Wt. n-Val.		* 0.020
* W.S. Elev (ft)	* 439.90	* Reach Len. (ft)	* 49.72	* 50.00
49.15				
* Crit W.S. (ft)	* 439.90	* Flow Area (sq ft)		* 19.96
* E.G. Slope (ft/ft)	* 0.005834	* Area (sq ft)		* 19.96
* Q Total (cfs)	* 135.60	* Flow (cfs)		* 135.60
* Top Width (ft)	* 14.07	* Top Width (ft)		* 14.07
* Vel Total (ft/s)	* 6.79	* Avg. Vel. (ft/s)		* 6.79
* Max Chl Dpth (ft)	* 1.90	* Hydr. Depth (ft)		* 1.42
* Conv. Total (cfs)	* 1775.4	* Conv. (cfs)		* 1775.4
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)		* 15.23
* Min Ch El (ft)	* 438.00	* Shear (lb/sq ft)		* 0.48
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 424.44	* 0.00
0.00				
* Frctn Loss (ft)	* 0.29	* Cum Volume (acre-ft)		* 0.16
0.00				
* C & E Loss (ft)	* 0.00	* Cum SA (acres)		* 0.19
0.00				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

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defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
REACH: Cl_Creek_Prop RS: 450

INPUT

Description:

Station Elevation Data		num= 120									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4446.609985	443.8510	60999	443.7813	35001	443.7515	44998	443.74			
19.38	443.719	97998	443.720	35001	443.7120	88998	443.7521	67999	443.77		
25.94998	443.82	45.16	44450	97998	444.0458	81998	444.09	66.87	444.12		
72.73999	444.1475	29999	444.13	79	444.0984	89999	444.02	86.84	444		
101.32	443.83	105.38	443.77	113.73	443.64	118.19	443.59	153.8	442.77		
156.71	442.71	157.28	442.69	157.55	442.69	158.2	442.68	169.18	442		
171.68	442	172.83	442	175.81	442	177.17	442	180.07	442		
181.7	442	183.46	442	184.63	442	188.21	442	188.39	442		
188.6	442	191.22	440.71	192.65	440	196.08	438.4	196.94	438		
198.14	437.46	201.29	436	201.77	436	202.85	436	203.1	436		
206.01	437.26	207.76	438	209.64	438.73	210.53	438.95	211.8	439.33		
212.92	439.46	213.76	439.63	214.08	439.78	214.34	440	215.88	440.28		
220.29	441.07	222.89	441.53	225.05	441.89	225.3	441.93	225.84	442		
226.22	442.02	227.11	442.04	228.21	442.02	228.76	442	232	441.86		
232.76	441.85	234.89	441.99	235.08	442	241.23	442.72	244.97	443.21		
250.31	444	253.82	444.2	254.55	444.23	254.65	444.23	255.24	444.25		
256.19	444.3	265.21	444.76	269.02	446.38	271.1	447.26	274.26	447.76		
283.98	449.3	286.04	449.63	294.13	450.91	297.83	451.49	302.94	452.31		
309.61	453.37	316.98	454.54	321.39	455.24	324.58	455.75	333.17	457.12		
334.14	457.27	344.44	458.92	345.12	459.02	349.39	459.41	349.95	459.41		
351.18	459.39	351.54	459.09	351.78	458.89	352.74	458.97	353.57	459.03		
362.6	459.19	380.43	459.51	380.96	459.96	380.97	459.97	381.08	460		
381.14	460.02	383.34	460.06	383.71	460.07	384.5	459.64	384.63	459.57		
389.73	459.65	391.67	459.68	402.42	459.83	403.58	459.85	411.21	459.96		

Manning's n Values		num= 3			
Sta	n Val	Sta	n Val	Sta	n Val
0	.02	184.63	.02	215.88	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	184.63	215.88		50.28 50	48.87	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 438.77	* Element	* Left OB	* Channel	*
Right OB					
* Vel Head (ft)	* 0.63	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 438.15	* Reach Len. (ft)	* 50.28	* 50.00	*
48.87					
* Crit W.S. (ft)	* 438.15	* Flow Area (sq ft)	*	* 14.20	*
* E.G. Slope (ft/ft)	* 0.006140	* Area (sq ft)	*	* 14.20	*
* Q Total (cfs)	* 90.40	* Flow (cfs)	*	* 90.40	*
* Top Width (ft)	* 11.51	* Top Width (ft)	*	* 11.51	*

Prop_Condn_100yr.rep					
* Vel Total (ft/s)	*	6.37	* Avg. Vel. (ft/s)	*	6.37
* Max Chl Dpth (ft)	*	2.15	* Hydr. Depth (ft)	*	1.23
* Conv. Total (cfs)	*	1153.7	* Conv. (cfs)	*	1153.7
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	12.41
* Min Ch El (ft)	*	436.00	* Shear (lb/sq ft)	*	0.44
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	411.21
0.00	*			*	0.00
* Frctn Loss (ft)	*	0.32	* Cum Volume (acre-ft)	*	0.10
0.00	*			*	
* C & E Loss (ft)	*	0.07	* Cum SA (acres)	*	0.15
0.00	*			*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	439.32	* Element	*	Left OB	* Channel
Right OB	*			*		
* Vel Head (ft)	*	0.74	* Wt. n-Val.	*		0.020
* W.S. Elev (ft)	*	438.58	* Reach Len. (ft)	*	50.28	50.00
48.87	*			*		
* Crit W.S. (ft)	*	438.58	* Flow Area (sq ft)	*		19.61
* E.G. Slope (ft/ft)	*	0.005861	* Area (sq ft)	*		19.61
* Q Total (cfs)	*	135.60	* Flow (cfs)	*		135.60
* Top Width (ft)	*	13.55	* Top Width (ft)	*		13.55
* Vel Total (ft/s)	*	6.91	* Avg. Vel. (ft/s)	*		6.91
* Max Chl Dpth (ft)	*	2.58	* Hydr. Depth (ft)	*		1.45
* Conv. Total (cfs)	*	1771.3	* Conv. (cfs)	*		1771.3
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*		14.63
* Min Ch El (ft)	*	436.00	* Shear (lb/sq ft)	*		0.49
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	411.21	0.00
0.00	*			*		

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Prop_Condn_100yr.rep
* Frctn Loss (ft)      * 0.30 * Cum Volume (acre-ft) *      * 0.14 *
  0.00 *
* C & E Loss (ft)     * 0.09 * Cum SA (acres)      *      * 0.18 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 400

INPUT

Description:

Station Elevation Data				num=	147				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	442.07	6300049	442.79	00085	441.99	2309998	441.98	3980011	442
6.61	442.12	8.76	442.16	10.81	442.12	13.06	442.04	14.06	442
15.48	441.97	19.87	441.93	23.19	441.92	23.26	441.92	27.23	441.92
31.76	441.94	36.88	441.99	36.91	441.99	37.51	442.41	54.99	442.05
45.32	442.12	47.66	442.15	61.28	442.4	63.09	442.46	75.10	442.47
71.88	442.51	73.62	442.52	78.13	442.54	82.41	442.55	83.16	442.55
89.88	442.54	90.87	442.53	96.69	442.49	106.23	442.41	113.01	442.37
116.9	442.35	123.81	442.35	127.25	442.33	131.2	442.3	135.48	442.25
142.15	442.15	144.58	442.1	148.57	442	163.07	441.28	164.84	441.19
167.07	441.08	175.32	440.69	177.73	440.59	180.43	440.49	183.69	440.35
186.22	440.29	186.75	440.27	187.61	440.25	188.08	440.24	195.77	440.09
195.95	440.09	198.61	440.02	199.11	440	202.39	439.84	202.9	439.79
202.92	439.79	204	439.67	205.83	439.46	210.49	439.06	211.67	438.95
213.12	438.82	217.93	438	220.62	437.14	224.02	436	230.25	434.09
230.33	434.06	230.38	434.05	230.39	434.05	230.55	434.06	230.56	434.06
230.62	434.08	230.78	434.14	230.91	434.17	231.36	434.26	232.41	434.49
234.25	434.9	238.94	436	244	437.45	245.55	437.89	245.68	437.93
245.75	437.95	245.76	437.96	245.77	437.96	245.8	437.93	245.82	437.91
245.84	437.91	246.39	438	246.86	438.05	252.16	438.44	252.46	438.5
257.08	440	260.19	440.46	263.67	441.09	268.9	442	269.87	442.06
276.74	442.42	279.39	442.55	280.43	442.59	281.37	442.63	282.64	442.66
283.38	442.67	283.89	442.67	285.49	442.63	285.56	442.57	285.62	442.54
286	442.52	286.86	442.49	293.2	442.35	293.52	442.33	295.06	442.28
297.9	442.14	298.25	442.15	298.83	442.22	300.02	442.38	312.59	444
323.17	444.75	331.55	445.48	338.16	446	356.89	447.97	357.2	448
360.6	448.32	378.71	450	378.74	450	379.9	450.05	380.62	450.35
381.56	450.75	391.47	454.88	396.75	457.08	403.89	460.05	405.32	460.04
405.71	460.03	405.82	459.94	406.32	459.54	408.04	459.67	408.14	459.67
408.7	459.68	409.05	459.69	417.36	459.84	421.57	459.92	424.62	459.97
426.9	460.01	431.09	460.09						

Prop_Condn_100yr.rep

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 0 .02 211.67 .02 244 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 211.67 244 49.39 50 49.1 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

 * E.G. Elev (ft) * 435.91 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.38 * Wt. n-Val. * * 0.020 *
 *
 * W.S. Elev (ft) * 435.52 * Reach Len. (ft) * 49.39 * 50.00 *
 49.10 *
 * Crit W.S. (ft) * 435.52 * Flow Area (sq ft) * * 8.44 *
 *
 * E.G. Slope (ft/ft) * 0.006917 * Area (sq ft) * * 8.44 *
 *
 * Q Total (cfs) * 41.90 * Flow (cfs) * * 41.90 *
 *
 * Top Width (ft) * 11.33 * Top Width (ft) * * 11.33 *
 *
 * Vel Total (ft/s) * 4.96 * Avg. Vel. (ft/s) * * 4.96 *
 *
 * Max Chl Dpth (ft) * 1.47 * Hydr. Depth (ft) * * 0.74 *
 *
 * Conv. Total (cfs) * 503.8 * Conv. (cfs) * * 503.8 *
 *
 * Length Wtd. (ft) * 50.00 * Wetted Per. (ft) * * 11.72 *
 *
 * Min Ch El (ft) * 434.05 * Shear (lb/sq ft) * * 0.31 *
 *
 * Alpha * 1.00 * Stream Power (lb/ft s) * 431.09 * 0.00 *
 0.00 *
 * Frctn Loss (ft) * 0.35 * Cum Volume (acre-ft) * * 0.09 *
 0.00 *
 * C & E Loss (ft) * 0.03 * Cum SA (acres) * * 0.14 *
 0.00 *

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
 Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

 * E.G. Elev (ft) * 436.24 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.45 * Wt. n-Val. * * 0.020 *
 *
 * W.S. Elev (ft) * 435.79 * Reach Len. (ft) * 49.39 * 50.00 *
 49.10 *

```

Prop_Condn_100yr.rep
* Crit W.S. (ft)      * 435.79 * Flow Area (sq ft)      *      * 11.67 *
* E.G. Slope (ft/ft) * 0.006552 * Area (sq ft)      *      * 11.67 *
* Q Total (cfs)      * 62.85 * Flow (cfs)      *      * 62.85 *
* Top Width (ft)     * 13.30 * Top Width (ft)     *      * 13.30 *
* Vel Total (ft/s)   * 5.39 * Avg. Vel. (ft/s)   *      * 5.39 *
* Max Chl Dpth (ft)  * 1.74 * Hydr. Depth (ft)   *      * 0.88 *
* Conv. Total (cfs)   * 776.4 * Conv. (cfs)      *      * 776.4 *
* Length Wtd. (ft)   * 50.00 * Wetted Per. (ft)   *      * 13.76 *
* Min Ch El (ft)     * 434.05 * Shear (lb/sq ft)   *      * 0.35 *
* Alpha              * 1.00 * Stream Power (lb/ft s) * 431.09 * 0.00 *
* Frctn Loss (ft)    * 0.33 * Cum Volume (acre-ft) *      * 0.12 *
* C & E Loss (ft)    * 0.03 * Cum SA (acres)      *      * 0.16 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 350

INPUT

Description:

Station Elevation Data		num= 102		Sta Elev		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4413.129974	440.726	109985	440.38	839996	440.18	10.72998	440.13			
11.95999	440.1114.54999	440.0515	91998	44017.82999		439.97	19.20999	439.95			
21.44998	439.93 22.97	439.9324	63998	439.9426	50998	439.97	27.62	440			
32.67999	440.1433.04999	440.1433	44998	440.15	47.37	440.48	51.75	440.55			
59.04999	440.761.23999	440.7364	93997	440.893	42999	441.1393	45999	441.13			
93.47	441.1393.47998	441.13	93.5	441.1393	50998	441.1393	53998	441.13			
134.43	440.87 136.98	440.86	141.19	440.85	154.19	440.57	160.98	440.48			
163.53	440.44 165.58	440.4	167.4	440.35	169.21	440.28	171.22	440.2			
175.33	440 185.77	439.56	187.23	439.5	190.76	439.38	209	438.34			
211.59	438.21 215.95	438	224.47	437.48	228.85	437.21	229.32	437.19			
230.21	437.18 231.49	437.14	233.43	437.06	235.22	436.97	245.74	436.44			
254.46	436 259.11	434.34	260.28	434	264.49	434	265.78	434			
271.97	434 272.28	434	272.54	434.07	275.63	434.79	278.6	435.51			

Prop_Condn_100yr.rep

280.63	436	285.24	437.58	286.61	438	292.29	438.85	294.41	439.16
294.82	439.2	297.04	439.34	297.96	439.41	302.75	440	308.18	440.55
311.17	440.93	317.49	441.66	319.69	441.95	319.81	441.97	320.1	442
328.92	442.55	330.42	442.66	333.91	442.92	341.82	443.55	345.61	443.83
347.26	444	362.74	445.55	367.26	446	368	446.07	368.33	446.1
370.99	446.33	389.52	448	392.15	448.13	412.32	449.47	414.1	449.55
422.9	449.9	425.64	450	429.27	450.16	435.12	450.41	438.61	451.77
444.94	454.13	450.08	456.02						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	245.74	.02	278.6	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	245.74	278.6		49.76	50	51.18	.1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)          * 434.96 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.29 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 434.67 * Reach Len. (ft)   * 49.76 * 50.00 *
51.18 *
* Crit W.S. (ft)          * 434.67 * Flow Area (sq ft) *          * 9.72 *
*
* E.G. Slope (ft/ft)      * 0.007155 * Area (sq ft)      *          * 9.72 *
*
* Q Total (cfs)           * 41.90 * Flow (cfs)        *          * 41.90 *
*
* Top Width (ft)          * 16.93 * Top Width (ft)     *          * 16.93 *
*
* Vel Total (ft/s)        * 4.31 * Avg. Vel. (ft/s)   *          * 4.31 *
*
* Max Chl Dpth (ft)       * 0.67 * Hydr. Depth (ft)   *          * 0.57 *
*
* Conv. Total (cfs)       * 495.4 * Conv. (cfs)        *          * 495.4 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)   *          * 17.12 *
*
* Min Ch El (ft)          * 434.00 * Shear (lb/sq ft)   *          * 0.25 *
*
* Alpha                    * 1.00 * Stream Power (lb/ft s) * 450.08 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.35 * Cum Volume (acre-ft) *          * 0.08 *
0.00 *
* C & E Loss (ft)         * 0.01 * Cum SA (acres)      *          * 0.13 *
0.00 *
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

Prop_Condn_100yr.rep

```

*****
* E.G. Elev (ft)          * 435.22 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)          * 0.36 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)          * 434.86 * Reach Len. (ft)   * 49.76 * 50.00 *
51.18 *
* Crit W.S. (ft)          * 434.86 * Flow Area (sq ft) *          * 13.03 *
*
* E.G. Slope (ft/ft)      * 0.006729 * Area (sq ft)      *          * 13.03 *
*
* Q Total (cfs)           * 62.85 * Flow (cfs)        *          * 62.85 *
*
* Top Width (ft)          * 18.25 * Top Width (ft)     *          * 18.25 *
*
* Vel Total (ft/s)        * 4.83 * Avg. Vel. (ft/s)   *          * 4.83 *
*
* Max Chl Dpth (ft)       * 0.86 * Hydr. Depth (ft)   *          * 0.71 *
*
* Conv. Total (cfs)       * 766.2 * Conv. (cfs)        *          * 766.2 *
*
* Length Wtd. (ft)        * 50.00 * Wetted Per. (ft)   *          * 18.49 *
*
* Min Ch El (ft)          * 434.00 * Shear (lb/sq ft)   *          * 0.30 *
*
* Alpha                   * 1.00 * Stream Power (lb/ft s) * 450.08 * 0.00 *
0.00 *
* Frctn Loss (ft)         * 0.33 * Cum Volume (acre-ft) *          * 0.10 *
0.00 *
* C & E Loss (ft)         * 0.01 * Cum SA (acres)      *          * 0.14 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
 REACH: Cl_Creek_Prop RS: 300

INPUT

Description:

Station Elevation Data		num= 94		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4381.670013	437.912.040009	437.92.799988	437.917.959991	438				
9.76001	438.09	11.25	438.13	12.53	438.1213.73001	438.117.42999	438		
17.45999	438	23.09	437.8923.70001	437.9	26.87	438	31.97	438.16	
47.62	438.63	49.97	438.6950.79999	438.7153.39999	438.7578.86002	439.14			
81.34	439.1690.20999	439.2993.76999	439.32	94.19	439.3296.86002	439.33			
107.93	439.3	130.48	439.21	131.76	439.21	132.54	439.21	132.61	439.21
134.01	439.19	155.94	438.93	162.28	438.88	166.2	438.83	170.8	438.75
177.24	438.65	181.73	438.56	191.54	438.34	192.53	438.32	201.72	438.03

Prop_Condn_100yr.rep									
201.79	438.03	202.64	438	211.35	437.72	213.52	437.63	222.95	437.37
225.61	437.28	228.58	437.18	241.6	436.71	252.81	436.31	257.5	436.13
260.41	436	262.63	435.82	270.78	435.07	282.5	434	285.96	432.79
288.09	432	288.76	432	288.83	432	289.24	432	292.77	433.4
293.39	433.55	293.63	433.62	294.63	433.73	295.2	433.85	296.3	434
300.68	434.27	301.29	434.42	302.3	434.66	303.11	434.77	309	436
311.47	436.19	314.47	436.44	333.07	438	340.38	438.86	349.45	439.9
350.06	439.97	350.32	440	355.45	440.63	364.47	442	366	442.17
380.3	444	386.88	444.67	391.7	445.13	400.77	446	411.39	446.96
423.34	448	430.04	448.27	439.97	448.55	452.04	448.94	455.86	449.06
458.59	449.14	460.88	449.2	463.17	449.25	476.72	449.39		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.02	270.78	.02	301.29	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	270.78	301.29		49.5	50		.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 433.96	* Element	* Left OB	* Channel	*
Right OB	*				
* Vel Head (ft)	* 0.43	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 433.53	* Reach Len. (ft)	* 49.50	* 50.00	*
49.57	*				
* Crit W.S. (ft)	* 433.53	* Flow Area (sq ft)	*	* 7.94	*
* E.G. Slope (ft/ft)	*0.006894	* Area (sq ft)	*	* 7.94	*
* Q Total (cfs)	* 41.90	* Flow (cfs)	*	* 41.90	*
* Top Width (ft)	* 9.47	* Top Width (ft)	*	* 9.47	*
* Vel Total (ft/s)	* 5.28	* Avg. Vel. (ft/s)	*	* 5.28	*
* Max Chl Dpth (ft)	* 1.53	* Hydr. Depth (ft)	*	* 0.84	*
* Conv. Total (cfs)	* 504.6	* Conv. (cfs)	*	* 504.6	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 10.02	*
* Min Ch El (ft)	* 432.00	* Shear (lb/sq ft)	*	* 0.34	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 476.72	* 0.00	*
0.00	*				
* Frctn Loss (ft)	* 0.35	* Cum Volume (acre-ft)	*	* 0.07	*
0.00	*				
* C & E Loss (ft)	* 0.03	* Cum SA (acres)	*	* 0.11	*
0.00	*				

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set

equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
* E.G. Elev (ft)      * 434.32 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.48 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 433.84 * Reach Len. (ft) * 49.50 * 50.00 *
49.57 *
* Crit W.S. (ft)      * 433.84 * Flow Area (sq ft) *      * 11.33 *
*
* E.G. Slope (ft/ft)  * 0.006596 * Area (sq ft)     *      * 11.33 *
*
* Q Total (cfs)       * 62.85 * Flow (cfs)       *      * 62.85 *
*
* Top Width (ft)      * 12.23 * Top Width (ft)    *      * 12.23 *
*
* Vel Total (ft/s)    * 5.55 * Avg. Vel. (ft/s) *      * 5.55 *
*
* Max Chl Dpth (ft)   * 1.84 * Hydr. Depth (ft) *      * 0.93 *
*
* Conv. Total (cfs)   * 773.8 * Conv. (cfs)      *      * 773.8 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *      * 12.87 *
*
* Min Ch El (ft)      * 432.00 * Shear (lb/sq ft) *      * 0.36 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 476.72 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.34 * Cum Volume (acre-ft) *      * 0.09 *
0.00 *
* C & E Loss (ft)     * 0.03 * Cum SA (acres)     *      * 0.13 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is
not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 250

INPUT

Description:

Station	Elevation	Data	num=	127	Station	Elevation	Station	Elevation	Station	Elevation	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

Prop_Condn_100yr.rep

```

*****
0      437 3.23999 436.495.089996 436.556.429993 436.627.570007 436.64
8.700012 436.629.839996 436.58 10.91 436.56 11.81 436.5612.92999 436.57
16.78 436.6 20.59 436.38 20.91 436.3620.98001 436.36 21.12 436.36
22.53 436.38 22.87 436.39 23.13 436.39 23.34 436.38 23.88 436.38
24.94 436.3525.05002 436.3626.08002 436.3931.58002 436.5534.57001 436.59
38.42999 436.6842.51001 436.846.95999 436.9349.14001 436.98 56 437.19
72.42001 437.4876.85001 437.5692.29001 437.83 93.5 437.8596.67999 437.89
97.72 437.9 127.65 437.78 128.75 437.78 130.1 437.78 133.37 437.76
140.11 437.75 145.79 437.68 153.75 437.6 159.86 437.54 164.2 437.51
168.78 437.48 188.77 437.17 192.64 437.13 195.86 437.08 197.66 437.05
199.79 437.01 202.24 436.95 205.81 436.9 215.66 436.65 228.82 436.28
232.85 436.2 233.81 436.18 237.76 436.05 239.28 436 244.32 435.82
246.8 435.71 256.47 435.35 272.35 434.86 277.07 434.57 279.82 434.43
280.38 434.41 281.72 434.38 283.94 434.29 292.07 434 304.52 433.27
307.87 433.07 309.03 432.92 311.51 432.57 314.12 432.15 314.93 432
319.62 431.01 320.82 430.78 321.35 430.67 321.99 430.45 322.44 430.28
322.55 430.22 322.68 430.17 322.85 430.16 322.87 430.16 323.33 430.16
323.35 430.17 323.4 430.17 323.51 430.18 323.65 430.2 323.69 430.21
324.08 430.31 324.25 430.35 324.49 430.39 325.03 430.45 327.09 430.74
328.55 430.9 335.38 431.83 336.6 432 338.94 432.33 341.29 432.61
345.12 433.12 349.8 433.67 352.45 434 354.68 434.51 359.87 436
371.69 437.89 372.43 438 376.79 438.46 391.24 440 393.29 440.27
396 440.63 404.18 441.7 406.65 442 410.03 442.46 421.48 444
432.2 444.91 434.75 445.14 445.23 446 456.38 446.75 463.98 447.08
466.38 447.19 468.6 447.3 480.94 448 485.76 448.08 490.09 448.16
509.8 448.84 514.38 449

```

```

Manning's n Values      num=      3
Sta  n Val      Sta  n Val      Sta  n Val
*****
0      .02 304.52      .02 335.38      .02

```

```

Bank Sta: Left      Right      Lengths: Left Channel      Right      Coeff Contr.      Expan.
          304.52 335.38          49.83      50      50.53          .1          .3

```

CROSS SECTION OUTPUT Profile #Q-100yr

```

*****
* E.G. Elev (ft)      * 431.76 * Element      * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.32 * Wt. n-Val.      *      * 0.020 *
*
* W.S. Elev (ft)      * 431.44 * Reach Len. (ft) * 49.83 * 50.00 *
50.53 *
* Crit W.S. (ft)      * 431.44 * Flow Area (sq ft) *      * 9.26 *
*
* E.G. Slope (ft/ft) *0.007179 * Area (sq ft)      *      * 9.26 *
*
* Q Total (cfs)      * 41.90 * Flow (cfs)      *      * 41.90 *
*
* Top Width (ft)      * 14.93 * Top Width (ft)      *      * 14.93 *
*
* Vel Total (ft/s)      * 4.53 * Avg. Vel. (ft/s) *      * 4.53 *
*
* Max Chl Dpth (ft) * 1.28 * Hydr. Depth (ft) *      * 0.62 *
*
* Conv. Total (cfs) * 494.5 * Conv. (cfs)      *      * 494.5 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 15.19 *
*
* Min Ch El (ft) * 430.16 * Shear (lb/sq ft) *      * 0.27 *
*

```

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) * 514.38 *      0.00 *
  0.00 *
* Frctn Loss (ft) *      0.36 * Cum Volume (acre-ft) *      *      0.06 *
  0.00 *
* C & E Loss (ft) *      0.01 * Cum SA (acres) *      *      0.10 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```

*****
*****
* E.G. Elev (ft) * 432.03 * Element * Left OB * Channel *
Right OB *
* Vel Head (ft) * 0.37 * Wt. n-Val. *      * 0.020 *
*
* W.S. Elev (ft) * 431.66 * Reach Len. (ft) * 49.83 * 50.00 *
50.53 *
* Crit W.S. (ft) * 431.66 * Flow Area (sq ft) *      * 12.80 *
*
* E.G. Slope (ft/ft) * 0.006814 * Area (sq ft) *      * 12.80 *
*
* Q Total (cfs) * 62.85 * Flow (cfs) *      * 62.85 *
*
* Top Width (ft) * 17.56 * Top Width (ft) *      * 17.56 *
*
* Vel Total (ft/s) * 4.91 * Avg. Vel. (ft/s) *      * 4.91 *
*
* Max Chl Dpth (ft) * 1.50 * Hydr. Depth (ft) *      * 0.73 *
*
* Conv. Total (cfs) * 761.4 * Conv. (cfs) *      * 761.4 *
*
* Length Wtd. (ft) * 50.00 * Wetted Per. (ft) *      * 17.86 *
*
* Min Ch El (ft) * 430.16 * Shear (lb/sq ft) *      * 0.30 *
*
* Alpha      * 1.00 * Stream Power (lb/ft s) * 514.38 * 0.00 *
  0.00 *
* Frctn Loss (ft) * 0.34 * Cum Volume (acre-ft) *      * 0.08 *
  0.00 *
* C & E Loss (ft) * 0.01 * Cum SA (acres) *      * 0.11 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Prop_Condn_100yr.rep

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
REACH: CL_Creek_Prop RS: 200

INPUT

Description:

Station Elevation Data		num= 121		Elev		Sta		Elev		Sta		Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4342.340027	433.884.200012	433.85.110046	433.785.960022	433.79								
6.860046	433.827.960022	433.89 9.51001	43420.63004	434.3921.02002	434.4								
22.10004	434.4129.30002	434.5133.39001	434.6143.50003	434.6846.03003	434.7								
47.92001	434.7550.35004	434.7953.85004	434.8656.41003	434.9160.67001	435.02								
68.16003	435.1871.07001	435.2374.78003	435.2878.10004	435.3682.15002	435.39								
96.98001	435.53 102.96	435.57 106.13	435.59 118.41	435.63 127.91	435.6								
128.6	435.59 136.62	435.61 137.45	435.6 147.28	435.58 151.74	435.56								
159.19	435.58 160.04	435.58 170.25	435.61 172.33	435.63 176.28	435.62								
177.44	435.63 178.45	435.62 180.99	435.59 183.25	435.57 206.09	435.21								
206.16	435.21 206.25	435.21 206.5	435.21 206.64	435.21 206.77	435.21								
207.07	435.21 207.69	435.2 230.28	434.99 232.1	434.96 234.07	434.95								
235.94	434.91 237.58	434.91 240.19	434.91 241.54	434.91 243.31	434.89								
245.87	434.83 249.64	434.73 263.89	434.31 264.85	434.29 267.19	434.23								
274.24	434 294.09	433.1 300.28	432.74 310.01	432.15 310.55	432.12								
312.46	432 320.13	430.42 321.75	430.08 322.11	430 329.35	428.88								
335.75	428 336.23	427.9 337.27	427.77 338.12	427.71 338.69	427.7								
338.73	427.7 339.42	427.72 341	427.8 342.55	427.9 343.55	428								
353.41	429.77 354.48	429.97 354.66	430 354.7	430.01 354.73	430.02								
354.74	430.02 354.75	430.02 354.76	430.02 355.1	430.11 362.72	432								
364.25	432.52 366.03	433.15 368.39	434 370.02	434.16 396.32	436								
403.2	436.56 407.8	437.03 411.92	437.41 417.62	438 433.59	439.6								
434.13	439.65 438.16	440 451.33	441.24 458.45	442 467.38	443.02								
476.99	444 479.33	444.17 484.29	444.51 493.12	445.18 498.76	445.57								
502.37	445.85 503.85	445.97 504.7	445.75 504.76	445.74 505.12	445.75								
518.96	446.29												

Manning's n Values		num= 3		Sta		n Val	
Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
0	.02	321.75	.02	353.41	.02		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	321.75	353.41		51.69 50	50.23	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 428.97	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.30	* Wt. n-Val.	* 0.020	*
* W.S. Elev (ft)	* 428.67	* Reach Len. (ft)	* 51.69	* 50.00
50.23				
* Crit W.S. (ft)	* 428.67	* Flow Area (sq ft)	* 9.56	*
* E.G. Slope (ft/ft)	* 0.007215	* Area (sq ft)	* 9.56	*

Prop_Condn_100yr.rep

* Q Total (cfs)	* 41.90	* Flow (cfs)	* 41.90
* Top Width (ft)	* 16.40	* Top Width (ft)	* 16.40
* Vel Total (ft/s)	* 4.38	* Avg. Vel. (ft/s)	* 4.38
* Max Chl Dpth (ft)	* 0.97	* Hydr. Depth (ft)	* 0.58
* Conv. Total (cfs)	* 493.3	* Conv. (cfs)	* 493.3
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	* 16.54
* Min Ch El (ft)	* 427.70	* Shear (lb/sq ft)	* 0.26
* Alpha 0.00	* 1.00	* Stream Power (lb/ft s)	* 518.96
* Frctn Loss (ft) 0.00	* 0.36	* Cum Volume (acre-ft)	* 0.04
* C & E Loss (ft) 0.00	* 0.00	* Cum SA (acres)	* 0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	* 429.23	* Element	* Left OB	* Channel
Right OB				
* Vel Head (ft)	* 0.35	* Wt. n-Val.	* 0.020	
* W.S. Elev (ft)	* 428.87	* Reach Len. (ft)	* 51.69	* 50.00
50.23				
* Crit W.S. (ft)	* 428.87	* Flow Area (sq ft)	* 13.17	
* E.G. Slope (ft/ft)	* 0.006813	* Area (sq ft)	* 13.17	
* Q Total (cfs)	* 62.85	* Flow (cfs)	* 62.85	
* Top Width (ft)	* 19.02	* Top Width (ft)	* 19.02	
* Vel Total (ft/s)	* 4.77	* Avg. Vel. (ft/s)	* 4.77	
* Max Chl Dpth (ft)	* 1.17	* Hydr. Depth (ft)	* 0.69	
* Conv. Total (cfs)	* 761.4	* Conv. (cfs)	* 761.4	
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	* 19.19	
* Min Ch El (ft)	* 427.70	* Shear (lb/sq ft)	* 0.29	

```

Prop_Condn_100yr.rep
* Alpha      *      1.00 * Stream Power (lb/ft s) *      518.96 *      0.00 *
  0.00      *
* Frctn Loss (ft) *      0.34 * Cum Volume (acre-ft) *      *      0.06 *
  0.00      *
* C & E Loss (ft) *      0.00 * Cum SA (acres) *      *      0.09 *
  0.00      *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 150

INPUT

Description:

Station Elevation Data		num= 143		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4348.119995	432.07	9.51001	432.04	11	432.09	12.51001	432.18	
16.72	432.51	18.22	432.57	27.07001	432.57	31.57001	432.33	32.34	432.29
32.63	432.28	32.76999	432.28	32.89999	432.28	33.04001	432.28	33.20999	432.29
34.17001	432.36	34.23001	432.36	34.42001	432.37	35.92001	432.39	50.35001	432.49
52.28	432.5	57.5	432.56	61.89001	432.62	66.98001	432.69	93.31	433.33
97.5	433.41	102.45	433.49	104.14	433.52	104.63	433.52	106.77	433.5
111.66	433.55	114.87	433.52	119.3	433.54	122.78	433.5	128.36	433.5
129.97	433.49	143.03	433.29	144.14	433.27	147.72	433.2	150.45	433.14
151.3	433.13	152.07	433.12	153.02	433.11	157.3	433.1	173.85	432.98
177.64	432.99	179.71	433.01	185.57	433.05	191.75	433.09	195.2	433.1
200.17	433.14	203.19	433.13	205.97	433.16	211.66	433.11	212.95	433.13
214.28	433.12	215.96	433.13	221.09	433.15	226.83	433.24	229.73	433.24
232.37	433.27	262.73	433.13	263.34	433.13	264.57	433.11	266.12	433.1
266.47	433.1	266.74	433.1	267.21	433.1	267.43	433.1	267.65	433.1
293.6	432.63	296.5	432.56	297.71	432.53	300.74	432.47	303.75	432.42
306.47	432.4	308.81	432.4	310.79	432.41	313.89	432.46	315.27	432.45
316.77	432.4	320.64	432.21	325.12	432	330.77	430.82	334.48	430.04
334.69	430	335.54	429.68	337.91	428.87	340.25	428	340.77	427.88
342.09	427.4	342.72	427.27	343.5	427.16	344.63	427.05	346.94	426.87
348.53	426.71	349.11	426.61	349.9	426.5	350.09	426.46	350.28	426.44
350.35	426.43	350.57	426.42	350.72	426.42	350.89	426.42	351.26	426.44
351.61	426.46	352.26	426.53	353.86	426.72	354.74	426.83	359.73	427.6
362.1	428	366.57	428.66	366.94	428.71	374.92	430	381.78	431.15
391.35	432	403.05	432.71	410.25	433.2	422.35	434	422.5	434.01
430.72	434.53	431.01	434.54	435.52	434.81	439.36	435.03	441.88	435.15
443.14	435.2	443.74	435.22	445.09	435.26	448.2	435.32	452.77	435.33
453.61	435.35	454.32	435.38	462.45	435.77	462.93	435.79	466.46	436
474.96	436.65	480.55	437.06	487.19	437.57	490.15	437.8	492.27	438
495.48	438.32	496.99	438.48	501.47	439				

Manning's n Values

num= 3


```

Prop_Condn_100yr.rep
Sta   n Val   Sta   n Val   Sta   n Val
*****
0      .02  334.48      .02  366.57      .02

Bank Sta: Left   Right   Lengths: Left Channel   Right   Coeff Contr.   Expan.
          334.48  366.57          50.7      50      50.4          .1          .3

CROSS SECTION OUTPUT  Profile #Q-100yr
*****
* E.G. Elev (ft)      * 427.75 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.29 * Wt. n-Val.      *          * 0.020 *
*
* W.S. Elev (ft)      * 427.46 * Reach Len. (ft)  * 50.70 * 50.00 *
50.40 *
* Crit W.S. (ft)      * 427.46 * Flow Area (sq ft) *          * 9.67 *
*
* E.G. Slope (ft/ft)  * 0.007245 * Area (sq ft)     *          * 9.67 *
*
* Q Total (cfs)       * 41.90 * Flow (cfs)       *          * 41.90 *
*
* Top Width (ft)      * 16.90 * Top Width (ft)   *          * 16.90 *
*
* Vel Total (ft/s)    * 4.33 * Avg. Vel. (ft/s) *          * 4.33 *
*
* Max Chl Dpth (ft)   * 1.04 * Hydr. Depth (ft) *          * 0.57 *
*
* Conv. Total (cfs)   * 492.3 * Conv. (cfs)      *          * 492.3 *
*
* Length Wtd. (ft)    * 50.00 * Wetted Per. (ft) *          * 17.04 *
*
* Min Ch El (ft)      * 426.42 * Shear (lb/sq ft) *          * 0.26 *
*
* Alpha              * 1.00 * Stream Power (lb/ft s) * 501.47 * 0.00 *
0.00 *
* Frctn Loss (ft)    * 0.36 * Cum Volume (acre-ft) *          * 0.03 *
0.00 *
* C & E Loss (ft)    * 0.00 * Cum SA (acres)    *          * 0.06 *
0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

```

CROSS SECTION OUTPUT  Profile #1.5 X Q-100yr
*****
* E.G. Elev (ft)      * 428.01 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.36 * Wt. n-Val.      *          * 0.020 *
*
* W.S. Elev (ft)      * 427.65 * Reach Len. (ft)  * 50.70 * 50.00 *
50.40 *
* Crit W.S. (ft)      * 427.65 * Flow Area (sq ft) *          * 13.05 *
*

```

```

                                Prop_Condn_100yr.rep
* E.G. Slope (ft/ft)      *0.006847 * Area (sq ft)          *      *      13.05 *
* Q Total (cfs)          *   62.85 * Flow (cfs)          *      *      62.85 *
* Top Width (ft)         *   18.62 * Top Width (ft)       *      *      18.62 *
* Vel Total (ft/s)       *    4.82 * Avg. Vel. (ft/s)     *      *      4.82 *
* Max Chl Dpth (ft)      *    1.23 * Hydr. Depth (ft)     *      *      0.70 *
* Conv. Total (cfs)      *   759.6 * Conv. (cfs)          *      *      759.6 *
* Length Wtd. (ft)       *   50.00 * Wetted Per. (ft)     *      *      18.82 *
* Min Ch El (ft)         *  426.42 * Shear (lb/sq ft)     *      *      0.30 *
* Alpha                  *    1.00 * Stream Power (lb/ft s) * 501.47 *      0.00 *
  0.00 *
* Frctn Loss (ft)        *    0.34 * Cum Volume (acre-ft) *      *      0.05 *
  0.00 *
* C & E Loss (ft)        *    0.00 * Cum SA (acres)       *      *      0.07 *
  0.00 *
*****
*****

```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: CL_Creek_Prop
 REACH: CL_Creek_Prop RS: 100

INPUT

Description:

Station Elevation Data				num=	134				
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4306.160004	43010.07999	430.06	11.59	430.0914.11002	430.1			
22.67001	430.1427.54001	430.17	34.91	430.2442.01999	430.32	45.37	430.36		
46.64001	430.3748.20999	430.3849.98999	430.3851.76001	430.3757.14001	430.34				
59.64001	430.33	75.12	430.6380.92001	430.62	86.62	430.6488.73001	430.69		
96.26001	430.7296.98001	430.7399.61002	430.71	102.64	430.67	109.06	430.53		
115.4	430.52	117.02	430.48	118.35	430.48	119.58	430.56		
123.79	430.59	125.37	430.6	129.68	430.6	136.71	430.58		
141.6	430.57	142.69	430.56	146.62	430.52	159.71	430.51		
165.67	430.51	167.61	430.52	169.11	430.54	171.62	430.61		
181.33	430.64	187.09	430.7	213.16	431.01	215.32	431.06		
217.98	431.08	218.21	431.08	219.07	431.09	244.76	431.41	250.98	431.41
256.62	431.44	257.59	431.43	258.48	431.43	259.63	431.41	267.17	431.42
270.67	431.36	272.49	431.35	290.13	431.04	292.84	431.01	296.85	430.93
299.05	430.89	303.9	430.8	306.68	430.76	308.93	430.74	309.48	430.78
338.08	430.08	340.56	430.01	340.91	430	341.29	429.81	344.68	428
348.01	426.44	349.54	426	352.87	426	353.94	426	356.17	426
357.36	426	366.88	427.44	370.37	428	370.61	428.01	371.35	428.06
373.42	428.14	376.28	428.28	377.76	428.34	378.79	428.39	379.13	428.38

Prop_Condn_100yr.rep									
379.49	428.31	380.25	428.34	381.71	428.41	385.66	428.62	408.47	429.89
408.9	429.92	409.06	429.93	409.19	429.94	409.27	429.94	409.36	429.95
409.39	429.95	409.5	429.96	409.58	429.96	409.75	429.97	410.44	430
412.55	430.17	412.67	430.18	412.84	430.19	416.15	430.47	417.35	430.49
418.63	430.61	420.22	430.76	424.01	431.06	424.95	431.12	425.71	431.15
426.5	431.18	427.51	431.19	428.05	431.19	428.6	431.18	430.53	431.13
431.77	431.12	434.25	431.13	434.82	431.15	435.41	431.18	435.75	431.18
437.73	431.17	439.88	431.19	442.67	431.22	444.07	431.25	444.63	431.28
454.47	432	459	432.38	459.66	432.44	476.97	434		

Manning's n Values					
Sta	n Val	Sta	n Val	Sta	n Val
0	.02	340.56	.02	370.61	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	340.56	370.61		48.38	50	50.42	.1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 427.11	* Element	* Left OB	* Channel	*
Right OB *					
* Vel Head (ft)	* 0.31	* Wt. n-Val.	*	* 0.020	*
* W.S. Elev (ft)	* 426.80	* Reach Len. (ft)	* 48.38	* 50.00	*
50.42 *					
* Crit W.S. (ft)	* 426.80	* Flow Area (sq ft)	*	* 9.43	*
* E.G. Slope (ft/ft)	*0.007008	* Area (sq ft)	*	* 9.43	*
* Q Total (cfs)	* 41.90	* Flow (cfs)	*	* 41.90	*
* Top Width (ft)	* 15.43	* Top Width (ft)	*	* 15.43	*
* Vel Total (ft/s)	* 4.44	* Avg. Vel. (ft/s)	*	* 4.44	*
* Max Chl Dpth (ft)	* 0.80	* Hydr. Depth (ft)	*	* 0.61	*
* Conv. Total (cfs)	* 500.5	* Conv. (cfs)	*	* 500.5	*
* Length Wtd. (ft)	* 50.00	* Wetted Per. (ft)	*	* 15.63	*
* Min Ch El (ft)	* 426.00	* Shear (lb/sq ft)	*	* 0.26	*
* Alpha	* 1.00	* Stream Power (lb/ft s)	* 476.97	* 0.00	*
0.00 *					
* Frctn Loss (ft)	* 0.36	* Cum Volume (acre-ft)	*	* 0.02	*
0.00 *					
* C & E Loss (ft)	* 0.01	* Cum SA (acres)	*	* 0.04	*
0.00 *					

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is

Prop_Condn_100yr.rep
not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

```
*****
*****
* E.G. Elev (ft)      * 427.38 * Element          * Left OB * Channel *
Right OB *
* Vel Head (ft)      * 0.38 * Wt. n-Val.        *          * 0.020 *
*
* W.S. Elev (ft)      * 427.01 * Reach Len. (ft)   * 48.38 * 50.00 *
50.42 *
* Crit W.S. (ft)      * 427.01 * Flow Area (sq ft) *          * 12.77 *
*
* E.G. Slope (ft/ft)   * 0.006675 * Area (sq ft)      *          * 12.77 *
*
* Q Total (cfs)        * 62.85 * Flow (cfs)        *          * 62.85 *
*
* Top Width (ft)       * 17.21 * Top Width (ft)     *          * 17.21 *
*
* Vel Total (ft/s)     * 4.92 * Avg. Vel. (ft/s)  *          * 4.92 *
*
* Max Chl Dpth (ft)    * 1.01 * Hydr. Depth (ft)  *          * 0.74 *
*
* Conv. Total (cfs)    * 769.2 * Conv. (cfs)       *          * 769.2 *
*
* Length Wtd. (ft)     * 50.00 * Wetted Per. (ft)  *          * 17.48 *
*
* Min Ch El (ft)       * 426.00 * Shear (lb/sq ft)  *          * 0.30 *
*
* Alpha               * 1.00 * Stream Power (lb/ft s) * 476.97 * 0.00 *
0.00 *
* Frctn Loss (ft)     * 0.34 * Cum Volume (acre-ft) *          * 0.03 *
0.00 *
* C & E Loss (ft)     * 0.01 * Cum SA (acres)     *          * 0.05 *
0.00 *
*****
*****
```

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop
REACH: Cl_Creek_Prop RS: 50

INPUT

Description:

Station	Elevation	Data	num=	176	Station	Elevation	Station	Elevation	Station	Elevation
0	430.282	300049	430.525	920044	430.888	780029	431.139	119995	431.16	

Prop_Condn_100yr.rep

9.300049	431.169.390015	431.1611.90002	430.8713.96002	430.5914.15002	430.59
17.77002	43022.91003	428.8426.86002	42829.90002	427.2530.90002	427.08
31.80002	427.0132.35004	427.0635.12003	426.636.57004	426.3736.76001	426.35
36.85004	426.3537.00003	426.3540.06003	426.4740.46002	426.4947.19003	426.8
48.52002	426.8350.36002	426.951.64001	426.9452.49002	426.9653.41003	426.97
57.35004	427.0564.08002	427.1765.91003	427.2179.30002	427.4688.83002	427.66
104.04	428 104.14	428 106.83	428.03 109.33	428.04 112.06	428.02
113.35	428 118.81	427.93 121.98	427.93 124.89	427.99 125	428
128.58	428.09 133.18	428.23 133.67	428.24 134.33	428.24 142.84	428.18
153.07	428.11 157.29	428.09 163.22	428.09 164.65	428.08 164.83	428.08
183.94	428.15 184.57	428.14 184.76	428.13 184.9	428.13 185.02	428.14
185.34	428.14 185.53	428.14 190.07	428.17 190.31	428.17 193.77	428.2
194.55	428.2 200.04	428.28 201.39	428.28 202.87	428.27 208.2	428.19
208.71	428.2 219.91	428 222.98	427.93 224.61	427.91 226.01	427.91
227.54	427.94 230.27	428 240.25	428.37 242.87	428.44 245.12	428.47
250.31	428.52 252.39	428.55 254.31	428.59 263.7	428.61 269.77	428.75
272.82	428.81 277.54	428.92 279.28	428.95 287.37	429.16 294.62	429.19
296.4	429.23 296.96	429.24 298.05	429.24 306.28	429.2 318.96	429.22
339.1	429.03 339.3	429.03 339.51	429.02 339.74	429.02 340.31	429.01
340.77	429.01 367.05	428.78 372.54	428.69 380.17	428.6 381.98	428.57
384.69	428.53 385.87	428.51 386.93	428.51 387.77	428.52 388.44	428.54
389.96	428.6 390.23	428.62 391.62	428.71 395.24	428.95 400.11	428.87
401.82	429.03 403.48	429 407.06	429.35 407.72	429.35 408.26	429.36
408.64	429.36 409.36	429.34 410.24	429.44 411.32	429.38 412.12	429.45
413.51	429.32 414.24	429.33 416.47	428.91 417.04	428.86 417.34	428.75
419.54	428 425.01	426.25 425.65	426 430.43	425.01 431.75	424.7
432.29	424.57 432.84	424.55 433.22	424.54 433.51	424.56 433.55	424.57
433.73	424.59 435.69	424.78 447.65	425.92 448.54	426 459.11	426.74
460.36	426.81 463.03	426.95 464.22	427.02 466.04	427.14 467.13	427.23
468.23	427.34 471.17	427.68 473.62	427.94 474.27	428 486.44	428.69
487.3	428.72 489.59	428.76 490.56	428.76 491.73	428.75 493.27	428.75
495.25	428.8 498.35	428.9 500	428.96 501.76	429.05 506.4	429.29
508.35	429.37 511.54	429.54 511.83	429.55 513.2	429.51 513.86	429.5
514.42	429.5 516.38	429.63 521.54	429.93 522.48	430 528.92	430.91
531.65	431.26				

Manning's n Values

Sta	n Val	Sta	n Val	Sta	n Val
0	.02	417.34	.02	447.65	.02

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	417.34	447.65		51.51	50	.1	.3

CROSS SECTION OUTPUT Profile #Q-100yr

* E.G. Elev (ft)	* 425.92	* Element	* Left OB	* Channel
Right OB *				
* Vel Head (ft)	* 0.29	* Wt. n-Val.	* 0.020	*
* W.S. Elev (ft)	* 425.63	* Reach Len. (ft)	* 51.51	* 50.00
50.01 *				
* Crit W.S. (ft)	* 425.63	* Flow Area (sq ft)	* 9.72	*
* E.G. Slope (ft/ft)	* 0.007302	* Area (sq ft)	* 9.72	*
* Q Total (cfs)	* 41.90	* Flow (cfs)	* 41.90	*
* Top Width (ft)	* 17.21	* Top Width (ft)	* 17.21	*
* Vel Total (ft/s)	* 4.31	* Avg. Vel. (ft/s)	* 4.31	*

Prop_Condn_100yr.rep					
* Max Chl Dpth (ft)	*	1.09	* Hydr. Depth (ft)	*	0.56
* Conv. Total (cfs)	*	490.3	* Conv. (cfs)	*	490.3
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*	17.38
* Min Ch El (ft)	*	424.54	* Shear (lb/sq ft)	*	0.25
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	531.65
0.00	*			*	0.00
* Frctn Loss (ft)	*	0.37	* Cum Volume (acre-ft)	*	0.01
0.00	*			*	
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*	0.02
0.00	*			*	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

* E.G. Elev (ft)	*	426.17	* Element	*	Left OB	* Channel
Right OB	*			*		
* Vel Head (ft)	*	0.34	* Wt. n-Val.	*		0.020
* W.S. Elev (ft)	*	425.84	* Reach Len. (ft)	*	51.51	50.00
50.01	*			*		
* Crit W.S. (ft)	*	425.84	* Flow Area (sq ft)	*		13.52
* E.G. Slope (ft/ft)	*	0.006822	* Area (sq ft)	*		13.52
* Q Total (cfs)	*	62.85	* Flow (cfs)	*		62.85
* Top Width (ft)	*	20.31	* Top Width (ft)	*		20.31
* Vel Total (ft/s)	*	4.65	* Avg. Vel. (ft/s)	*		4.65
* Max Chl Dpth (ft)	*	1.30	* Hydr. Depth (ft)	*		0.67
* Conv. Total (cfs)	*	760.9	* Conv. (cfs)	*		760.9
* Length Wtd. (ft)	*	50.00	* Wetted Per. (ft)	*		20.51
* Min Ch El (ft)	*	424.54	* Shear (lb/sq ft)	*		0.28
* Alpha	*	1.00	* Stream Power (lb/ft s)	*	531.65	0.00
0.00	*			*		
* Frctn Loss (ft)	*	0.33	* Cum Volume (acre-ft)	*		0.02
0.00	*			*		
* C & E Loss (ft)	*	0.01	* Cum SA (acres)	*		0.02
0.00	*			*		

Prop_Condn_100yr.rep

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION

RIVER: Cl_Creek_Prop

REACH: Cl_Creek_Prop RS: 0

INPUT

Description:

Station Elevation Data num= 175

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	4251.840027	424.473.340027	424	5.77002	423.867.410034	423.78			
7.890015	423.778.299988	423.7811.14001	424	23.59003	424.34	28.56	424.47		
30.77002	424.52	31.69	424.54	32.25	424.54	32.81	424.5433.70001	424.53	
35.12003	424.536.52002	424.538.40002	424.5440.36002	424.5942.09003	424.65				
43.43002	424.71	45.28	424.845.58002	424.8	46	424.8148.87003	424.81		
50.81	424.8173.09003	425.2678.07001	425.2979.52002	425.380.89001	425.32				
82.08002	425.34	105.06	425.46	107.2	425.5	108.04	425.51	108.85	425.52
110.63	425.51	111.53	425.51	115.23	425.53	117.03	425.55	117.77	425.56
127.46	425.64	132.65	425.76	134.27	425.78	139.72	425.84	155.84	425.96
163.34	426	163.37	426	163.38	426	165.75	426	165.76	426
165.77	426	171.16	425.96	171.38	425.96	186.39	425.82	187.51	425.82
194.7	425.77	197.27	425.76	199.34	425.77	201.36	425.81	203.71	425.89
206.65	426	212.2	426.15	214.33	426.2	216.79	426.24	229.6	426.4
230.29	426.41	235.13	426.45	237.06	426.47	243.05	426.5	256.78	426.6
258.99	426.63	260.19	426.64	264.68	426.67	265.84	426.68	266.74	426.7
267.5	426.71	268.22	426.71	269.8	426.7	275.25	426.7	278.6	426.7
288.12	426.97	289.41	426.96	290.64	426.95	292	426.94	299.82	426.8
308.16	426.75	312.26	426.68	314.18	426.66	317.12	426.65	322.93	426.6
323.92	426.61	324.8	426.63	326.45	426.62	329.12	426.68	330.99	426.71
333.09	426.74	335.4	426.74	340.13	426.73	357.2	426.44	358.58	426.44
358.84	426.44	359.04	426.44	359.53	426.43	359.92	426.42	360.46	426.42
361.15	426.42	363.63	426.43	365.7	426.43	365.79	426.42	366.07	426.42
377.26	426.28	394.6	426.19	396.98	426.12	397.67	426.11	399.07	426.07
400.08	426.06	401.72	426.06	402.65	426.08	404.94	426.13	405.98	426.13
406.87	426.08	407.71	426	410.18	425.67	417.75	424.78	424.42	424
429.73	422.56	430.15	422.45	430.47	422.39	430.98	422.31	431.42	422.25
431.62	422.23	432.04	422.2	432.22	422.18	432.43	422.14	432.53	422.13
432.66	422.13	432.85	422.14	432.86	422.14	433.45	422.18	435.16	422.27
442.75	422.79	448.35	423.07	467.54	424	473.7	424.53	474.86	424.6
476.42	424.65	480.86	424.76	487.38	425.15	490.47	425.2	491.85	425.29
492.63	425.34	493.16	425.36	493.71	425.39	494.25	425.39	494.74	425.4
495.33	425.39	496.09	425.4	497.15	425.35	498.08	425.34	500.18	425.32
501.35	425.32	501.74	425.33	503.36	425.41	505.42	425.49	509.39	425.62
510.43	425.66	511.11	425.71	512.33	425.83	514.8	425.99	514.97	426
519.27	426.62	530.29	428	533.98	429.27	535.81	430	536.95	430.33

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val
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 0 .02 417.75 .02 448.35 .02

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 417.75 448.35 0 0 0 .1 .3

CROSS SECTION OUTPUT Profile #Q-100yr

 * E.G. Elev (ft) * 423.35 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.26 * Wt. n-Val. * * 0.020 *
 0.020 *
 * W.S. Elev (ft) * 423.09 * Reach Len. (ft) * * *
 *
 * Crit W.S. (ft) * 423.09 * Flow Area (sq ft) * * 10.27 *
 0.01 *
 * E.G. Slope (ft/ft) * 0.007682 * Area (sq ft) * * 10.27 *
 0.01 *
 * Q Total (cfs) * 41.90 * Flow (cfs) * * 41.90 *
 0.00 *
 * Top Width (ft) * 21.08 * Top Width (ft) * * 20.59 *
 0.49 *
 * Vel Total (ft/s) * 4.08 * Avg. Vel. (ft/s) * * 4.08 *
 0.34 *
 * Max Chl Dpth (ft) * 0.96 * Hydr. Depth (ft) * * 0.50 *
 0.01 *
 * Conv. Total (cfs) * 478.0 * Conv. (cfs) * * 478.0 *
 0.0 *
 * Length Wtd. (ft) * * Wetted Per. (ft) * * 20.73 *
 0.49 *
 * Min Ch El (ft) * 422.13 * Shear (lb/sq ft) * * 0.24 *
 0.01 *
 * Alpha * 1.00 * Stream Power (lb/ft s) * 536.95 * 0.00 *
 0.00 *
 * Frctn Loss (ft) * * Cum Volume (acre-ft) * * *
 *
 * C & E Loss (ft) * * Cum SA (acres) * * *
 *

Warning: Slope too steep for slope area to converge during supercritical flow
 calculations (normal depth is below critical depth).
 Water surface set to critical depth.

CROSS SECTION OUTPUT Profile #1.5 X Q-100yr

 * E.G. Elev (ft) * 423.58 * Element * Left OB * Channel *
 Right OB *
 * Vel Head (ft) * 0.31 * Wt. n-Val. * * 0.020 *
 0.020 *
 * W.S. Elev (ft) * 423.27 * Reach Len. (ft) * * *
 *
 * Crit W.S. (ft) * 423.27 * Flow Area (sq ft) * * 13.96 *
 0.41 *
 * E.G. Slope (ft/ft) * 0.006378 * Area (sq ft) * * 13.96 *
 0.41 *
 * Q Total (cfs) * 62.85 * Flow (cfs) * * 62.32 *
 0.53 *
 * Top Width (ft) * 25.37 * Top Width (ft) * * 21.24 *
 4.13 *

Prop_Condn_100yr.rep					
* Vel Total (ft/s)	*	4.37	* Avg. Vel. (ft/s)	*	4.46
1.28 *					
* Max Chl Dpth (ft)	*	1.14	* Hydr. Depth (ft)	*	0.66
0.10 *					
* Conv. Total (cfs)	*	787.0	* Conv. (cfs)	*	780.4
6.6 *					
* Length Wtd. (ft)	*		* Wetted Per. (ft)	*	21.40
4.14 *					
* Min Ch El (ft)	*	422.13	* Shear (lb/sq ft)	*	0.26
0.04 *					
* Alpha	*	1.03	* Stream Power (lb/ft s)	*	536.95
0.00 *				*	0.00
* Frctn Loss (ft)	*		* Cum Volume (acre-ft)	*	
*				*	
* C & E Loss (ft)	*		* Cum SA (acres)	*	
*				*	

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
Water surface set to critical depth.

SUMMARY OF REACH LENGTHS

River: CL_Creek_Prop

* Reach	* River Sta.	* Left	* Channel	* Right
*CL_Creek_Prop	* 1100.00	* 51.79*	50*	43.58*
*CL_Creek_Prop	* 1050	* 50.18*	50*	49.43*
*CL_Creek_Prop	* 1000	* 48.69*	50*	48.85*
*CL_Creek_Prop	* 950	* 49.87*	50*	49.98*
*CL_Creek_Prop	* 900	* 51.65*	50*	49.46*
*CL_Creek_Prop	* 850	* 48.06*	50*	50.3*
*CL_Creek_Prop	* 800	* 50.11*	50*	49.99*
*CL_Creek_Prop	* 750	* 50.12*	50*	50.04*
*CL_Creek_Prop	* 700	* 49.58*	50*	52.14*
*CL_Creek_Prop	* 650	* 49.04*	50*	50.64*
*CL_Creek_Prop	* 600	* 49.43*	50*	49.19*
*CL_Creek_Prop	* 550	* 49.94*	50*	50*
*CL_Creek_Prop	* 500	* 49.72*	50*	49.15*
*CL_Creek_Prop	* 450	* 50.28*	50*	48.87*
*CL_Creek_Prop	* 400	* 49.39*	50*	49.1*
*CL_Creek_Prop	* 350	* 49.76*	50*	51.18*
*CL_Creek_Prop	* 300	* 49.5*	50*	49.57*
*CL_Creek_Prop	* 250	* 49.83*	50*	50.53*
*CL_Creek_Prop	* 200	* 51.69*	50*	50.23*
*CL_Creek_Prop	* 150	* 50.7*	50*	50.4*
*CL_Creek_Prop	* 100	* 48.38*	50*	50.42*
*CL_Creek_Prop	* 50	* 51.51*	50*	50.01*
*CL_Creek_Prop	* 0	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

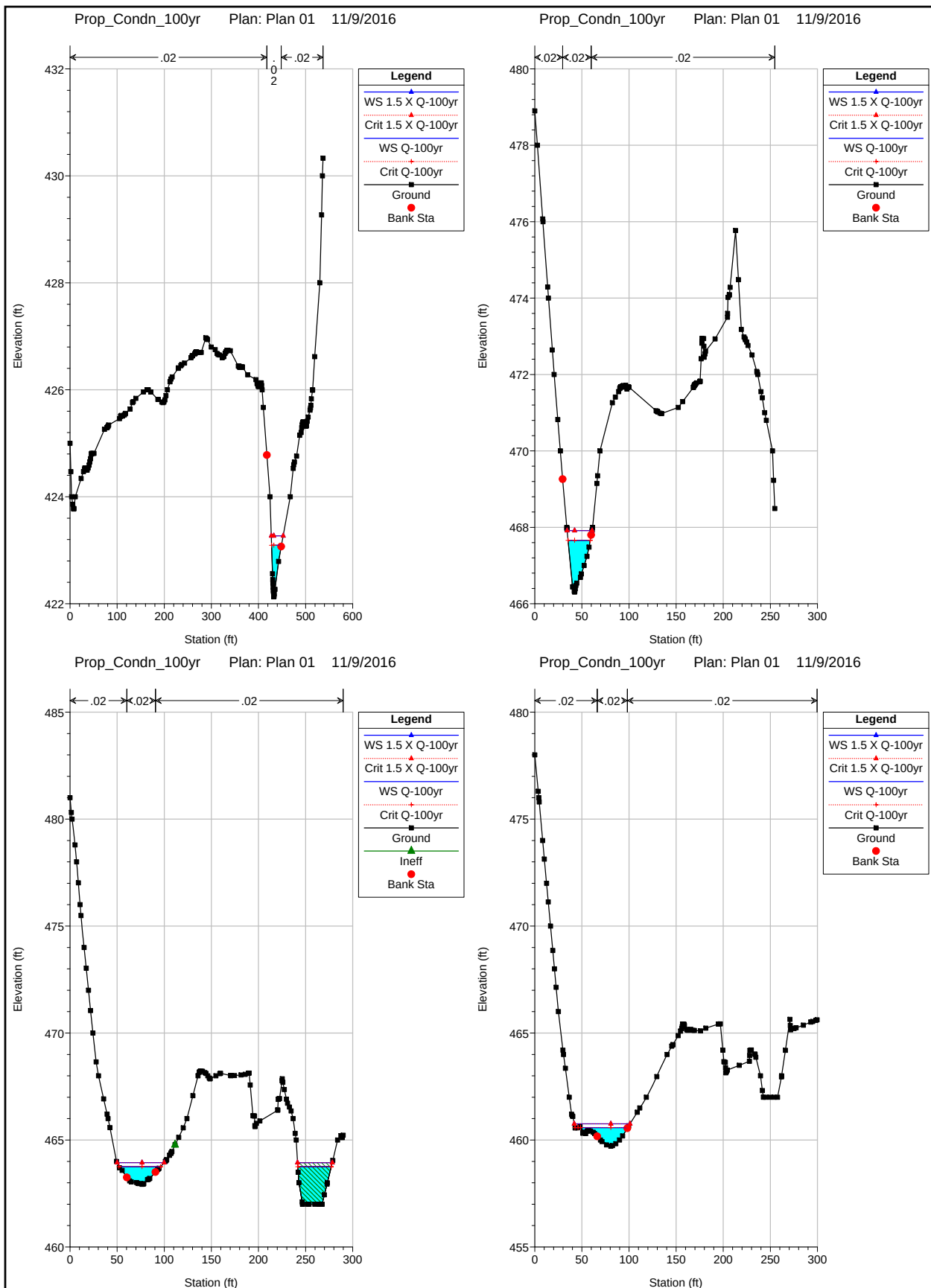
River: CL_Creek_Prop

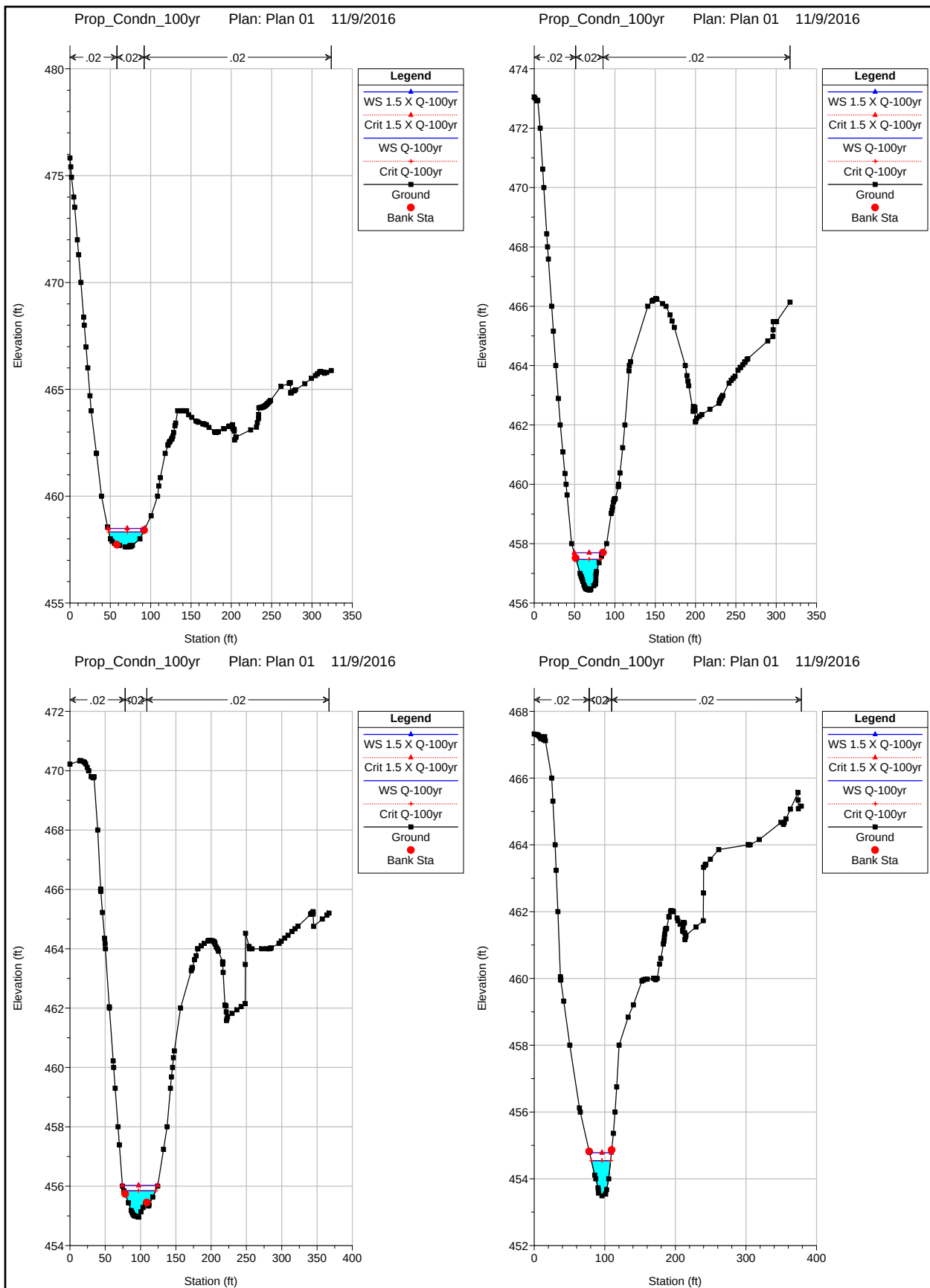
* Reach	* River Sta.	* Contr.	* Expan.

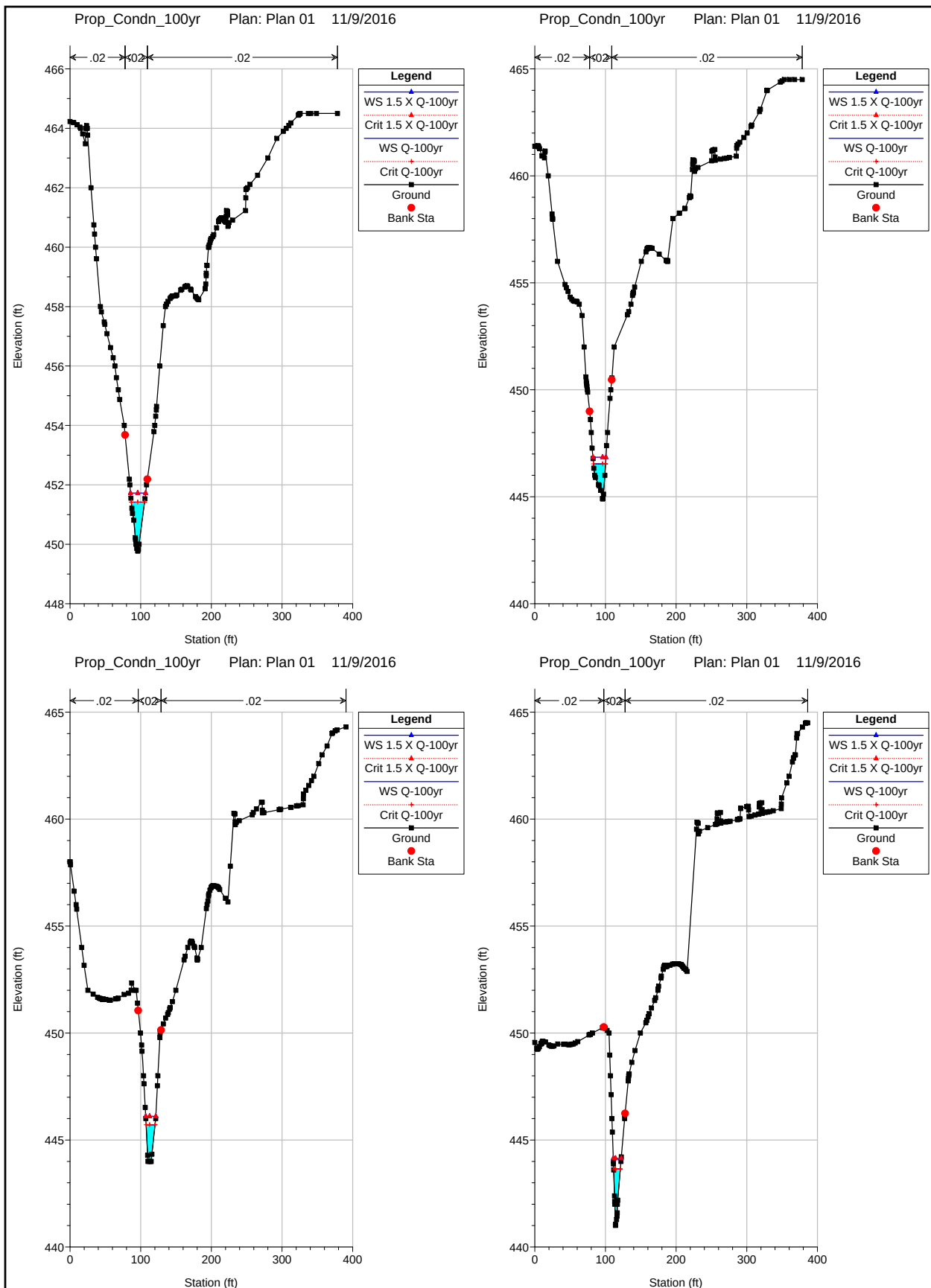
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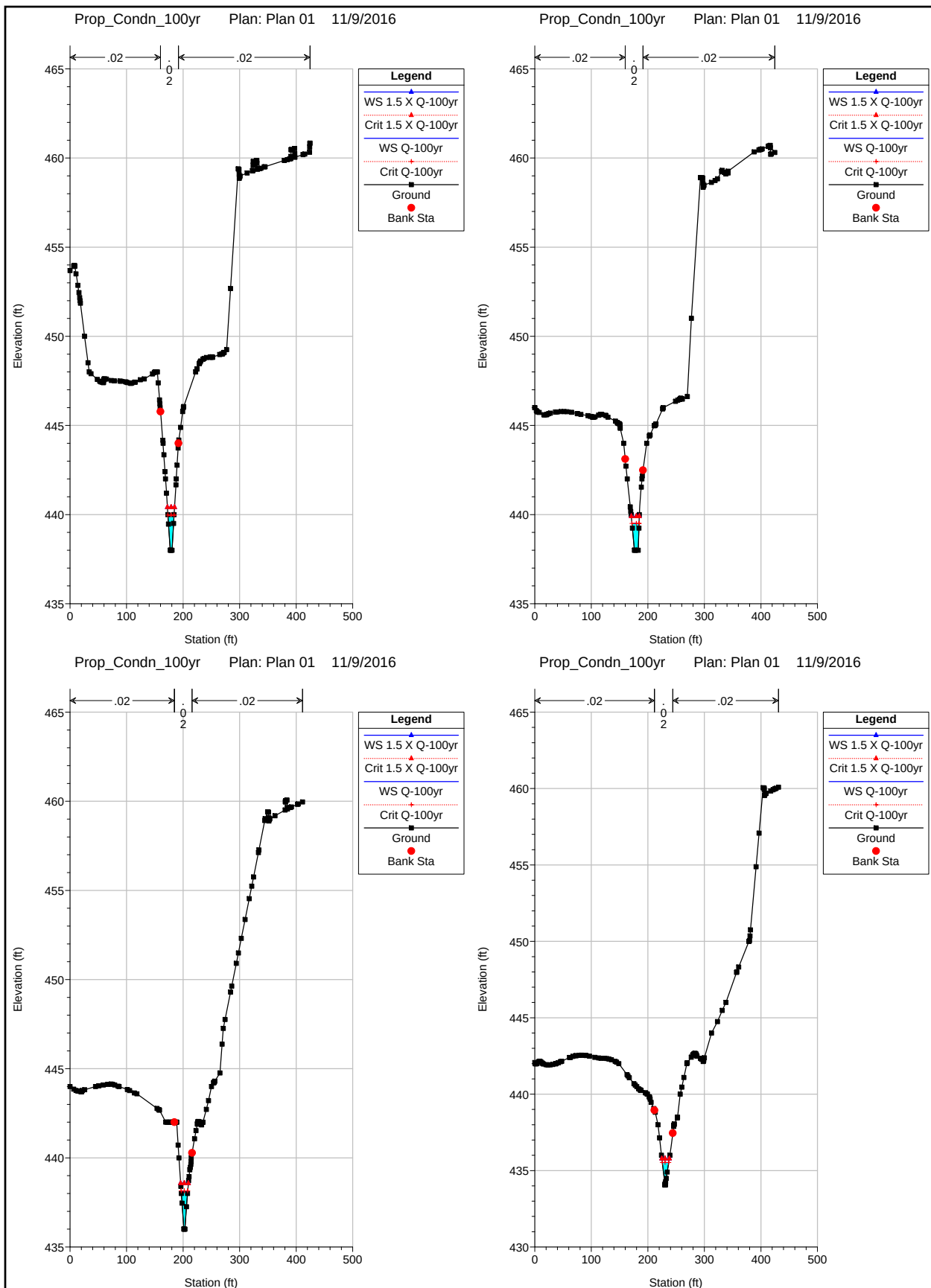
Prop_Condn_100yr.rep
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*Cl_Creek_Prop      *    1100.00 *      .1*      .3*
*Cl_Creek_Prop      *    1050   *      .1*      .3*
*Cl_Creek_Prop      *    1000   *      .1*      .3*
*Cl_Creek_Prop      *    950    *      .1*      .3*
*Cl_Creek_Prop      *    900    *      .1*      .3*
*Cl_Creek_Prop      *    850    *      .1*      .3*
*Cl_Creek_Prop      *    800    *      .1*      .3*
*Cl_Creek_Prop      *    750    *      .1*      .3*
*Cl_Creek_Prop      *    700    *      .1*      .3*
*Cl_Creek_Prop      *    650    *      .1*      .3*
*Cl_Creek_Prop      *    600    *      .1*      .3*
*Cl_Creek_Prop      *    550    *      .1*      .3*
*Cl_Creek_Prop      *    500    *      .1*      .3*
*Cl_Creek_Prop      *    450    *      .1*      .3*
*Cl_Creek_Prop      *    400    *      .1*      .3*
*Cl_Creek_Prop      *    350    *      .1*      .3*
*Cl_Creek_Prop      *    300    *      .1*      .3*
*Cl_Creek_Prop      *    250    *      .1*      .3*
*Cl_Creek_Prop      *    200    *      .1*      .3*
*Cl_Creek_Prop      *    150    *      .1*      .3*
*Cl_Creek_Prop      *    100    *      .1*      .3*
*Cl_Creek_Prop      *    50     *      .1*      .3*
*Cl_Creek_Prop      *    0      *      .1*      .3*
*****

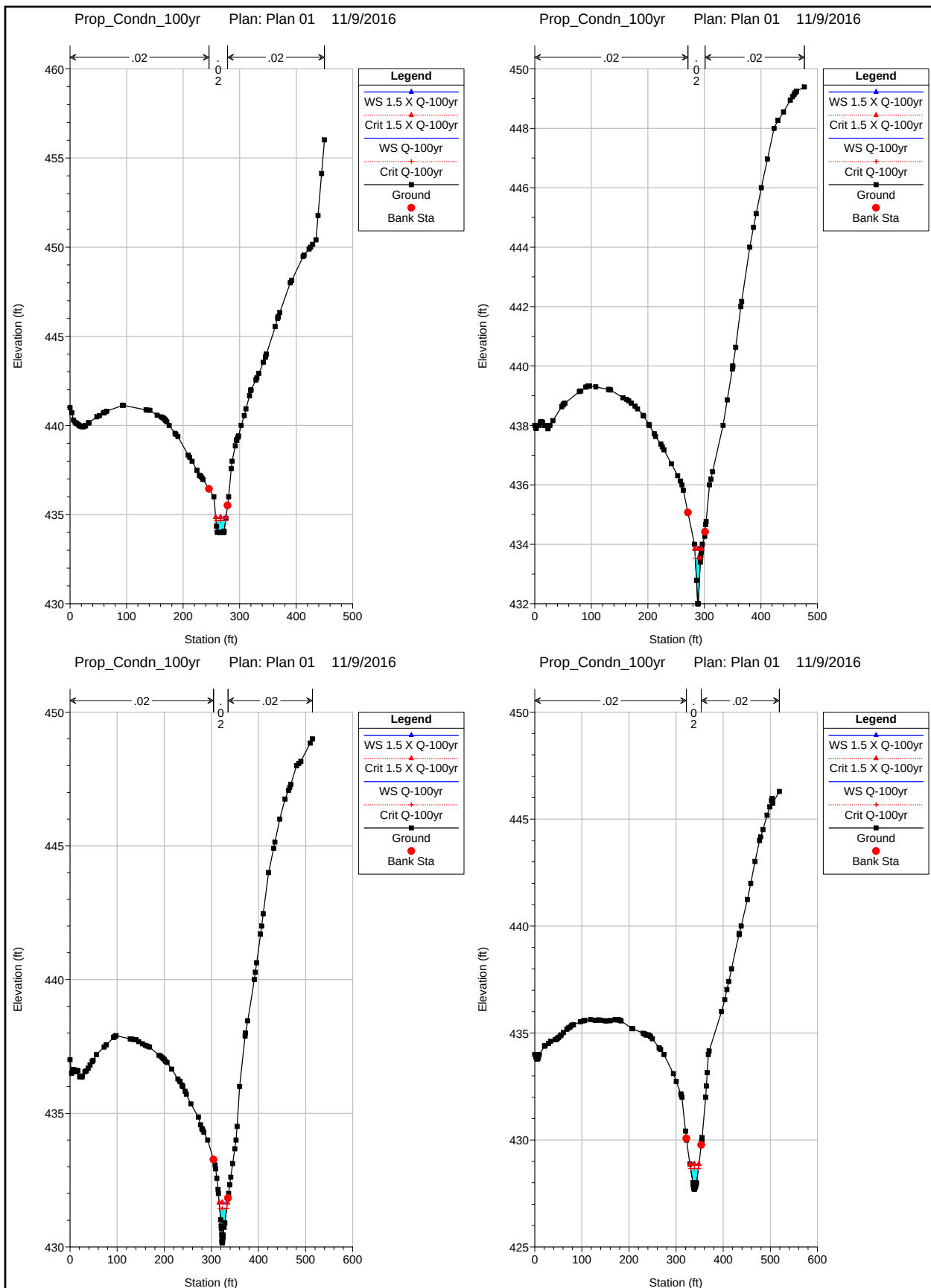
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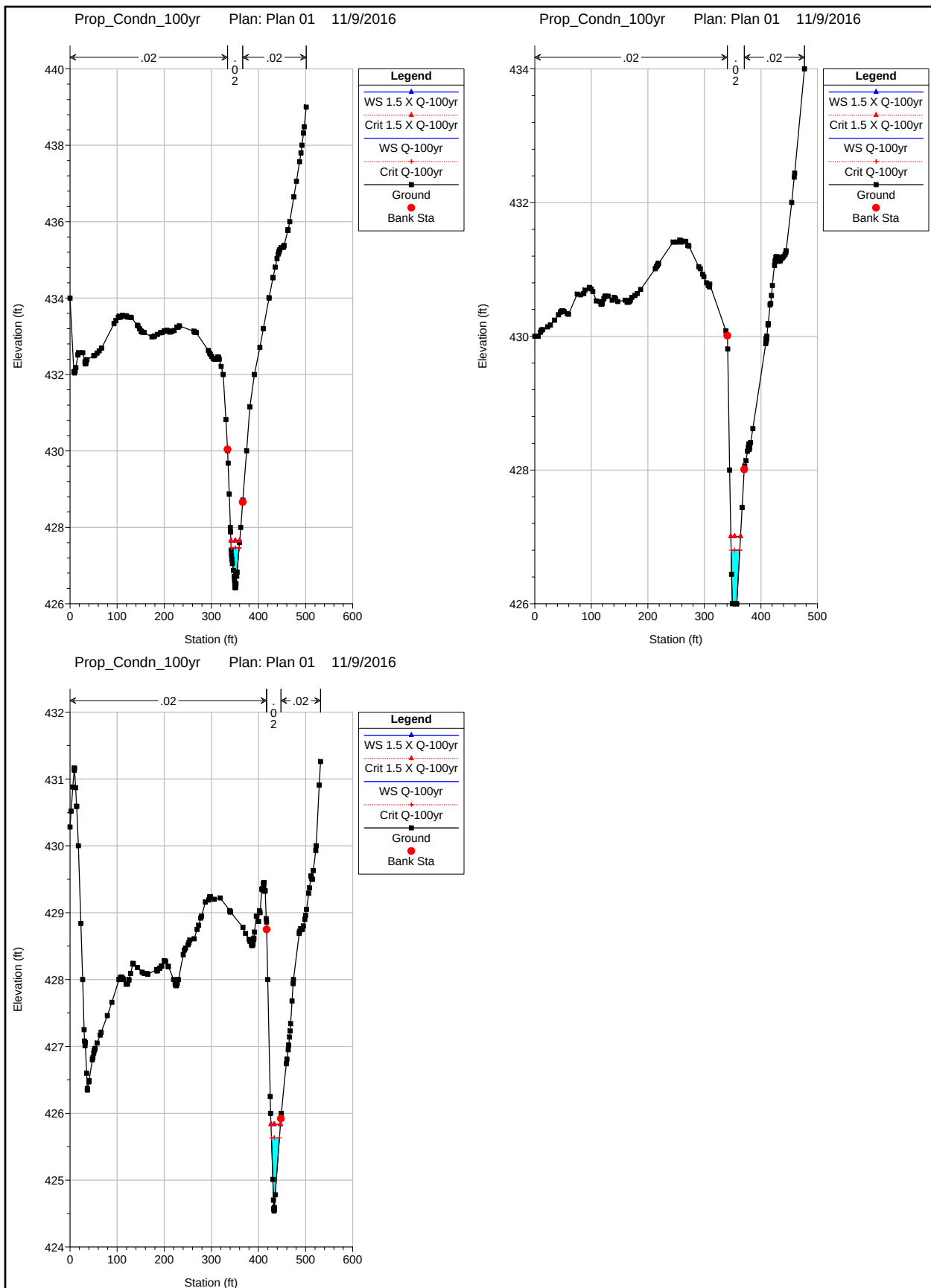






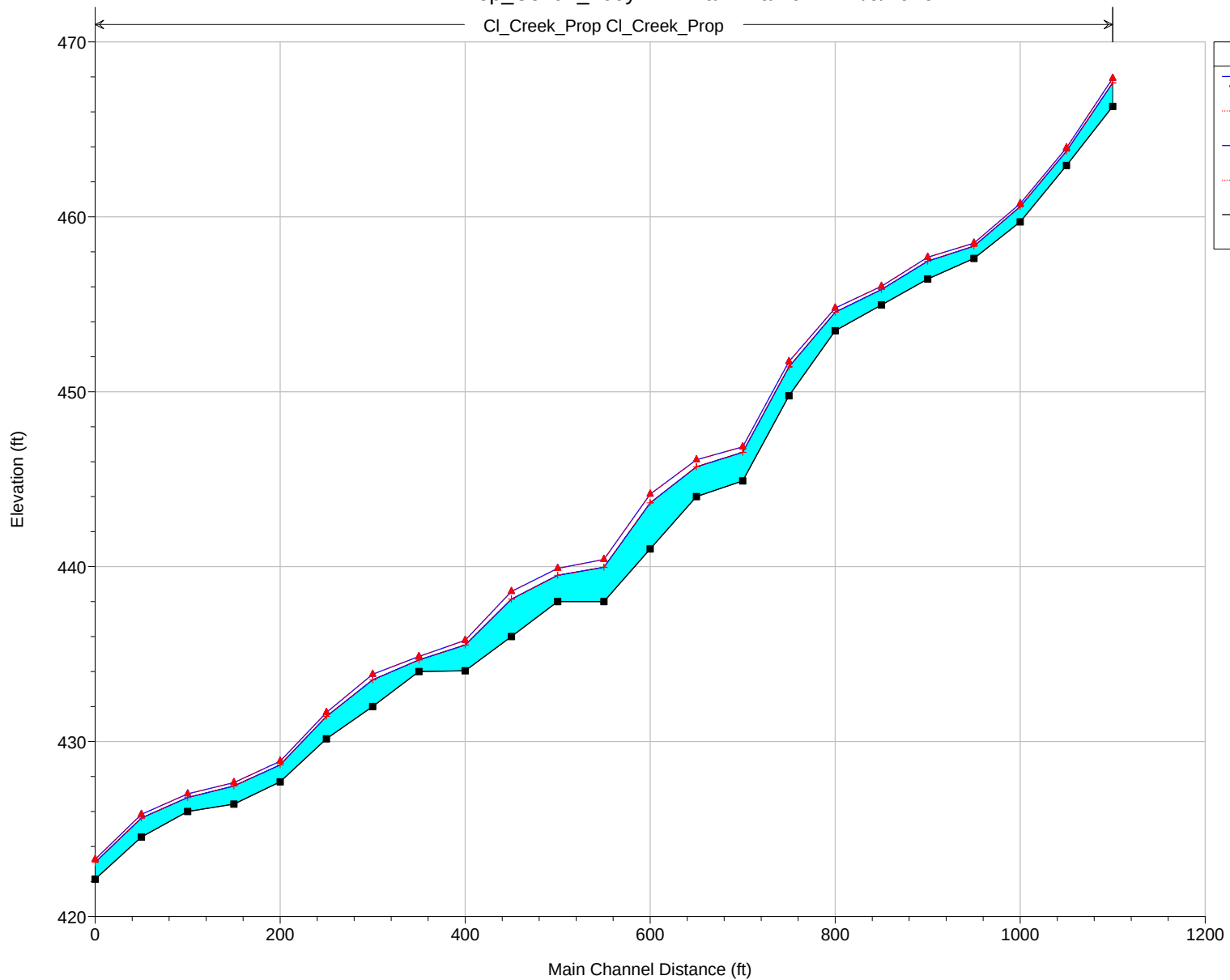






Prop_Condn_100yr Plan: Plan 01 11/9/2016

CI_Creek_Prop CI_Creek_Prop



Legend

- WS 1.5 X Q-100yr
- Crit 1.5 X Q-100yr
- WS Q-100yr
- Crit Q-100yr
- Ground

HEC-RAS Plan: Plan 01 River: Cl Creek Prop Reach: Cl Creek Prop

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)	
Cl_Creek_Prop	1100.00	Q-100yr	90.40	466.31	467.66	467.66	468.05	0.006628	5.03	17.98	23.51	1.01
Cl_Creek_Prop	1100.00	1.5 X Q-100yr	135.60	466.31	467.92	467.92	468.40	0.006086	5.57	24.39	26.48	1.01
Cl_Creek_Prop	1050	Q-100yr	90.40	462.93	463.76	463.76	464.03	0.005879	4.28	22.55	79.69	0.93
Cl_Creek_Prop	1050	1.5 X Q-100yr	135.60	462.93	463.94	463.94	464.27	0.005209	4.76	31.28	86.85	0.92
Cl_Creek_Prop	1000	Q-100yr	90.40	459.71	460.58	460.58	460.84	0.006057	4.18	23.61	53.51	0.94
Cl_Creek_Prop	1000	1.5 X Q-100yr	135.60	459.71	460.76	460.76	461.04	0.005107	4.54	33.66	59.23	0.90
Cl_Creek_Prop	950	Q-100yr	90.40	457.62	458.33	458.33	458.59	0.007193	4.21	22.14	42.76	1.00
Cl_Creek_Prop	950	1.5 X Q-100yr	135.60	457.62	458.49	458.49	458.82	0.006692	4.76	29.46	45.90	1.01
Cl_Creek_Prop	900	Q-100yr	90.40	456.44	457.47	457.47	457.80	0.006838	4.61	19.62	29.99	1.00
Cl_Creek_Prop	900	1.5 X Q-100yr	135.60	456.44	457.69	457.69	458.09	0.006375	5.06	26.93	35.54	1.00
Cl_Creek_Prop	850	Q-100yr	90.40	454.96	455.84	455.84	456.11	0.006340	4.28	22.61	45.14	0.96
Cl_Creek_Prop	850	1.5 X Q-100yr	135.60	454.96	456.02	456.02	456.34	0.005495	4.73	31.33	50.09	0.93
Cl_Creek_Prop	800	Q-100yr	90.40	453.49	454.54	454.54	454.89	0.006665	4.75	19.02	27.28	1.00
Cl_Creek_Prop	800	1.5 X Q-100yr	135.60	453.49	454.78	454.78	455.20	0.006303	5.22	25.96	30.99	1.01
Cl_Creek_Prop	750	Q-100yr	90.40	449.77	451.42	451.42	451.87	0.006300	5.41	16.71	18.71	1.01
Cl_Creek_Prop	750	1.5 X Q-100yr	135.60	449.77	451.73	451.73	452.27	0.005969	5.93	22.86	21.37	1.01
Cl_Creek_Prop	700	Q-100yr	90.40	444.90	446.54	446.54	447.02	0.006355	5.59	16.16	17.11	1.01
Cl_Creek_Prop	700	1.5 X Q-100yr	135.60	444.90	446.85	446.85	447.46	0.005926	6.25	21.71	18.36	1.01
Cl_Creek_Prop	650	Q-100yr	90.40	444.00	445.71	445.71	446.30	0.006097	6.17	14.65	12.57	1.01
Cl_Creek_Prop	650	1.5 X Q-100yr	135.60	444.00	446.11	446.11	446.82	0.005770	6.77	20.03	14.27	1.01
Cl_Creek_Prop	600	Q-100yr	90.40	441.01	443.65	443.65	444.36	0.006605	6.78	13.34	9.49	1.01
Cl_Creek_Prop	600	1.5 X Q-100yr	135.60	441.01	444.14	444.14	444.98	0.006298	7.35	18.45	11.23	1.01
Cl_Creek_Prop	550	Q-100yr	90.40	438.00	439.97	439.97	440.62	0.006097	6.46	14.00	10.98	1.01
Cl_Creek_Prop	550	1.5 X Q-100yr	135.60	438.00	440.41	440.41	441.18	0.005812	7.04	19.25	12.73	1.01
Cl_Creek_Prop	500	Q-100yr	90.40	438.00	439.50	439.50	440.10	0.006178	6.17	14.65	12.56	1.01
Cl_Creek_Prop	500	1.5 X Q-100yr	135.60	438.00	439.90	439.90	440.62	0.005834	6.79	19.96	14.07	1.01
Cl_Creek_Prop	450	Q-100yr	90.40	436.00	438.15	438.15	438.77	0.006140	6.37	14.20	11.51	1.01
Cl_Creek_Prop	450	1.5 X Q-100yr	135.60	436.00	438.58	438.58	439.32	0.005861	6.91	19.61	13.55	1.01

HEC-RAS Plan: Plan 01 River: Cl_Creek_Prop Reach: Cl_Creek_Prop (Continued)

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)	
Cl_Creek_Prop	400	Q-100yr	41.90	434.05	435.52	435.52	435.91	0.006917	4.96	8.44	11.33	1.01
Cl_Creek_Prop	400	1.5 X Q-100yr	62.85	434.05	435.79	435.79	436.24	0.006552	5.39	11.67	13.30	1.01
Cl_Creek_Prop	350	Q-100yr	41.90	434.00	434.67	434.67	434.96	0.007155	4.31	9.72	16.93	1.00
Cl_Creek_Prop	350	1.5 X Q-100yr	62.85	434.00	434.86	434.86	435.22	0.006729	4.83	13.03	18.25	1.01
Cl_Creek_Prop	300	Q-100yr	41.90	432.00	433.53	433.53	433.96	0.006894	5.28	7.94	9.47	1.02
Cl_Creek_Prop	300	1.5 X Q-100yr	62.85	432.00	433.84	433.84	434.32	0.006596	5.55	11.33	12.23	1.02
Cl_Creek_Prop	250	Q-100yr	41.90	430.16	431.44	431.44	431.76	0.007179	4.53	9.26	14.93	1.01
Cl_Creek_Prop	250	1.5 X Q-100yr	62.85	430.16	431.66	431.66	432.03	0.006814	4.91	12.80	17.56	1.01
Cl_Creek_Prop	200	Q-100yr	41.90	427.70	428.67	428.67	428.97	0.007215	4.38	9.56	16.40	1.01
Cl_Creek_Prop	200	1.5 X Q-100yr	62.85	427.70	428.87	428.87	429.23	0.006813	4.77	13.17	19.02	1.01
Cl_Creek_Prop	150	Q-100yr	41.90	426.42	427.46	427.46	427.75	0.007245	4.33	9.67	16.90	1.01
Cl_Creek_Prop	150	1.5 X Q-100yr	62.85	426.42	427.65	427.65	428.01	0.006847	4.82	13.05	18.62	1.01
Cl_Creek_Prop	100	Q-100yr	41.90	426.00	426.80	426.80	427.11	0.007008	4.44	9.43	15.43	1.00
Cl_Creek_Prop	100	1.5 X Q-100yr	62.85	426.00	427.01	427.01	427.38	0.006675	4.92	12.77	17.21	1.01
Cl_Creek_Prop	50	Q-100yr	41.90	424.54	425.63	425.63	425.92	0.007302	4.31	9.72	17.21	1.01
Cl_Creek_Prop	50	1.5 X Q-100yr	62.85	424.54	425.84	425.84	426.17	0.006822	4.65	13.52	20.31	1.00
Cl_Creek_Prop	0	Q-100yr	41.90	422.13	423.09	423.09	423.35	0.007682	4.08	10.28	21.08	1.02
Cl_Creek_Prop	0	1.5 X Q-100yr	62.85	422.13	423.27	423.27	423.58	0.006378	4.46	14.38	25.37	0.97

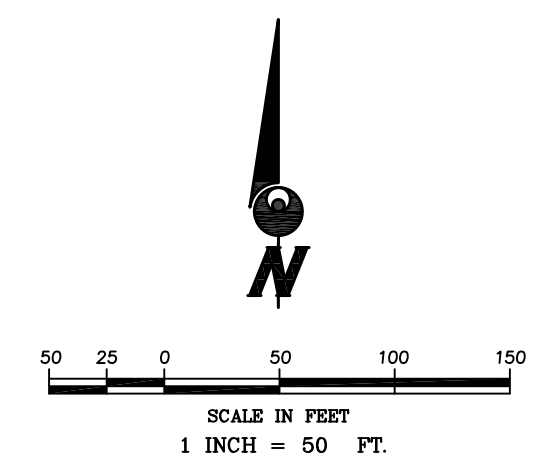
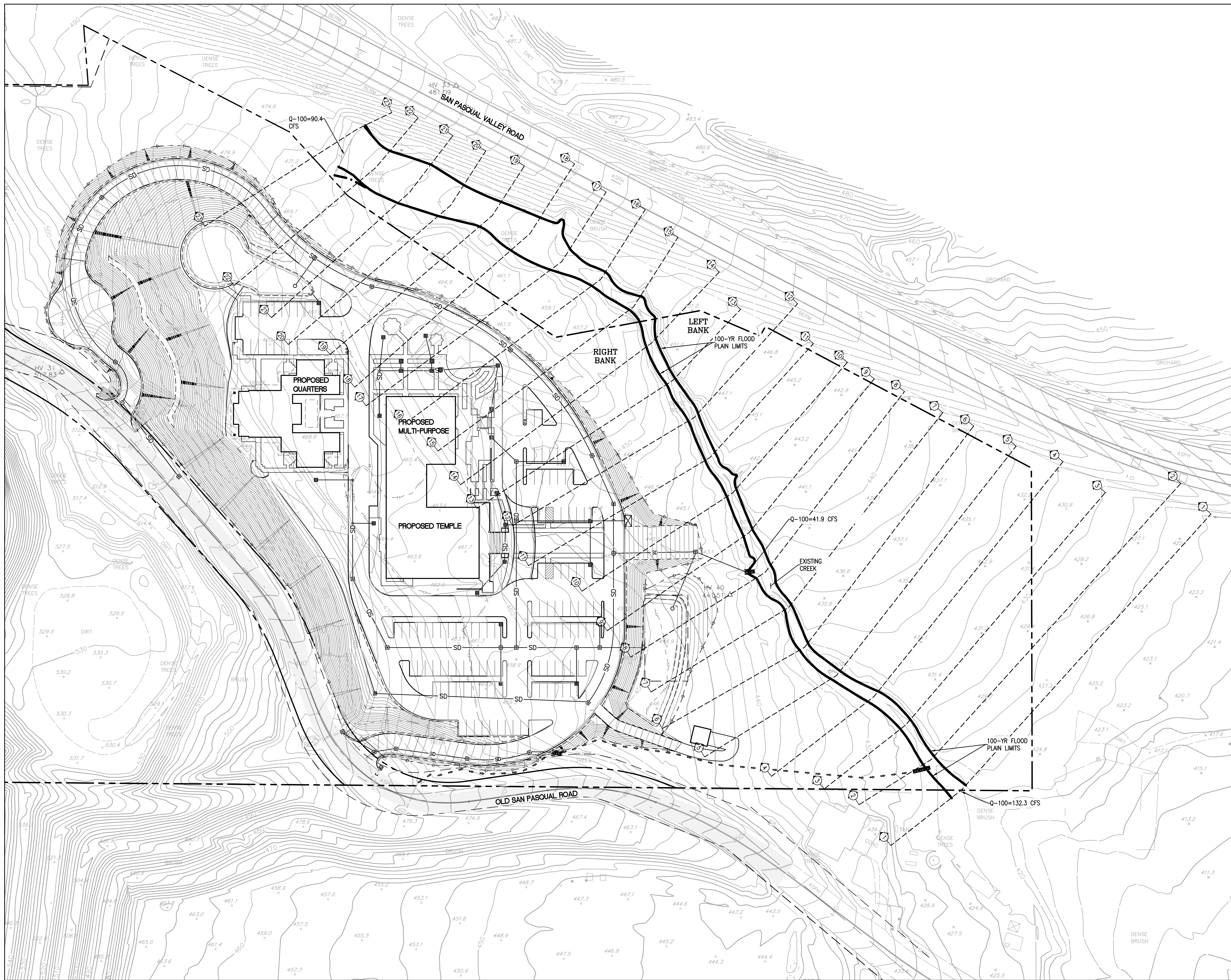


EXHIBIT 1
EXISTING CREEK CROSS
SECTIONS
PROPOSED CONDITION

ATTACHMENT D:

Excerpts from Hydrology Manual

**Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS**

Land Use		Runoff Coefficient "C"				
NRCS Elements	County Elements	% IMPER.	Soil Type			
			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

-Exist.
Condition

Prop.
Condition

*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, C_p , 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

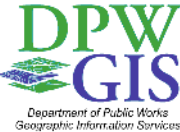
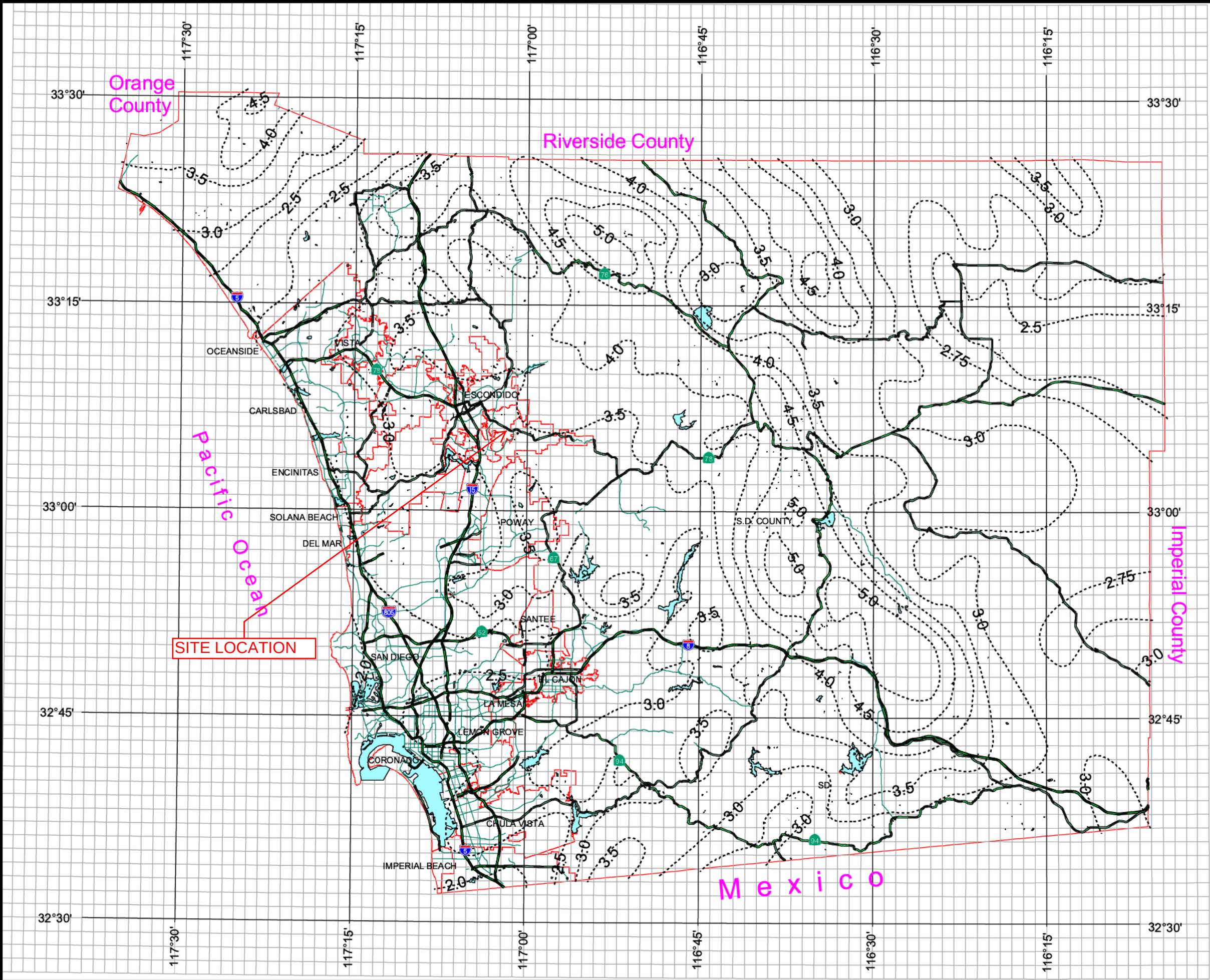
County of San Diego Hydrology Manual



Rainfall Isophuvials

100 Year Rainfall Event - 6 Hours

3.4	Isopluvial (inches)
-----	---------------------



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3 0 3 Miles

County of San Diego Hydrology Manual



Rainfall Isophyvals

100 Year Rainfall Event - 24 Hours

6.0 Isophyval (inches)

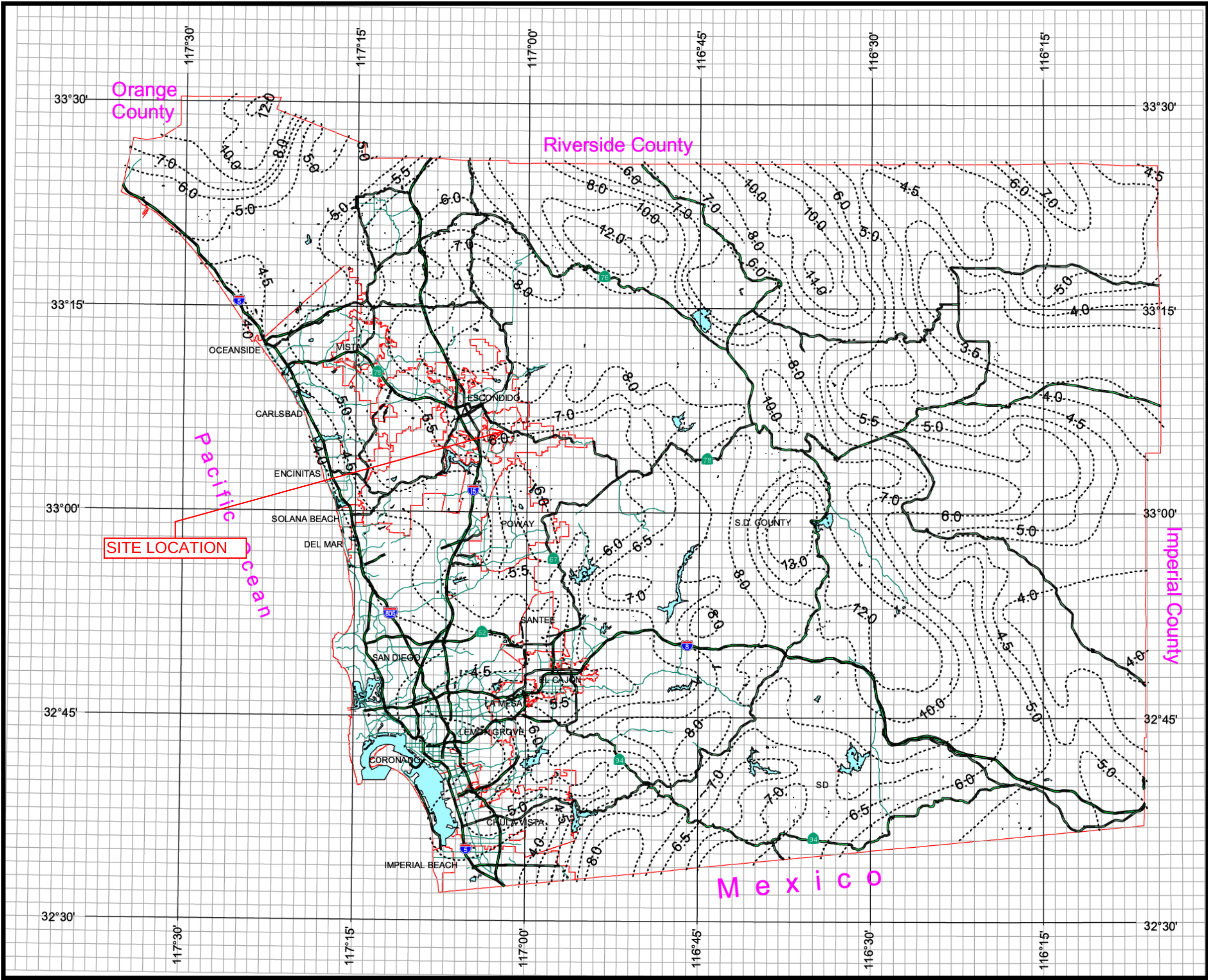


3 0 3 Miles

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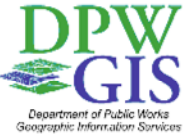
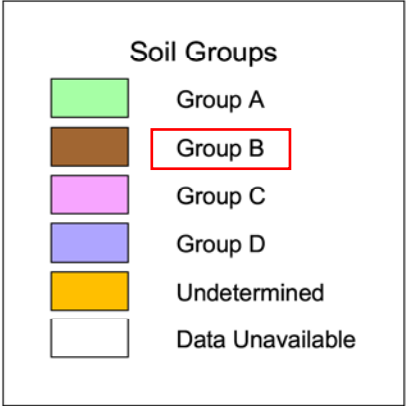


County of San Diego Hydrology Manual



Soil Hydrologic Groups

Legend

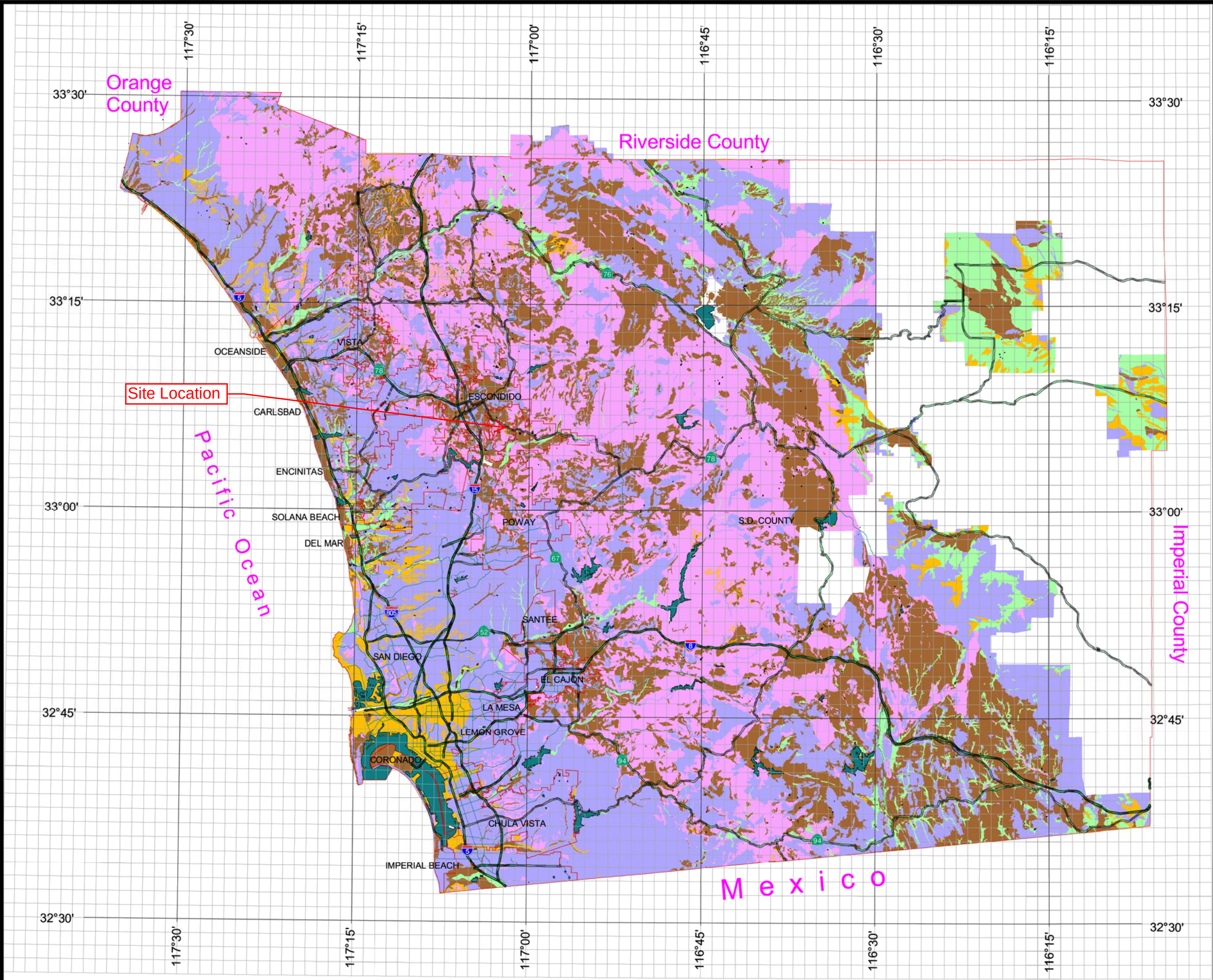


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3 0 3 Miles



5.6.6 Side Slopes

Side slopes of wetland-bottom channels shall not be steeper than 3H:1V whenever practical. When the side slopes of a wetland-bottom channel are grass-lined, refer to the guidelines provided in Section 5.5.

5.6.7 Horizontal Channel Alignment and Bend Protection

Channel bends shall be designed according to the criteria provided in Section 5.5.8.

5.6.8 Maintenance

Wetland-bottom channels require a maintenance and operation plan, along with appropriate easements and mechanisms for assuring the perpetual maintenance of the facility. The project owner shall ensure that appropriate mechanism is in place to provide maintenance for the lifetime of the facility.

5.7 DESIGN CRITERIA – RIPRAP-LINED CHANNELS

This Section presents minimum design criteria for rock riprap-lined channels. Riprapped transitions and bends in otherwise non-riprap channels are also considered riprap-lined channels, and shall be designed in accordance with the design standards outlined in this Section. The design engineer is responsible for confirming that a channel design meets these criteria, the general open-channel criteria outlined in Section 5.3, and any special considerations for a particular design situation.

5.7.1 Longitudinal Channel Slope

The longitudinal slope of riprap-lined channels shall be dictated by maximum permissible velocity requirements. Table 5-3 summarizes the maximum permissible velocity for standard riprap gradations. Where topography is steeper than desirable, drop structures may be used to maintain design velocities (see Section 5.12).

Table 5-3 Channel Bottom Riprap Protection

Design Velocity (ft/s)	Rock Gradation
6-10	No. 2 Backing
10-12	¼ ton
12-14	½ ton
14-16	1 ton
16-18	2 ton
> 18	Special Design

5.7.2 Roughness Coefficients

The Manning roughness coefficient (n) for hydraulic computations shall be estimated for loose rock riprap using the Manning-Strickler equation (Equation 5-5). Equation 5-5 (Chang, 1992) does not apply to grouted rock riprap or to very shallow flow. Table 5-4 provides Manning roughness coefficients for standard rock riprap classifications based on the Manning-Strickler method.

$$n = 0.0395d_{50}^{1/6} \quad (5-5)$$

where ...

- n = Manning roughness coefficient (dimensionless); and
 d_{50} = median stone diameter (feet).

Table 5-4 Standard Rock Riprap Gradations

##Rock Gradation ^a	Median Stone Weight (W_{50}) ^c	Median Stone Diameter (d_{50}) ^d	Manning n (UngROUTED) ^e
No. 3 Backing	5 lb	0.4 ft	0.034
No. 2 Backing	25 lb	0.7 ft	0.037
No. 1 Backing ^b	75 lb	1.0 ft	0.039
Light	200 lb	1.3 ft	0.041
¼ Ton	500 lb	1.8 ft	0.044
½ Ton	1000 lb	2.3 ft	0.045
1 Ton	2000 lb	2.9 ft	0.047
2 Ton	4000 lb	3.6 ft	0.049

(a) Except for 2 ton rock, classification is based upon Caltrans Method B Placement, which allows dumping of the rock and spreading by mechanical equipment. Local surface irregularities shall not vary from the planned grade by more than 1 foot, measured perpendicular to the slope. Two-ton rock requires special placement, see Caltrans (2002) or Greenbook for more information. (b) No. 1 Backing has same gradation as Facing Riprap. (c) per Caltrans (2002). (d) Assumes specific weight of 165 lb/ft³. The designer shall take care to apply a unit weight that is applicable to the type of riprap specified for the project, and adjust their calculations when necessary. (e) Based on Manning-Strickler relationship (Chang, 1988).

Where hydraulic radius is less than or equal to two times the maximum rock size, the roughness coefficient will be greater than indicated by Equation 5-5. In these cases, the design engineer shall use the method outlined in Section 5.7.17 to calculate the roughness of the channel. Appendix A (Table A-3) provides recommended Manning roughness coefficient (n) for grouted riprap applications. A 20% roughness coefficient reduction ($N_{grouted} = 0.80 N_{ungROUTED}$) for grouted rip-rap shall be required for velocity-based design for energy dissipation/scour minimization measures applications. For channel capacity design, the roughness coefficients in Table 5-4 and Appendix A shall be used.

5.7.3 Low Flow and Trickle Channels

Riprap-lined channels conveying a 100-year peak runoff of 20 cfs or less do not require trickle channels. The design engineer shall evaluate the factors such as drainage slope, flow velocity, soil type, and upstream impervious area, and specify a trickle channel when needed based on their engineering judgment. Low-flow channels shall be designed in accordance with Section 5.5.3.2.

5.7.4 Bottom Width

The selection of the over-all channel bottom width shall consider factors such as ultimate conveyance requirements, constructability, channel stability, and maintenance.

5.7.5 Freeboard and Flow Depth

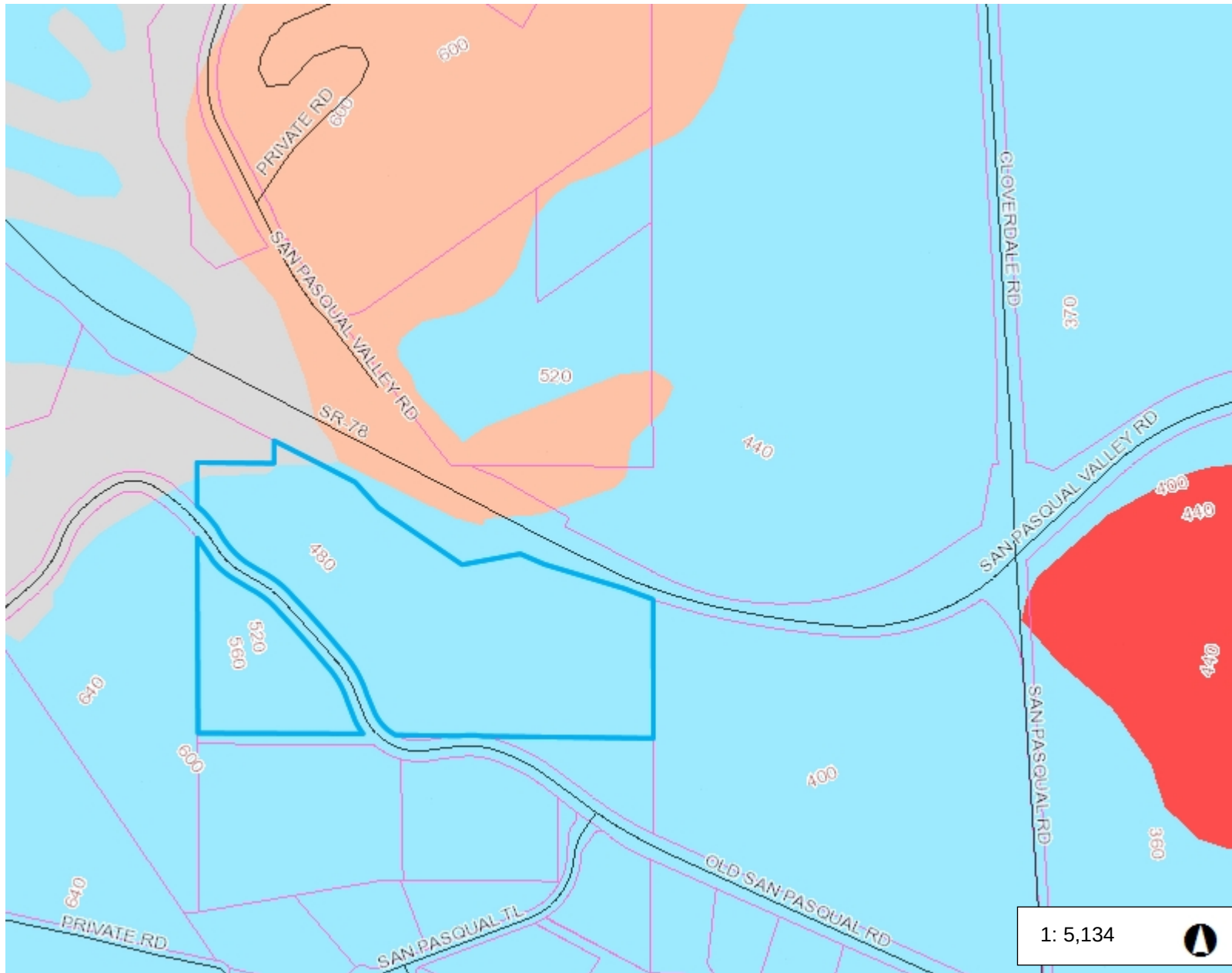
Riprap-lined channels shall meet the minimum freeboard requirements outlined in Section 5.3.7. Excessive depths and high velocities shall be avoided whenever practicable to maintain public safety. Section 5.3.9 discusses access and safety for open channels, including thresholds for flow depth and velocity.

5.7.6 Side Slopes

The side slopes of riprap-lined channel shall not ordinarily be steeper than 2H:1V, except in cases where an embankment stability analysis can justify a steeper side slope. The stability analysis should be completed in consultation with a soils engineer, and consider such factors such as: soil

ATTACHMENT E:

FEMA Flood Plain Map



Legend

- Streets
- Parcels with no labels
- Soil Hydrologic Group**
 - Hydrologic Group Undefined
 - Hydrologic Group A
 - Hydrologic Group B
 - Hydrologic Group C
 - Hydrologic Group D
- Topography - 40' Contour Inter

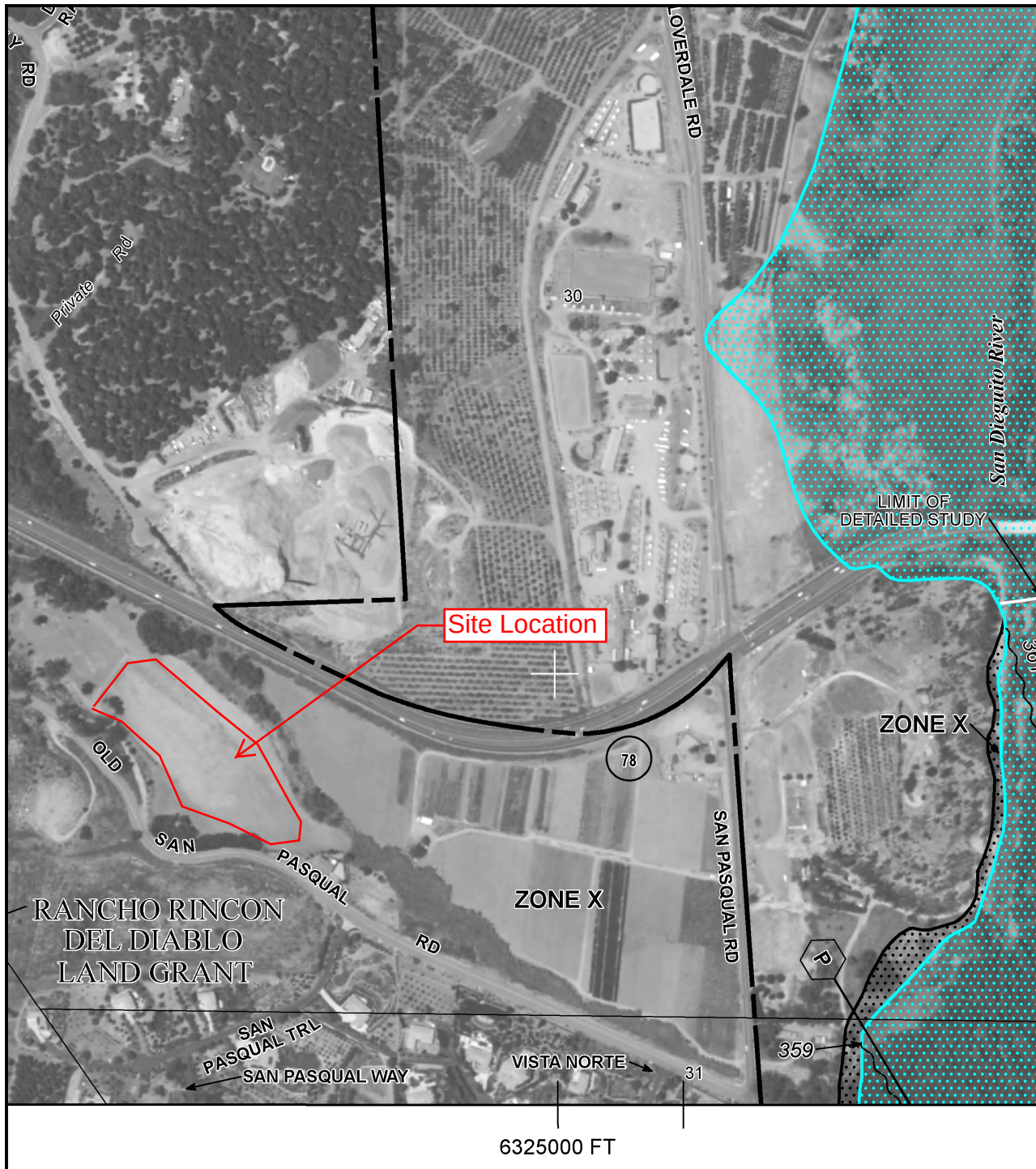
Notes

0.2 0 0.08 0.2 Miles

NAD_1983_StatePlane_California_VI_FIPS_0406_Feet
Department of Public Works

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION



ance Program at 1-800-638-6620.



MAP SCALE 1" = 500'

0 250 500 750 1,000 FEET

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 1082G

FIRM

**FLOOD INSURANCE RATE MAP
SAN DIEGO COUNTY,
CALIFORNIA
AND INCORPORATED AREAS**

PANEL 1082 OF 2375

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ESCONDIDO, CITY OF	060290	1082	G
SAN DIEGO COUNTY	060284	1082	G
SAN DIEGO, CITY OF	060295	1082	G

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



**MAP NUMBER
06073C1082G**

**MAP REVISED
MAY 16, 2012**

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

ATTACHMENT 7

Copy of Project's Geotechnical and Groundwater Investigation Report

This is the cover sheet for Attachment 7.

If hardcopy or CD is not attached, the following information should be provided:

Title:

Prepared By:

Date:

This page was left intentionally blank.

COUNTY OF SAN DIEGO
DEPARTMENT OF ENVIRONMENTAL HEALTH
PERCOLATION TEST REPORT

DEH Control #: _____
Date: _____
Activity Code: _____

Assessor's Parcel #: APN 241-080-47-00 Map #: DEED Lot #: --

Site Address: NKA OLD SAN PASQUAL RD. Town: ESCONDIDO CA Zip Code: _____

Owner: SVBF INC. Phone: Sitaram (602) 549-2537

Mailing Address: 5 YATES DRIVE, EAST BRUNSWICK NJ 08816

Test Hole	Test Depth	Stabilized Rate	Test Hole	Test Depth	Stabilized Rate	Test Hole	Test Depth	Stabilized Rate	Average Perc Rate
A1	6'	17	D1	20					USE DESIGN RATE OF 30 MPI
A2	8'	14	D2	25					
A3	11'	21	D3	26					
A4	13'	27	D4	29					

TYPE OF SOIL: (clay, silt, sand, decomposed granite, etc.)

Surface

0-4' ft. below surface FILL MATERIAL D.G./SILTY SAND

4'-5' ft. below surface RED TOP SOILS W ORGANICS

4'-25' ft. below surface D.G. WITH FINES, TAN, MOIST

 ft. below surface

Depth to Refusal: NONE Depth to Groundwater: NOT ENCOUNTERED

RECOMMENDATIONS:

Septic Tank: _____ gal. Pump Chamber: _____ gal. Surge Tank: _____ gal.

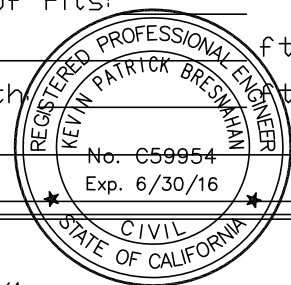
Leach Line Length: _____ ft. Seepage Pit Type: _____ Number of Pits: _____

Trench Depth: _____ ft. Length: _____ ft. Width: _____ ft.

Rock Below Pipe: _____ in. Total Depth: _____ ft. Cap Depth: _____ ft.

Other: TEMPLE FACILITY WITH PREIST QUARTERS

Proposed Structure: SEE ATTACHED SCOPE OF WORK ON SEPTIC LAYOUT



WATER SUPPLY:

Source of Potable Water: CITY OF ESCONDIDO Well Permit Number: N/A

Registered CE, PE, Geologist, REHS: KEVIN BRESNAHAN RCE 59954

Kevin Bresnahan

Address: 3031 RIDGE CREEK DRIVE~ FALLBROOK CA 92028 Phone: 951-532-6371 Date: 10/2015

FOR DEPARTMENTAL USE ONLY

APPROVED YES _____ NO _____ DATE _____ FINAL MAP REQUIREMENTS YES _____ NO _____

Specialist: _____

Bldg. Plan Review: _____ DATE: _____

Grading Review: _____ DATE: _____

Water Analysis Results: _____ DATE: _____