County of San Diego

Stormwater Quality Management Plan (SWQMP) For Priority Development Projects (PDPs)

Use for all PDPs (see Storm Water Intake Form, Part 4)

Priority Development Project

Project Information	Development type ☐ New development ☐ Redevelopment
Project Name	Questhaven 76 Lot Residential Subdivision
Project Address	Near 1058 San Elijo Road, San Marcos, CA 92078
Assessor's Parcel # (APN)	APN 223-080-46-00, 223-070-07-00, & 223-070-08-00
Permit # / Record ID	PDS2020-TM-5643
Project category (select one)	☐ Commercial ☐ Minor subdivision* ☐ Industrial ☐ Major subdivision* ☐ Single family residential lot ☐ Multi-family residential* *If residential, is a Homeowners Association (HOA) proposed? ☐ Yes ☐ No

Project Applicant / Project Proponent			
Name	Colrich California, LLC.		
Address	444 West Beech Street, Suite 300, San Diego, CA 92101		
Phone	858-490-2343	**Email:**	ritam@colrich.com

SWQMP Preparer			
Name	Robert D. Dentino		
Company (if applicable)	Excel Engineering		
Address	440 State Place, Escondido, CA 92029		
Phone	760-745-8118	**Email:**	rdentino@excelengineering.net
PE Number (if applicable)	45629		

Preparer's Certification

I 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 County of San Diego BMP Design Manual. The BMP Design Manual 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 Order No. R9-2015-0001 and Order No. R9-2015-0100) requirements for storm water management.

This SWQMP is intended to comply with applicable requirements of the BMP Design Manual. I certify that it 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 SWQMP by County staff is confined to a review and does not relieve me as the person in charge of overseeing the selection and design of storm water BMPs for this project, of my responsibilities for project design.

Signature	Date

COUNTY ACCEPTED

SWQMP Approved By: *Approval Date:*

**** NOTE* Approval does not constitute compliance with regulatory requirements.***

Preparation Date: 8/5/2021

Scope of SWQMP Submittal (Required)

Select the option that describes the scope of this SWQMP Submittal. Document your selection as indicated.

SWQMP Scope	Required Documentation
☒ ***a. SWQMP addresses the entire project***	No additional documentation.
☐ ***b. SWQMP implements requirements of an earlier master SWQMP submittal***	Include a copy of the previous submittal as **Attachment 4**.
☐ ***c. First of multiple SWQMP submittals***	Identify below the elements addressed in this submittal and in future submittals.

(1) Elements addressed in current submittal (streets, common areas, first project phase, etc.):

(2) Elements to be addressed in future submittal(s) (individual lots, future project phases, etc.):

Submittal Record: List the dates of SWQMP and plan submittals and updates. Briefly describe key changes from previous versions. If responding to plan check comments, note this in the entry and attach the responses as applicable.

No.	Date	Summary of Changes
Preliminary Design / Planning / CEQA		
1	6/13/2020	Initial Submittal
2	4/8/2021	2nd Submittal
3	August 2021	3rd Submittal
Final Design		
1		Initial Submittal
2		
3		
Plan Changes		
1		Initial Submittal
2		
3		

ATTACHMENT A
PROJECT ISSUE CHECKLIST

Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4 - 1	Stormwater Quality Management Plan (SWQMP)	The Storm Water Intake Form and PDP SWQMP shall be in conformance with the new municipal permit, 2013 MS4, that was implemented by the County on February 26, 2016. The BMP Design Manual and SWQMP forms are available at: http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction.html The SWQMP is a living document to be updated to reflect any changes during the project's final plan review and construction throughout the life of the project in perpetuity.	Submitted	9/10/2020	9/25/2020
4 - 2	SWQMP	The PDP SWQMP forms are currently being updated to reflect changes in the BMP Design Manual. There may be changes to Tables 1, 2, and 3, Attachment 3, and Attachment 10. These changes are scheduled to occur in August 2020. The PDP SWQMP form submitted may be required to be updated with the new forms. Please see the website below for future updates: https://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction.html	Submitted	9/10/2020	9/25/2020

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4 - 3	SWQMP	Sub-attachment 2.1: DMA Exhibit: - Show/label natural hydrologic features. Addressed 5/17/2021 **- Include a table of approximate impervious area features breakdown - square footage of streets, assumed square footage of roofs, driveways, etc. 3rd Review: Please provide a breakdown of the proposed 5,000 square feet of proposed impervious cover per lot.** - Show existing & proposed drainage network, directions, and offsite connections. Addressed 5/17/2021 **- show locations of Group 1, 2, 3, and 4 features and BMPs.** **- show construction BMPs** - The tree wells are difficult to see. A typical tree well design following Fact Sheet SD-A should also be included. **3rd Review: Please provide** - Show a DMA for any improvements for "Street E" and show how it will be treated. Addressed 5/17/2021 - Show a DMA for the driveway at "Street D" and show how it will be treated, unless it qualifies as a de minimis DMA. Addressed 5/17/2021 - Show maintenance access for the BMPs. Addressed 5/17/2021 - Label POCs. Addressed 5/17/2021 - Undisturbed areas of the project do not need to be designated into DMAs. Addressed 5/17/2021 - In the DMA Data Table, all DMAs are labeled as self-mitigating. Please revise. Addressed 5/17/2021 **3rd Review: Please show all proposed infrastructure for the basins and tree wells. Please show the Catch Basin in plan view and the outlet pipe all proposed basins and show how the Tree Well underdrains connect to the storm drain system.**	The table in the SWQMP after sub-attachment 7.3 was added to the DMA exhibit to show the impervious area breakdown used in calculations. There are no requirements in the BMP Manual that require a further breakdown of the impervious area. 5000 sqft was chosen as a conservative value so houses that are built can have up to 5000 sqft of impervious infrastructure if desired. The area will be inclusive of all walkways, roof areas, driveways and any other impervious features. The impervious cover per lot will therefore vary - but will not be able to exceed the 5000 sqft that is allotted per lot in order to meet hydromodication requirements. There are no requirements in the BMP Manual that require a further breakdown of the impervious area per lot.The group number of each BMP was added to the BMP summary table on the DMA sheet. A list of consruction BMP's and site BMP's was also added to the DMA sheet. The tree wells should not have underdrains. The detail with the underdrain on the DMA and HMP exhibits has been changed accordingly. All catch basins and outlet pipe linework have been added. The tree wells will not have an underdrain. All linework regarding an underdrain has been removed. A standard tree well section was added to the report in section 6. It can also be found in the DMA exhibit.	9/10/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4 - 4	SWQMP	Sub-attachment 2.1: Bioretention Basin Detail: - BMP-100 and BMP-200 have a contributing tributary area greater than 5 acres. In order to allow this, please include the following: 1) incorporate design features (e.g. flow spreaders) to minimize short circuiting of flows in the BMP and 2) incorporate additional design features for proper performance of the regional BMP (e.g. sediment control). **3rd Review: Please provide requested information for BMP A and B** - For dimensions that are the same for all the BMPs, please show on the typical section. Addressed 5/17/2021	Linework and callouts were added to the DMA exhibit to represent a flow spreading device to be designed in final engineering.	9/10/2020 6/7/2021	
4 - 5	SWQMP	Sub-attachment 2.3: Include the Preliminary Grading Plans in this attachment.	They will be included.	9/10/2020 6/7/2021	
4 - 6	SWQMP	Sub-attachment 6.1, Self-Mitigating DMAs: - The self-mitigating DMAs do not need to include undisturbed areas. I.e. the graded slopes for DMA 103 should be included in the DMA, but the undisturbed areas can be removed. - DMA 125 includes impervious areas. This total impervious area should be noted in the table and a calculation should be performed to determined that it is less than 5% of the DMA. If not, it will not qualify as a self-mitigating DMA.	All self mitigating DMA's (1,6,7,8,9,10) have been reviewed and do not contain undisturbed areas. DMA-125 is no longer a relevant DMA.	9/10/2020 6/7/2021	
4 - 7	SWQMP	Sub-attachment 6.3.2: Please provide the DCV calculation for DMA 205 and 502. **3rd Review: Step 1 of SSD-BMP Worksheet I-1 Tree Well Sizing was attached twice. Please provide Step 3 (DCV Calculations) for the proposed Tree Wells.** **-Please note per BMP Design Manual, SD-A Tree Wells, If an underdrain is proposed for the Tree Well, the sizing factors shown in the DCV Multiplier Table cannot be used, and instead continuous simulation modeling should be performed.**	There are no longer trees in the areas where DMA's 205 and 502 used to be since the most recent site redesign. Tree well calculations were checked and both the Step 1 (DCV Calculations) and Step 3 (Tree Well Sizing) worksheets have been included. The tree wells are not planned to have an underdrain and will be used for water quality calculations only.	9/10/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4 - 8	SWQMP	Sub-attachment 8.1: SWMM Model - The pre-development and post-development HMP Exhibits were very unclear and difficult to read. There may be additional comments once a clear version is provided. - Addressed 5/17/2021 - Please provide executable SWMM files with the formal project submittal **3rd Review: The SWMM PDF Results for POC - 2 are missing. POC-3 was attached twice, please provide results for POC-2.**	Results for POC-2 were added in place of one of the POC-3 calculations.	9/10/2020 6/7/2021	
4 - 9	SWQMP	Sub-attachment 8.2: POCs: - Please clearly label the POCs on the DMA Exhibit, and clearly show/label the channel name as described in the table. Or provide a separate exhibit showing the POCs. A pre-development POC exhibit may also be required. - On the DMA Exhibit, the POC for Basin BMP-200 is labeled POC-OF, it should be POC B	Channel names were reviewed for clarity. POC's are all correctly labeled and called out with leaders with a short excerpt from the channel description. All POC's are correctly labeled as "POC-1" POC-2" "POC-3" and "POC-4"	9/10/2020 6/7/2021	
4 - 10	SWQMP	Sub-attachment 8.4: Please provide drawdown calculations **Per Underdrain and Drawdown Results Table, the drawdown for BMP-A exceeds 96 hours. Please revise or provide Vector Control Plan.**	BMP A's low-flow oriface was adjusted to meet the 96 hr drawdown time requirement. The POC report, inp files, and other relevant tables and files were updated to reflect this.	9/10/2020 6/7/2021	
4- 11	SWQMP	Cover Page: Please include permit number/record ID number: PDS2020-TM-5643	The provided permit no. record ID no. was added to the cover page.	9/10/2020 6/7/2021	
4- 12	SWQMP	Cover Page: Please provide Project Applicant email address and phone number	Permit number has been added and page stamped and signed.	9/10/2020 6/7/2021	
4- 13	SWQMP	Cover Page: Please sign and stamp the Preparer's Certification Page on Final Submittal	Page has been signed and stamped.	9/10/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4- 14	SWQMP	Attach. 3 Source Control BMP Worksheet not provided - Please provide	Per the September 2020 SWQMP template that is being used for this report, attachment 3 is "reserved for future use" and was not added. Please see the following link to the county SWQMP template for any questions. https://www.sandiegocounty.gov/content/sdc/dpw/watersheds/DevelopmentandConstruction/BMP_Design_Manual.html	9/10/2020 6/7/2021	
4 - 15	SWQMP	Table 2 Group 1: Baseline BMPs for Existing Natural Site Features: Natural Waterbodies is not selected however there is a watercourse onsite. Select Full or Partial for Maintain Conserve Natural features	Resolved	9/25/2020	6/2/2021
4 - 16	SWQMP	Table 2 Group 2: Common Impervious Outdoor Site Features: For each item identify Full or Partial for Disperse Impervious Areas (SD-B)	Resolved	9/25/2020	6/2/2021
4 - 17	SWQMP	Table 3: Baseline BMPs for Pollutant Generating Sources: Source Control BMP Requirements Worksheet is not selected and not included. Please select and include in the attachments.	Resolved	9/25/2020	6/2/2021
4 - 18	SWQMP	Table 5: DMA Structural Compliance Strategies and Documentation: Part B Compliance Strategies and Required Attachments: Att. 3 Source Control BMP Worksheets is not selected and included. Please select and include the attachment.	Resolved	9/25/2020	6/2/2021
4 - 19	SWQMP	Attach. 1. Storm Water Intake Form: Please provide the Permit No. Record ID No. : PDS2020-TM-5643	The provided permit no. record ID no. was added to the intake form.	9/25/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
4 - 20	SWQMP	Attach. 1. Storm Water Intake Form: Part 2 Applicant Information: Please provide phone number and email address information	Added the information	9/25/2020 6/7/2021	
4 - 21	SWQMP	Attach. 1. Storm Water Intake Form: Part 3 Required Information for All Development Projects: The total disturbed area does not match the total for all DMA areas, please revise.	Total Disturbed area does not include the undisturbed sections that begin with "SUBCATCH-" in the SWMM calculations and write up. The values for the disturbed DMA areas (including all DMA's (self mitigating, tree wells and biofiltration) was recalculated.	6/72021	
4 - 22	SWQMP	Attachment 7: 7.1 Engineers of Work Certification for Structural BMPs: -Please list Permit # -Please sign and stamp.	Permit number has been added and certification page stamped and signed.	6/72021	
4 - 23	SWQMP	Attachment 7: 7.2.2 Structural BMP Summary Table: -Please list Permit # and Sheet # for all Structural BMPs - Please list DMA Area, not BMP surface area	Information was fixed and added.	6/72021	
4 - 24	SWQMP	Attachment 7: 7.3 Structural BMP Checklist: -Please list Permit # and Sheet # for all Structural BMPs	Information was added to the pages.	6/72021	
4 - 25	SWQMP	Attachment 7: Questhaven Impervious Area Calculations: Please provide a breakdown of the proposed 5,000 square feet of proposed impervious cover per lot.	5000 sqft was chosen as a conservative value so houses that are built can have up to 5000 sqft of impervious infrastructure if desired. The area will be inclusive of all walkways, roof areas, driveways and any other impervious features. The impervious cover per lot will therefore vary - but will not be able to exceed the 5000 sqft that is allotted per lot in order to meet hydromodication requirements. There are no requirements in the BMP Manual that require a further breakdown of the impervious area per lot.	6/72021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
5 - 1	CEQA Drainage Study	The project is required to prepare and submit a CEQA Drainage Study in compliance with the documents shown below. The CEQA Drainage study shall be prepared in compliance with the documents shown below. San Diego County Hydrology Manual: http://www.sandiegocounty.gov/content/sdc/dpw/flood/hydrologymanual.html San Diego County Hydraulic Design Manual: http://www.sandiegocounty.gov/content/dam/sdc/dpw/FLOOD_CONTROL/floodcontrolpdf/hydraulic_design_manual_2014.pdf	Submitted	9/10/2020	9/25/2020
5 - 2	CEQA Drainage Study	The narrative of the report refers to the POCs with letters, but the Hydrology Exhibits refer to the POC with numbers. Please revise to be consistent.	This report was changed during the last submittal so that all POC's are consistant with the names "POC-1" "POC-2" "POC-3" and "POC-4" across all reports and DMA exhibits.	9/10/2020 6/7/2021	
5 - 3	CEQA Drainage Study	Summary table: Please include C, Tc, I, V_{100}, for each area (or point) where drainage discharges from the project. Include identification of all erosive velocities (at all points of discharge) calculations for pre-development and post-development.	Page 9 has a summary table added after the previous plan check with the Tc at each POC. It also contains a summary table for the velocities of each node that outlets to a POC. However, these values are still representative of each individual stream that confluences at the POC's. Any flows with erosive velocities will be slowed with an energy dissapator.The "C" and "I" values varies depending on the area, and summarizing them at the POC is not feasible. Please refer to the calculations for the "C" and "I" value for each area on the site.	9/10/2020 6/7/2021	
5 - 4	CEQA Drainage Study	POC 3 shows an increase in discharge for the post-project condition. This POC is a City of San Marcos pipe. They may require replacement and/or upsizing of the pipe to accommodate the increased flows created by the project.	POC 3 no longer has an increase in post-project velocity. No upsizing, replacement or accomodation should be required. The pre flow is 11.81 cfs and the post is 11.61 cfs.	9/10/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
5 - 5	CEQA Drainage Study	Declaration of Responsible Charge shall be stamped and signed for the Drainage Study submitted for approval.	Page is signed and stamped.	9/10/2020 6/7/2021	
5 - 6	CEQA Drainage Study	Summary/Conclusion: Please discuss whether or not the proposed project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site? Provide reasons and mitigations proposed.	Resolved	9/10/2020	6/7/2021
5 - 7	CEQA Drainage Study	Discuss whether or not the proposed project would substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site? Provide reasons and mitigations proposed.	Resolved	9/10/2020	6/7/2021
5 - 8	CEQA Drainage Study	Discuss whether or not the proposed project would create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems? Provide reasons and mitigations proposed.	Resolved	9/10/2020	6/7/2021
5 - 9	CEQA Drainage Study	Discuss whether or not the proposed project would place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, including County Floodplain Maps? Provide reasons and mitigations proposed.	Resolved	9/10/2020	6/7/2021
5 - 10	CEQA Drainage Study	Discuss whether or not the proposed project would place structures within a 100-year flood hazard area which would impede or redirect flood flows?	Resolved	9/10/2020	6/7/2021

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
5 - 11	CEQA Drainage Study	Discuss whether or not the proposed project would expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam?	Resolved	9/10/2020	6/7/2021
5- 12	CEQA Drainage Study	**3rd Comment:** 7.0 References: Please refer to the San Diego County Hydraulic Design Manual, 2014. Delete reference to the Drainage Design Manual, 2005	This has been updated in the report.	6/7/2021	
5 - 13	CEQA Drainage Study	Table 3-1 - Please indicate which runoff coefficients were used for the project.	Resolved	9/10/2020	6/7/2021
5 - 13	CEQA Drainage Study	Existing and Proposed Conditions Hydrology Maps: * Show Q at discharge point. * Include a legend to show existing & proposed drainage facilities * Include the drainage area for "Street E". All areas of the project should be included. * Include the drainage area for the southeast portion of the project parcel. * Show/label San Marcos Creek and show the downstream connection of POC 3 and POC 4 to support the conclusions in the narrative. * Label the proposed basins consistent with the routing analysis.	Resolved	9/10/2020	6/7/2021
5 - 14	CEQA Drainage Study	The bioretention basin at the end of the cul-de-sac at Street "C" does not appear to be shown on the post-project exhibit.	Resolved	9/10/2020	6/7/2021
5 - 15	CEQA Drainage Study	Please include analysis for all the project area, including the drainage area for Street "E" and the southeast portion of the parcel. The drainage study must analyze all areas of the project. Please include analysis.	Resolved	9/10/2020	6/7/2021

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
5 - 16	CEQA Drainage Study	Routing Calculations: - Please clarify the names of the basins consistent with the DMA Exhibit. - Please provide a cross-section of the basins and label outlets. From the pond report, it appears that the pond is counting the water quality volume. Per Section 6.2.7 of the Hydraulic Design Manual, the flood storage volume must be provided in addition to the water quality volume. - Show that there is 1' freeboard available above the maximum flood storage elevation. - If BMP-400 will provide flood storage, please provide routing calculations.	Comment for information only.	9/10/2020	9/10/2020
5 - 17	CEQA Hydrology Study	Provide Hydrologic Soil Group Map.	Attach. 2	9/25/2020	9/25/2020
5 - 18	CEQA Hydrology Study	Provide Rainfall Isopluvials for 100 Year Rainfall Event - 6 Hours and 24 Hours Maps.	Attach. 2	9/25/2020	9/25/2020
5 - 19	CEQA Hydrology Study	Provide Intensity-Duration Design Chart-Figure 3-1.	Attach. 1	9/25/2020	9/25/2020
5 - 20	CEQA Hydrology Study	Provide runoff coefficients for urban areas-Table 3-1.	Attach. 1	9/25/2020	9/25/2020
5 - 21	CEQA Hydrology Study	Provide Rationa Formula for Overland Time of Flow Nomograph Figure 3-3	Attach. 1	9/25/2020	9/25/2020
5 - 22	CEQA Hydrology Study	Provide Nomograph for Determination of Tc Figure 3-4	Nomograph was added to the report behind figure 3-3.	9/25/2020 6/7/2021	
5 - 23	CEQA Hydrology Study	Provide Computation of Effective Slope for Natural Watersheds Figure 3-5	Figure was added.	9/25/2020 6/7/2021	

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Item No.	Subject Area	Issue, Revision or Information Required	Issue Resolution Summary (Include Conditions)	Date Identified	Date Resolved
5 - 24	CEQA Hydrology Study	Please clarify how runoff from from Nodes 1201-1203 reach POC-3.	These nodes flow into a BMP which will have an outlet pipe that will lead to the POC 3.	6/7/2021	
5 - 25	CEQA Hydrology Study	Per PGP Cross Sections D-D and E-E, runoff from the offsite undeveloped area appears to flow directly into the lots and contradicts the Proposed delineations. Please provide clarification within cross sections or revise drainage delineations.	As seen on the plan view, there are brow ditches at the tops of these slopes to direct the water. These brow ditches were added to the sheet profiles.	6/7/2021	

PDP SWQMP Submittal Checklist

SWQMP Tables: All of the tables below must be completed.

SWQMP Attachments[1]: Use the checklist below to identify which attachments will be included with this submittal. Attachments with boxes already checked (☒) are required for all projects. The applicability of other attachments will be determined upon completing this form.

☒ Attachment 1: Storm Water Intake Form

☒ Attachment 2: DMA Exhibits and Construction Plan Sheets

☐ Attachment 3: Reserved for Future Use

☐ Attachment 4: Previous SWQMP Submittals

☒ Attachment 5: Existing Site and Drainage Description

☒ Attachment 6: Documentation of DMAs without Structural BMPs

☒ Attachment 7: Documentation of DMAs with Structural Pollutant Control BMPs

☒ Attachment 8: Documentation of DMAs with Structural Hydromodification Management BMPs

☒ Attachment 9: Management of Critical Coarse Sediment Yield Areas

☒ Attachment 10: BMP Installation Verification Form

☒ Attachment 11: BMP Maintenance Agreements and Plans

☐ Attachment 12: Documentation of Alternative Compliance Projects (ACPs)

After completing the remainder of this form, check the applicable SWQMP Attachment boxes to summarize your selections.

[1] All SWQMP Attachments are available at www.sandiego.gov/stormwater under the Development Resources tab, Submittal Templates.

Table 1 – Baseline BMPs for Existing and Proposed Site Features

A. BMPs for Existing Natural Site Features (See Fact Sheet BL-1)

1. Check the boxes below for each existing feature on the site.

2. Select the BMPs to be implemented for each identified feature. Explain why any BMP not selected is infeasible in Table 3.

	Conserve natural features (SD-G)	Provide buffers around waterbodies (SD-H)
☐ Natural waterbodies	☐	☐
☐ Natural storage reservoirs & drainage corridors	☐	---
☒ Natural areas, soils, & vegetation (incl. trees)	☒	---

B. BMPs for Common Impervious Outdoor Site Features (See Fact Sheet BL-2)

1. Check the boxes below for each proposed feature.

*2. Select the BMPs to be implemented for each proposed feature. If neither BMP **SD-B** nor **SD-I** is selected for a feature, explain why both BMPs are infeasible in Table 3.*

	a. Direct runoff to pervious areas (SD-B)	b. Construct surfaces from permeable materials (SD-I)
☒ Streets and roads	☒	☐
☒ Sidewalks & walkways	☒	☐
☐ Parking areas & lots	☐	☐
☒ Driveways	☒	☐
☒ Patios, decks, & courtyards	☒	☐
☐ Hardcourt recreation areas	☐	☐
☐ Other:	☐	☐

c. Minimize the size of impervious areas

☒ *Check this box to confirm that all impervious areas on the site will be minimized where feasible.*

If this box is not checked, identify the surfaces that cannot be minimized in Table 3, and explain why it is infeasible to do so.

C. ☒ BMPs for Rooftop Areas: *Check this box if rooftop areas are proposed and select at least one BMP below.*

If no BMPs are selected, explain why they are infeasible in Table 3.

(See Fact Sheet BL-3)

1. Direct runoff to pervious areas (SD-B)	2. Install green roofs (SD-C)	3. Install rain barrels (SD-E)
☒	☐	☐

D. ☒ BMPs for Landscaped Areas: *Check this box if landscaping is proposed and select at least one BMP below.*

If no BMPs are selected, explain why they are infeasible in Table 3.

(See Fact Sheet BL-4)

1. Sustainable Landscaping (SD-K)

☒

Note: All features and BMPs must be shown on applicable construction plans. See applicable Fact Sheets in Appendix C of the BMP Design Manual for additional information.

Note: Use Table 3 to explain BMP infeasibility or inapplicability, or to describe features or BMPs not listed in this table. Additional explanation may be required by the County.

Table 2 – Baseline BMPs for Pollutant-generating Sources

☐ If this is a **Small Residential Project**, check this box and skip the rest of this table.

A. Management of Stormwater Discharges

1. Identify all proposed outdoor work areas below (☐ *Check here if none are proposed*)	**2. Which BMPs will be used to prevent materials from contacting rainfall or runoff?** **(See Fact Sheet BL-5)** (*Select all feasible BMPs for each work area*[2])			**3. Where will runoff from the work area be routed?** **(See Fact Sheet BL-6)** (*Select one or more option for each work area*)			
	Overhead covering (rooftops, etc.) (SC-A)	**Separation of flows from adjacent areas (berms, etc.) (SC-B)**	**Wind protection (screens, etc.) (SC-C)**	**Sanitary sewer[3] (SC-D)**	**Containment system (SC-E)**	**Stormwater S-BMP or SSD-BMP[4]**	**Other[5]**
☒ Trash & Refuse Storage	☐	☒	☒	☒	☐	☐	☐
☐ Materials & Equipment Storage	☐	☐	☐	☐	☐	☐	☐
☐ Loading & Unloading	☐	☐	---	☐	☐	☐	☐
☐ Fueling	☐	☐	---	☐	☐	☐	☐
☐ Maintenance & Repair	☐	☐	---	☐	☐	☐	☐
☐ Vehicle & Equipment Cleaning	☐	☐	---	☐	☐	☐	☐
☐ Other:	☐	☐	---	☐	☐	☐	☐

B. Prevention of Non-stormwater Discharges (See Fact Sheet BL-7)

Select one option for each feature below:

• **Storm drain inlets and catch basins …**	☐ are not proposed	☒ will be labeled with stenciling or signage to discourage dumping **(SC-F)**
• **Educational BMP Signage …**	☐ are not proposed	☒ will be labeled with educational signage for BMP **(SC-G)**
• **Interior work surfaces, floor drains, & sumps …**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters
• **Drain lines (e.g., air conditioning, boiler, etc.) …**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters
• **Fire sprinkler test water …**	☐ are not proposed	☐ will not discharge directly or indirectly to the MS4 or receiving waters

Note: All outdoor features and BMPs in this table must be shown on applicable construction plans. See applicable Fact Sheets in Appendix C of the BMP Design Manual for additional information. **Note:** Use Table 3 to explain BMP infeasibility or inapplicability, or to describe features or BMPs not listed in this table. Additional explanation may be required by the County.

[2] Each BMP is required where feasible. If none are selected for any feature, explain why they are infeasible in Table 3.

[3] Separate wastewater agency approvals may be required.

[4] Structural Treatment Control BMPs (S-BMPs) and Significant Site Design BMPs (SSD-BMPs) may not receive discharges from work areas that concentrate pollutants in a manner that will impair their functioning. Discharges from the proposed work area must also be included in DCV calculations for the applicable BMP.

[5] Describe other proposed options for managing stormwater discharges in Table 3.

Table 3 – Explanations and Justifications for Table 1 and 2 Baseline BMPs

☒ **Check here if no explanations or justifications for Table 1 or 2 BMPs are required.**

- **Required Justifications**: Provide explanations of BMP inapplicability and/or infeasibility as indicated per Tables 1 and 2.
- **If Requested**: Justify why specific BMPs will not be implemented or will only be partially implemented.
- **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Tables 1 or 2.

BMP-Feature Combination		Explanation
Feature		
BMP		
Feature		
BMP		
Feature		
BMP		
Feature		
BMP		
Feature		
BMP		
Feature		
BMP		
Feature		
BMP		

Table 4: DMA Structural Compliance Strategies and Documentation

Part A – Selection and Application Structural Performance Standards

1. Selection of Standards (select one; see BMPDM Section 6.1)

☒ a. Pollutant control + hydromodification ☐ b. Pollutant control only (project is exempt from hydromodification requirements)

2. Application of Structural Performance Standards (select one; see BMPDM Section 1.7)

☒ **New Development Projects:** Standards apply to all impervious surfaces.

☐ **Redevelopment Projects:** Complete the calculations below. Select the applicable scenario based on the results.

a. Existing impervious area (ft²)	b. Impervious area created / replaced (ft²)	c. % Impervious created / replaced [(b/a)*100]

☐ *Scenario 1: c is 50% or more*: Performance standards apply to all impervious surfaces (a + b).

☐ *Scenario 2: c is less than 50%*: Performance standards apply only to created or replaced impervious surfaces (b only).

Part B – Compliance Strategies and Required Attachments

1. *Complete and submit each of the applicable attachments on the right.*

Att. 1	Att. 2	Att. 3	Att. 4	Att. 5
Storm Water Intake Form	DMA Exhibits and Construction Plan Sheets	N/A	Previous SWQMP Submittals (see inside cover)	Existing Site and Drainage Description
☒	☒	☐	☐	☒

2. *Indicate each compliance strategy below that will be used for one or more DMAs on the site.*

	Att. 6	Att. 7	Att. 8	Att. 9	Att. 10	Att. 11	Att. 12
	DMAs without Structural BMPs	DMAs w/ Structural Pollutant Control BMPs	DMAs w/ Structural Hydromod. BMPs	Critical Coarse Sediment Yield Areas	BMP Installation Verification Form	Maintenance Agreements/ Plans	Alternative Compliance Projects
☒Self-mitigating DMAs (BMPDM Section 5.2.1)	☒			☒			
☐De Minimis DMAs (BMPDM Section 5.2.2)	☐			☐			
☐Self-retaining DMAs (BMPDM Section 5.2.3)	☐			☐	☐		
Structural BMPs (select all that apply)							
☒Pollutant Control BMPs (BMPDM Section 5.4)		☒		☒	☒	☒	
☒Hydromodification Control BMPs (BMPDM Chapter 6)			☒	☒	☒	☒	
☐Alternative Compliance Project (BMPDM Section 1.8)				☐	☐	☐	☐

- *Attachments 1, 2, and 5 are required for all projects.*

Table 5: Critical Coarse Sediment Yield Area (CCSYA) Requirements

- Identify one applicable compliance pathway for the PDP below.
- Document your selection in **Attachment 9**.

A. Hydromodification Management Exemption (BMPDM Sections 1.6 and 6.1)

☐ **PDP is Exempt from Hydromodification Management Requirements**

Select if hydromodification management exemption was selected in Table 4 Part A.1.

B. Watershed Management Area (WMAA) Mapping (BMPDM Appendix H.1.1.2)

☒ **WMAA mapping demonstrates the following:**

a. <5% of potential onsite CCYSAs will be impacted (built on or obstructed)

b. All potential upstream offsite CCYSAs will be bypassed

C. Resource Protection Ordinance (RPO) Methods (BMPDM Appendix H.1.1.1)

☐ **RPO Scenario 1: PDP is subject to and in compliance with RPO requirements**

a. Project requires one or more discretionary permits (RPO applicability is confirmed during discretionary review)

b. Onsite AND upstream offsite CCSYAs will be avoided and/or bypassed

☐ **RPO Scenario 2: PDP is entirely exempt/not subject to RPO requirements**[6]

a. Project does not require discretionary permits

b. Project will bypass all upstream offsite CCSYAs (no requirements for onsite CCSYAs)

D. No Net Impact Analysis (BMPDM Appendix H.4)

☐ **Project demonstrates no net impact to receiving waters**

[6] Does not include PDPs utilizing exemption(s) via RPO Section 86.604(e)(2)(cc) or 86.604(e)(3).

Table 6 –Minimum Construction Stormwater BMPs

Minimum Required BMPs by Activity Type Select all applicable activities and at least one BMP for each.	**References** **Caltrans**[7]	**County of San Diego**
☒ **Erosion Control for Disturbed Slopes** (choose at least 1 per season)		
☐ Vegetation Stabilization Planting[8] (Summer)	SS-2, SS-4	
☒ Hydraulic Stabilization Hydroseeding (Summer)	SS-4	
☐ Bonded Fiber Matrix or Stabilized Fiber Matrix[9] (Winter)	SS-3	
☒ Physical Stabilization Erosion Control Blanket (Winter)	SS-7	
☒ **Erosion control for disturbed flat areas (slope < 5%)**		
☒ County Standard Lot Perimeter Protection Detail	SC-2	PDS 659[10]
☐ Use of Item A erosion control measures on flat areas	SS-3, SS-4, SS-7	
☐ County Standard Desilting Basin (must treat all site runoff)	SC-2	PDS 660[11]
☐ Mulch, straw, wood chips, soil application	SS-6, SS-8	
☒ **Energy dissipation (required to control velocity for concentrated runoff or dewatering discharge)**		
☒ Energy Dissipater Outlet Protection	SS-10	RSD D-40[12]
☒ **Sediment control for all disturbed areas**		
☒ Silt Fence	SC-1	
☐ Fiber Rolls (Straw Wattles)	SC-5	
☒ Gravel & Sand Bags	SC-6, SC-8	
☐ Dewatering Filtration	NS-2	
☒ Storm Drain Inlet Protection	SC-10	
☒ Engineered Desilting Basin (sized for 10-year flow)	SC-2	
☒ **Preventing offsite tracking of sediment**		
☒ Stabilized Construction Entrance	TC-1	
☒ Construction Road Stabilization	TC-2	
☒ Entrance/Exit Tire Wash	TC-3	
☒ Entrance/Exit Inspection & Cleaning Facility	TC-1	
☒ Street Sweeping and Vacuuming	SC-7	
☒ **Materials Management**		
☒ Material Delivery & Storage	WM-1	
☒ Spill Prevention and Control	WM-4	
☒ **Waste Management**[13]		
☒ Waste Management Concrete Waste Management	WM-8	
☒ Solid Waste Management	WM-5	
☒ Sanitary Waste Management	WM-9	
☒ Hazardous Waste Management	WM-6	

[7] See Caltrans 2017 Construction Site Best Management Practices (BMP) Manual available at: https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control/manuals-and-handbooks
[8] Planting or Hydroseeding may be installed between May 1st and August 15th. Slope irrigation must be in place and operable for slopes >3 feet. Vegetation must be watered and established prior to October 1st. A contingency physical BMP must be implemented by August 15th if vegetation is not established 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.
[9] All slopes over three feet must have established vegetative cover prior to final permit approval.
[10] County PDS 659. Standard Lot Perimeter Protection Design System (Bldg. Division)
[11] County PDS 660. County Standard Desilting Basin for Disturbed Areas of 1 Acre or Less Bldg. Division
[12] Regional Standard Drawing D-40 – Rip Rap Energy Dissipater (also acceptable for velocity reduction)
[13] Applicants are responsible to apply appropriate BMPs for specific wastes (e.g., BMP WM-8 for concrete).

Table 7 – Explanations and Justifications for Construction Phase BMPs

☒ **Check here if no explanations or justifications for Table 6 BMPs are required.**

Justifications for Table 6 Temporary Construction Phase BMPs

- **Required Justifications**: Justify all construction activity types for which NO BMPs were selected.
- **If Requested**: Justify why specific individual BMPs were not selected.
- **Additional Explanation**: Describe any proposed features and/or BMPs not listed in Table 6.

Activity Type / BMP		Explanation
Activity Type		
BMP		
Activity Type		
BMP		
Activity Type		
BMP		
Activity Type		
BMP		
Activity Type		
BMP		
Activity Type		
BMP		
Activity Type		
BMP		

This form establishes Stormwater Quality Management Plan (SWQMP) requirements for Development Projects per Sections 67.809 and 67.811 of the County of San Diego Watershed Protection Ordinance (WPO).
See ***Storm Water Intake Form Instructions*** for additional guidance and explanation of terms.

Part 1. Project Information	
Project Name:	Questhaven 76 Lot Residential Subdivision
Record ID (Permit) No(s):	PDS2020-TM-5643
Assessor's Parcel No(s):	223-080-46-00,223-070-07-00 & 223-070-08-00
Street Address (or Intersection):	Near 1058 San Elijo Road
City, State, Zip:	San Marcos, CA 92078

Part 2. Applicant / Project Proponent Information	
Name:	Rita Mahoney
Company:	Colrich California, LLC
Street Address:	444 West Beech Street, Suite 300
City, State, Zip:	San Diego, CA 92101
Phone Number	858-490-2343
Email:	ritam@colrich.com

Part 3. Required Information for All Development Projects

	1. Existing (pre-development) impervious surfaces (ft²)	**2. Created or replaced impervious surfaces (ft²)**	**3. Total disturbed area (acres or ft²)**
A	0	513,123 sf (10.6 ac)	1,295,910 sf (29.8 ac)

		WDID # (if issued)
B	☒ Check here and provide a WDID# if this project is subject to the California Construction General Permit (Order No. 2009-0009-DWQ)[1]	Not Issued Yet

For County Use Only	**Reviewed By:**	**Review Date:**
☐ Standard SWQMP	☐ PDP SWQMP	☐ Green Streets PDP Exemption SWQMP

[1] Available at: https://www.waterboards.ca.gov/water_issues/programs/stormwater/construction.html

Part 4. Priority Classification & SWQMP Form Selection	
Ⓐ ***If your project is the following ... (select one)***	Ⓑ ***You must complete ...***
☐ **Standard Project** ☐ a. Project is East of the Pacific/Salton Sea Divide ☐ b. None of the PDP criteria below applies	➔ **Standard *SWQMP Form***
☒ **Priority Development Project (PDP)** ☐ 1. Project is part of an existing PDP**,** OR ☒ 2. Project does any of the following: ☒ a. Creates or replaces a total of 10,000 ft² or more of impervious surface ☒ b. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) parking lots; (2) streets, roads, highways, freeways, and/or driveways; (3) restaurants; and (4) hillsides ☐ c. Creates or replaces a combined total of 5,000 ft² or more of impervious surface within one or more of the following uses: (1) automotive repair shops; and (2) retail gasoline outlets ☐ d. Discharges directly to an Environmentally Sensitive Area (ESA) AND creates or replaces 2,500 ft² or more of impervious surface ☒ e. Disturbs one or more acres of land (43,560 ft²) and is expected to generate pollutants post-construction ☐ f. Is a redevelopment project that creates or replaces 5,000 ft² or more of impervious surface on a site already having at least 10,000 ft² of impervious surface	➔ **PDP *SWQMP Form***
☐ **Green Streets PDP Exemption**[2]	➔ **Green *Streets PDP Exemption SWQMP Form***

Part 5. Applicant Signature	
I have reviewed the information in this form, and it is true and correct to the best of my knowledge.	
Applicant / Project Proponent Signature:	Date:

- ***Upon completion*** *submit this form to the County.*
- ***If requested****, attach supporting documentation to justify selections made or exemptions claimed.*
- ***If this is a PDP that is part of a larger existing PDP****, you will be required to attach a copy of the existing SWQMP to the newer SWQMP submittal.*

[2] ***Green Streets PDP Exemption Projects*** are those claiming exemption from PDP classification per WPO Section 67.811(b)(2) because they consist exclusively of *either* 1) development of new sidewalks, bike lanes, and/or trails; *or* 2) improvements to existing roads, sidewalks, bike lanes, and/or trails.

2.0 General Requirements

- Attachment 2 consolidates exhibits and plans required for the entire project.
- Complete the table below to indicate which sub-attachments are included with the submittal. Sub-attachments that are not applicable can be excluded from the submittal.
- Unless otherwise stated, features and BMPs identified and described in each corresponding Attachment (6 through 9) must be shown on applicable DMA Exhibits and construction plans submitted for the project.

Sub-attachments	Requirement
☒ **2.1: DMA Exhibits**	All PDPs
☒ **2.2: Individual Structural BMP DMA Mapbook**	PDPs with structural BMPs
☒ **2.3: Construction Plan Sets**	All projects

2.1 DMA Exhibits

- DMA Exhibits must show all DMAs on the project site. Exhibits must include all applicable features identified in applicable SWQMP attachments.
- Exhibits may be prepared individually for the BMPs associated with each applicable SWQMP Attachment (6, 7, 8, and/or 9) or combined into one or more consolidated exhibits.
- Use this checklist to ensure required information is included on each exhibit (copy as needed).

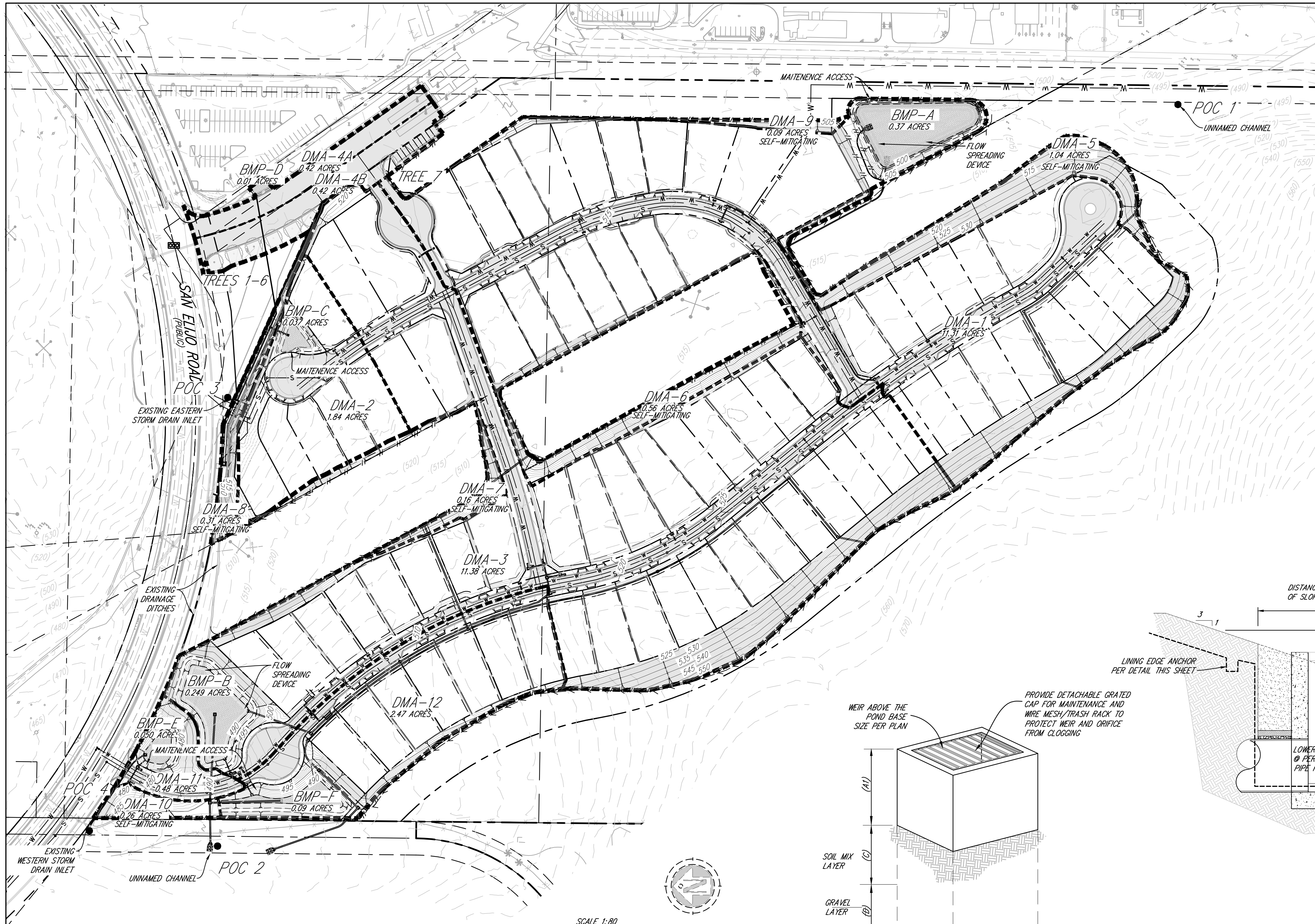
DMA Exhibit ID #:	QUESTHAVEN DMA AND SOURCE CONTROL EXHIBIT	
A. Features required for all exhibits		
1. Existing Site Features		
☒ Underlying hydrologic soil group (A, B, C, D) ☒ Approximate depth to groundwater ☒ Natural hydrologic features	☒ Topography and impervious areas ☒ Existing drainage network, directions, and offsite connections	
2. Drainage Management Area (DMA) Information		
☒ Proposed drainage network, directions, and offsite connections	☒ DMA boundaries, ID numbers, areas, and type (structural BMP, de minimis, etc.)	
3. Proposed Site Changes, Features, and BMPs		
☒ Proposed demolition and grading ☐ Group 1, 2, and 3 Features[1] ☐ Group 4 Features	☐ Construction BMPs[2] ☒ Baseline source control BMPs ☒ Baseline source control BMPs	
B. Proposed Features and BMPs Specific to Individual SWQMP Attachments[3]		
☒ Attachment 6	☐ SSD-BMP impervious dispersion areas ☒ SSD-BMP tree wells	
☒ Attachment 7	☒ Structural pollutant control BMPs	
☒ Attachment 8	☒ Structural hydromodification management BMPs ☒ Point(s) of Compliance (POC) for hydromodification management ☒ Proposed drainage boundary and drainage area to each POC	
☒ Attachment 9	☒ Onsite CCSYAs	☐ Bypass of onsite CCSYAs ☐ Bypass of upstream offsite CCSYAs

[1] Group 1-4 features and baseline BMPs from PDP SWQMP Tables 2 and 3.
[2] Minimum Construction Stormwater BMPs from PDP SWQMP Table 7.
[3] Identify the location, ID numbers, type, and size/detail of BMPs.

2.2 Individual Structural BMP DMA Mapbook

- Use this page as a cover sheet for the Structural DMA Mapbook.
- An individual Structural DMA Mapbook must be submitted for any project site with one or more structural BMPs. One Mapbook is required for each unique subsequent owner with responsibility for maintenance of a Structural BMP. Mapbook exhibits will be incorporated as exhibits in Stormwater Maintenance Agreements (SWMAs) and Maintenance Notifications (MNs). See Attachment 11 for additional information on maintenance agreements. If the Mapbook has been provided for each subsequent owner in Attachment 11, they are not required here.
- Place each map on 8.5"x11" paper.
- Show at a minimum the DMA, Structural BMP, Assessor's parcel boundaries with parcel numbers, and any existing hydrologic features within the DMA.

☒	All Mapbooks are attached
☐	All Mapbooks are in Attachment 11



SCALE 1:80

0 80 160 240 320

EXISTING SITE FEATURES:

- THE UNDERLYING HYDROLOGIC SOILS GROUP FOR THE ENTIRE SITE IS SOIL TYPE D.
- THE APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 20 FEET BASED ON THE EPA WEB SOIL SURVEY RESULTS
- THE TWO NATURAL HYDROLOGIC FEATURES OF THE SITE ARE A NATURAL DRY DRAINAGE COURSE FLOWING ON A SOUTHERLY DIRECTION ALONG THE EASTERN PROPERTY LINE, AND A NATURAL DRY DRAINAGE COURSE FLOWING IN A NORTHWESTERLY DIRECTION LEAVING THE SITE NEAR THE NORTH WEST LIMITS OF THE SITE.
- THE SITE IS GENTLY SLOPING NATURAL UNDEVELOPED AREA WITH NO APPRECIABLE IMPERVIOUS AREAS WITHIN THE PROJECT BOUNDARIES.
- THE SITE PROPOSES TO CONNECT TO THE EXISTING PUBLIC STORMDRAIN SYSTEM FLOWING IN A WESTERLY DIRECTION LOCATED IN THE PUBLIC RIGHT-OF-WAY FOR SAN ELIJO ROAD.
- BASED ON WATERSHED MAPPING OF POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS (PCCSYA), THERE ARE NO PCCSYA LOCATED WITHIN THE PROJECT BOUNDARY OR TRIBUTARY TO THE RUNOFF BYPASSED AROUND THE SITE.

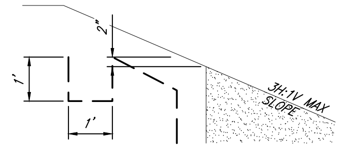
DETAIL
"NO DUMPING" AT CATCH BASINS

NOTE: ALL CATCH BASINS WITH GRATES SHALL BE STENCILED WITH CITY REQUIRED ITEM PER ABOVE DETAIL:

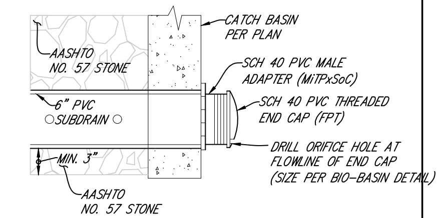
(DAS MANUFACTURING #SDO OR EQUIVALENT)

DETAIL
WATER QUALITY SIGN– PLACED AT EACH BIOFILTRATION BASIN

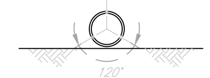
NOTE: ALL BIOFILTRATION AREAS WILL HAVE A SIGN POSTED TO BE VISIBLE AT ALL TIMES.



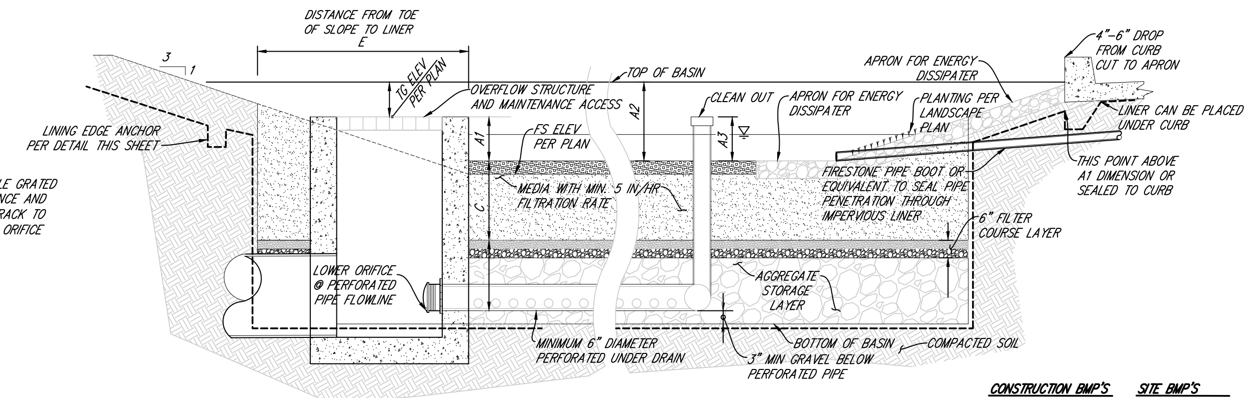
IMPERMEABLE LINER EDGE ANCHOR DETAIL
NOT TO SCALE



ORIFICE DETAIL
NOT TO SCALE



6" PVC PIPE PERFORATION LAYOUT DETAIL
NOT TO SCALE



BIOFILTRATION BASIN DETAIL
NOT TO SCALE

CONSTRUCTION BMP'S

TREE WELL'S 1–6

SITE BMP'S

BMP–A
BMP–B
BMP–C
BMP–D
BMP–E
BMP–F

WEIR ABOVE THE POND BASE SIZE PER PLAN

PROVIDE DETACHABLE GRATED CAP FOR MAINTENANCE AND WIRE MESH/TRASH RACK TO PROTECT WEIR AND ORIFICE FROM CLOGGING

SOIL MIX LAYER

GRAVEL LAYER

FLOW RESTRICTOR LOWER ORIFICE SIZE PER TABLE SEE ORIFICE DETAIL

CATCHBASIN DETAIL
NOT TO SCALE

BMP MAINTENANCE ACCESS NOTE

ALL BMP'S TO BE ACCESSED FROM NEAREST ROADWAY FOR MAITENENCE.

SIGNIFICANT SITE DESIGN (SSD) BMP SUMMARY TABLE									
BASIN	DMA TYPE: DRAINS TO	TYPE OF BMP	MIN EFFECTIVE AREA (SQFT)	F (IN) POND	G (IN) CU STRUCTURAL SOIL	NUMBER OF TREES	DIAMETER OF TREE (FT)	IMPERMEABLE LINER?	TREE SPECIES
DMA-4B	TREES 1-7	TREE WELL	565 (EA)	4-6	30	7	30	SIDEWALLS ONLY	–

SITE DESIGN BMPs

4.3.2 CONSERVE NATURAL AREAS
4.3.3 MINIMIZE IMPERVIOUS SURFACES
4.3.5 IMPERVIOUS AREA DISPERSION

SOURCE CONTROL BMPs

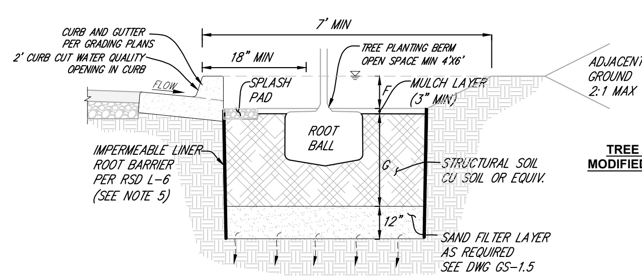
4.2.2 STORM DRAIN INLET STENCILING
4.2.6(E) LANDSCAPE/PESTICIDE USE

LEGEND

DMA BOUNDARY

PROPOSED IMPERVIOUS ROADWAY

IMPERVIOUS AREA CALCULATIONS								
		TOTAL DMA AREA (SQFT)	PAVEMENT AREA (SQFT)	# LOTS (EA)	TOTAL LOT IMPERVIOUS AREA*	SUM OF IMPERVIOUS AREA (SQFT)	TOTAL PERVIOUS AREA (SQFT)	PERCENT IMPERVIOUS (%)
BMP-A	DMA-1	449,128	53,883	30	150,000	203,883	245,244	45.4%
BMP-B	DMA-3	484,970	53,221	33	165,000	218,221	266,748	45.0%
BMP-C	DMA-2	75,232	8,584	6	30,000	38,584	36,648	51.30%
BMP-D	DMA-4A	17,480	17,480	0	0	17,480	0	100.0%
BMP-E	DMA-11	18,784	5,328	0	0	5,328	13,486	28.4%
BMP-F	DMA-12	106,885	12,106	7	35,000	47,106	59,779	44.10%



TREE WELL
MODIFIED GS-1.3b

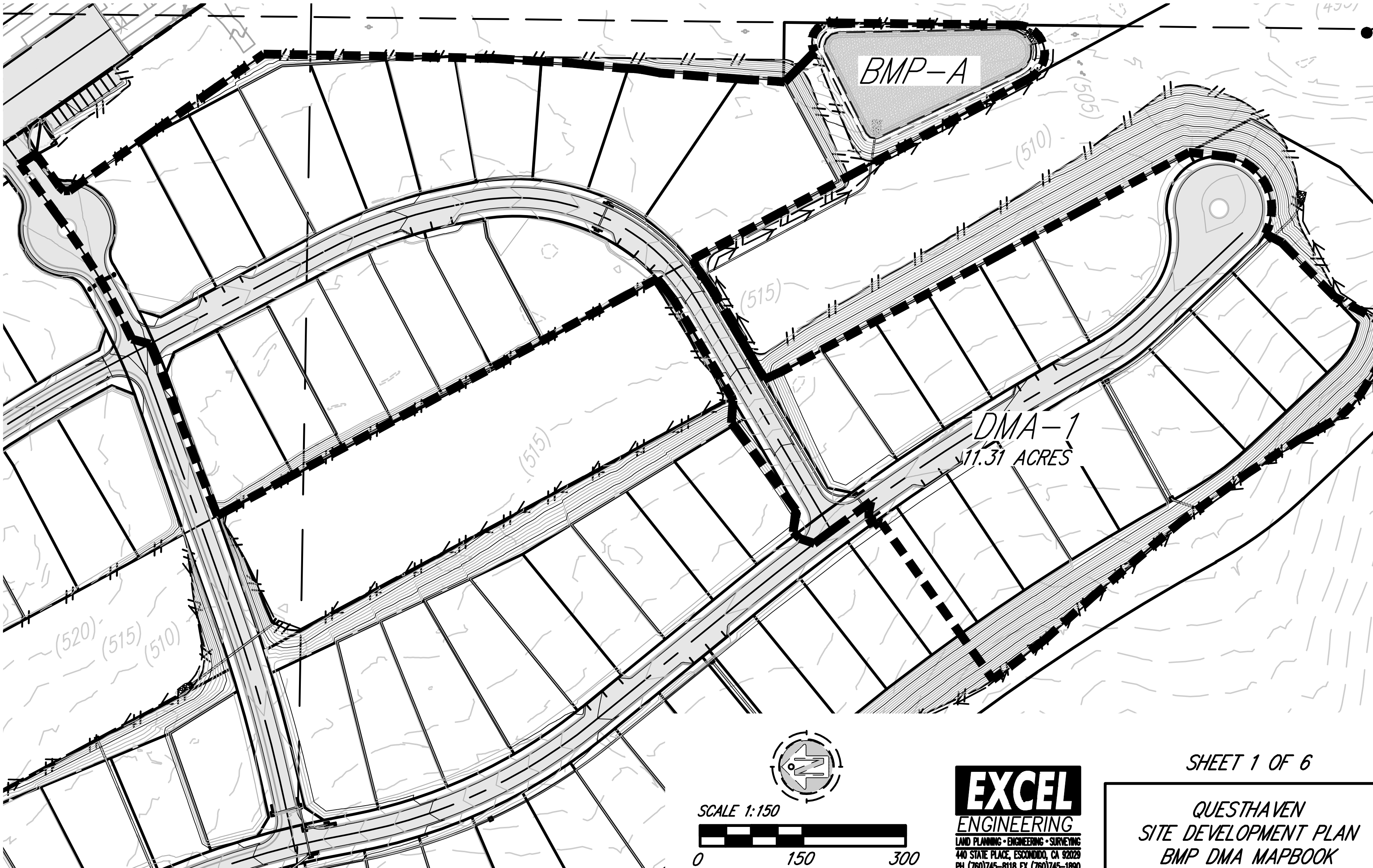
STRUCTURAL BMP SUMMARY TABLE																
DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER?	MAINTENANCE CATEGORY
DMA-1	BMP-A	BIOFILTRATION	17,236	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.8	YES	1
DMA-2	BMP-C	BIOFILTRATION	10,862	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.5	YES	1
DMA-3	BMP-B	BIOFILTRATION	1,486	6	12.0	6.0	–	21.0	15	1.5	36X36	–	0.75	YES	1
DMA-4A	BMP-D	BIOFILTRATION	597	6	12.0	6.0	–	21.0	18	1.5	36X36	–	0.75	YES	1
DMA-11	BMP-E	BIOFILTRATION	2,189	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.0	YES	1
DMA-12	BMP-F	BIOFILTRATION	4,691	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.0	YES	1

QUESTHAVEN
DMA EXHIBIT

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • SURVEYING
440 STATE PLACE, ESCONDIDO, CA 92029
PH (760)745-8118 FX (760)745-1890

STRUCTURAL BIO-BASIN SUMMARY TABLE

DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER		IMPERMEABLE LINER?
												UPPER (INCH)	LOWER (INCH)	
DMA-1	BMP-A	BIOFILTRATION	17,236	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.5	YES



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0 150 300

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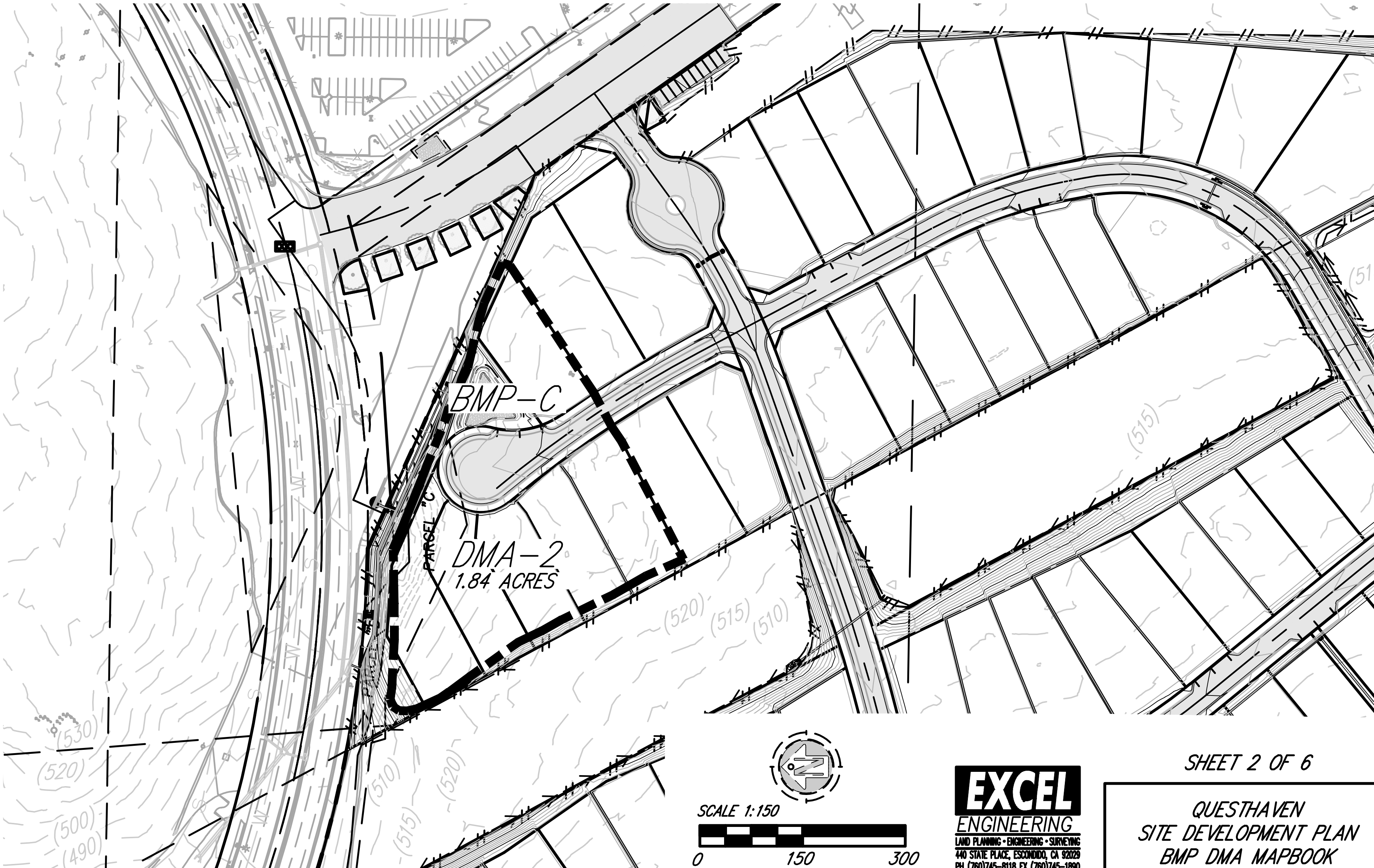
QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

STRUCTURAL BIO-BASIN SUMMARY TABLE														
DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER		IMPERMEABLE LINER?
												UPPER (INCH)	LOWER (INCH)	
DMA-2	BMP-C	BIOFILTRATION	10,862	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.5	YES



SHEET 2 OF 6

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QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

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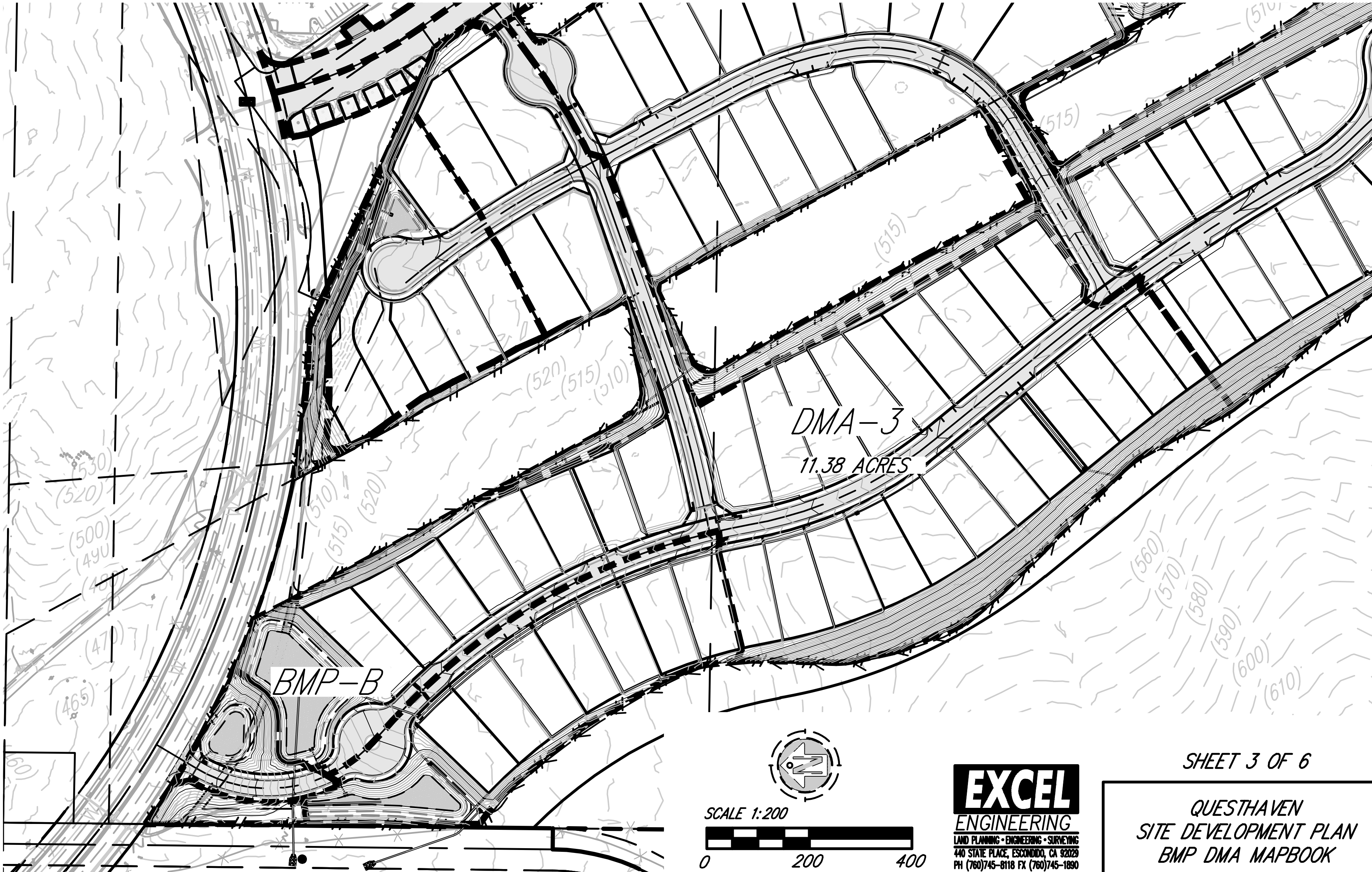
STRUCTURAL BIO-BASIN SUMMARY TABLE

DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER		IMPERMEABLE LINER?
												UPPER (INCH)	LOWER (INCH)	
DMA-3	BMP-B	BIOFILTRATION	1,486	6	12.0	6.0	–	21.0	15	1.5	36X36	–	0.75	YES



SHEET 3 OF 6

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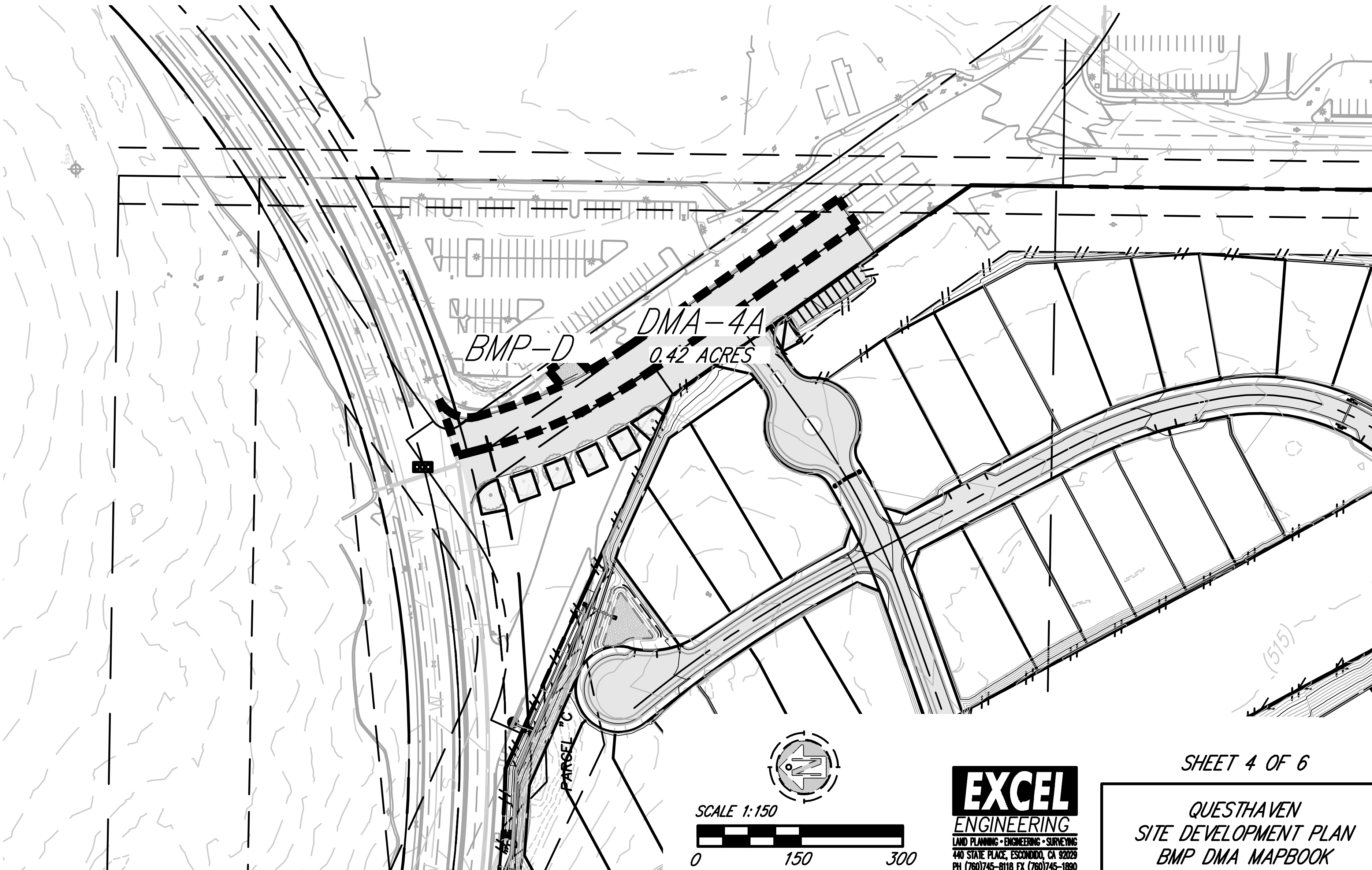
QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

STRUCTURAL BIO-BASIN SUMMARY TABLE

DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER?
DMA-4A	BMP-D	BIOFILTRATION	597	6	12.0	6.0	-	21.0	18	1.5	36X36	-	0.75	YES



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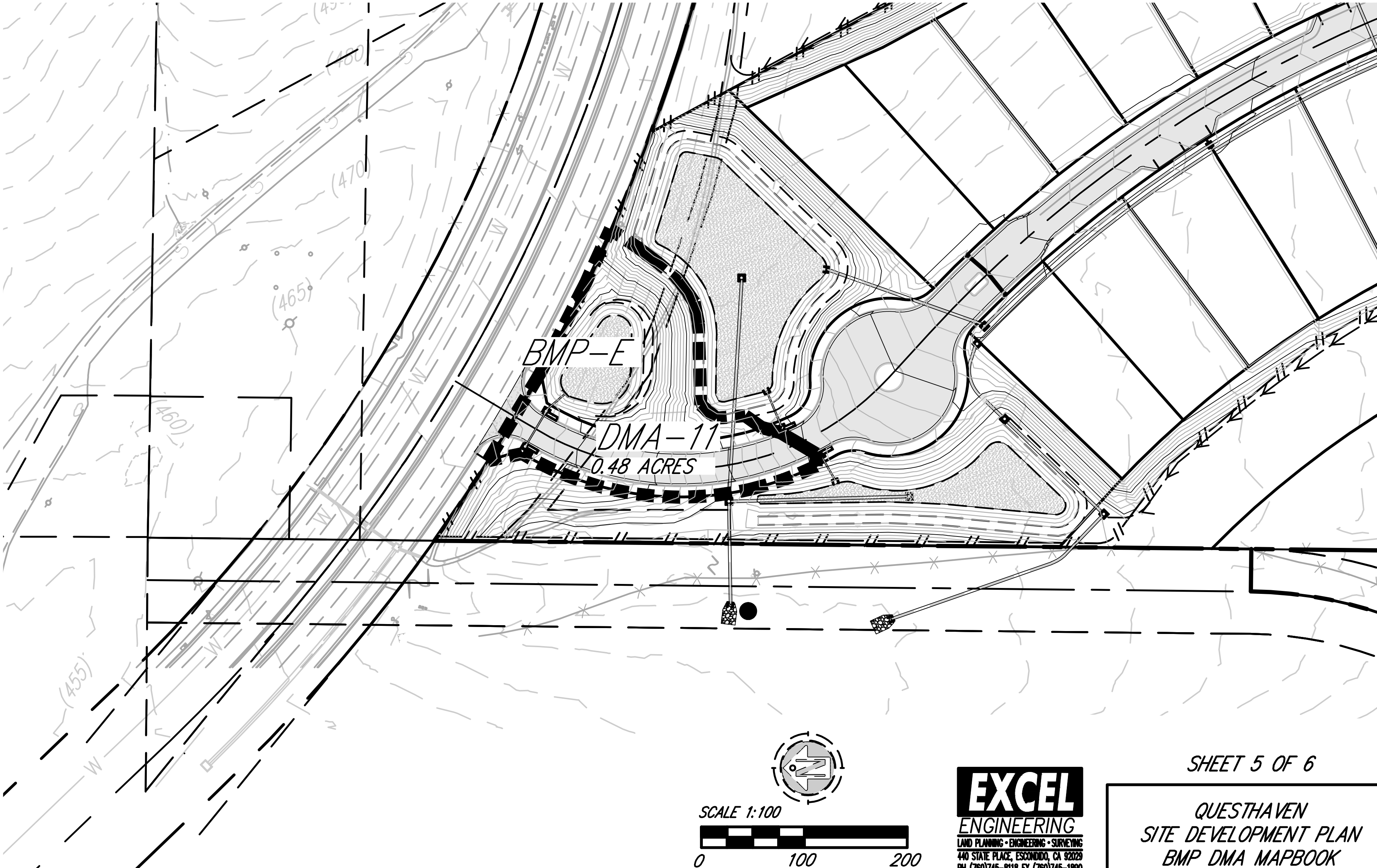
QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

STRUCTURAL BIO-BASIN SUMMARY TABLE

DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER		IMPERMEABLE LINER?
												UPPER (INCH)	LOWER (INCH)	
DMA-11	BMP-E	BIOFILTRATION	2,189	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.0	YES



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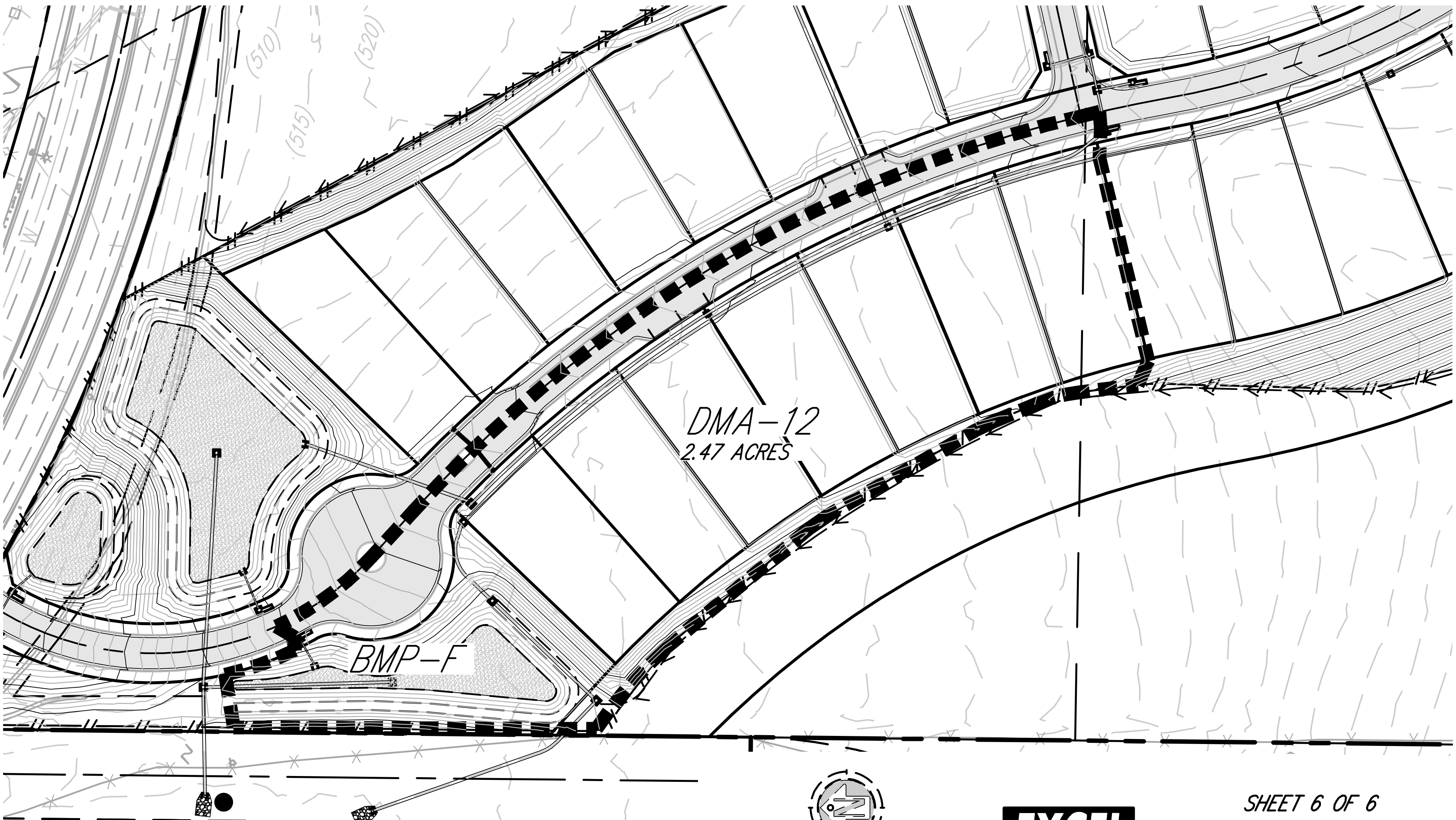
SHEET 5 OF 6

QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

STRUCTURAL BIO-BASIN SUMMARY TABLE														
DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER?
DMA-12	BMP-F	BIOFILTRATION	4,691	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.0	YES



SCALE 1:100

0 100 200

SHEET 6 OF 6

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QUESTHAVEN
SITE DEVELOPMENT PLAN
BMP DMA MAPBOOK

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2.3 Construction Plan Sets

- DMAs, features, and BMPs identified and described in this attachment must also be shown on all applicable construction and landscape plans.
- As applicable, plan sheets must identify:
  - All features and BMPs identified in Sub-attachment 2.1 (DMA Exhibits).
  - The additional information listed below.
- Use this checklist to ensure required information is included on each plan (copy as needed).

Plan Type	Tentative Map
Required Information[4]	
☒ Structural BMP(s) and Significant Site Design BMPs (if applicable) with ID numbers. ☒ 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) and Significant Site Design BMPs (if applicable). ☒ 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). ☒ 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 (if available) 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 manufacturer model number must be provided. Photocopies of general brochures are not acceptable. ☒ Include all source control and site design measures described in the SWQMP. ☒ Include all construction BMPs described in the SWQMP.	

[4] For Building Permit Applications, refer to Form PDS 272, https://www.sandiegocounty.gov/content/dam/sdc/pds/docs/pds272.pdf

INSERT CONSTRUCTION PLAN SETS

5.0 General Requirements

- Each Priority Development Project (PDP) must provide a description of existing site conditions and proposed changes to them, including changes to topography and drainage.
- Has a **Drainage Report** has been prepared for the PDP?

☒ **Yes**

- o Review of the Drainage Report must be concurrent with the PDP SWQMP.
- o Include the summary page of the Drainage Report with this cover page, and provide the following information:

Title: HYDROLOGY / HYDRAULICS STUDY, Questhaven 76 Lot Residential Subdivision, Near 1058 San Elijo Road San Marcos, CA 92078, APNs 223-080-46-00, 223-070-07-00, & 223-070-08-00
Prepared By: Excel Engineering
Date: 8/5/21

- o Do not complete the rest of this attachment (also exclude these additional pages from your submittal). Additional documentation of site and drainage conditions is not required unless requested by County staff.

☐ **No** -- Complete and submit the remainder of this attachment below.

HYDROLOGY / HYDRAULICS STUDY

FOR THE:
Questhaven 76 Lot Residential Subdivision
Near 1058 San Elijo Road
San Marcos, CA 92078
APNs 223-080-46-00, 223-070-07-00, & 223-070-08-00

PREPARED FOR:
Colrich California, LLC.
444 West Beech Street, Suite 300
San Diego, CA 92101

PREPARED BY:
EXCEL ENGINEERING
440 State Place
Escondido, CA 92029
Tel: (760) 745-8118
Project No: 17-047

ORIGINAL REPORT PREPARATION DATE:
May 04, 2020

REVISION DATE(S):
March 16, 2021
August 4, 2021

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION

1.1 Purpose of Study

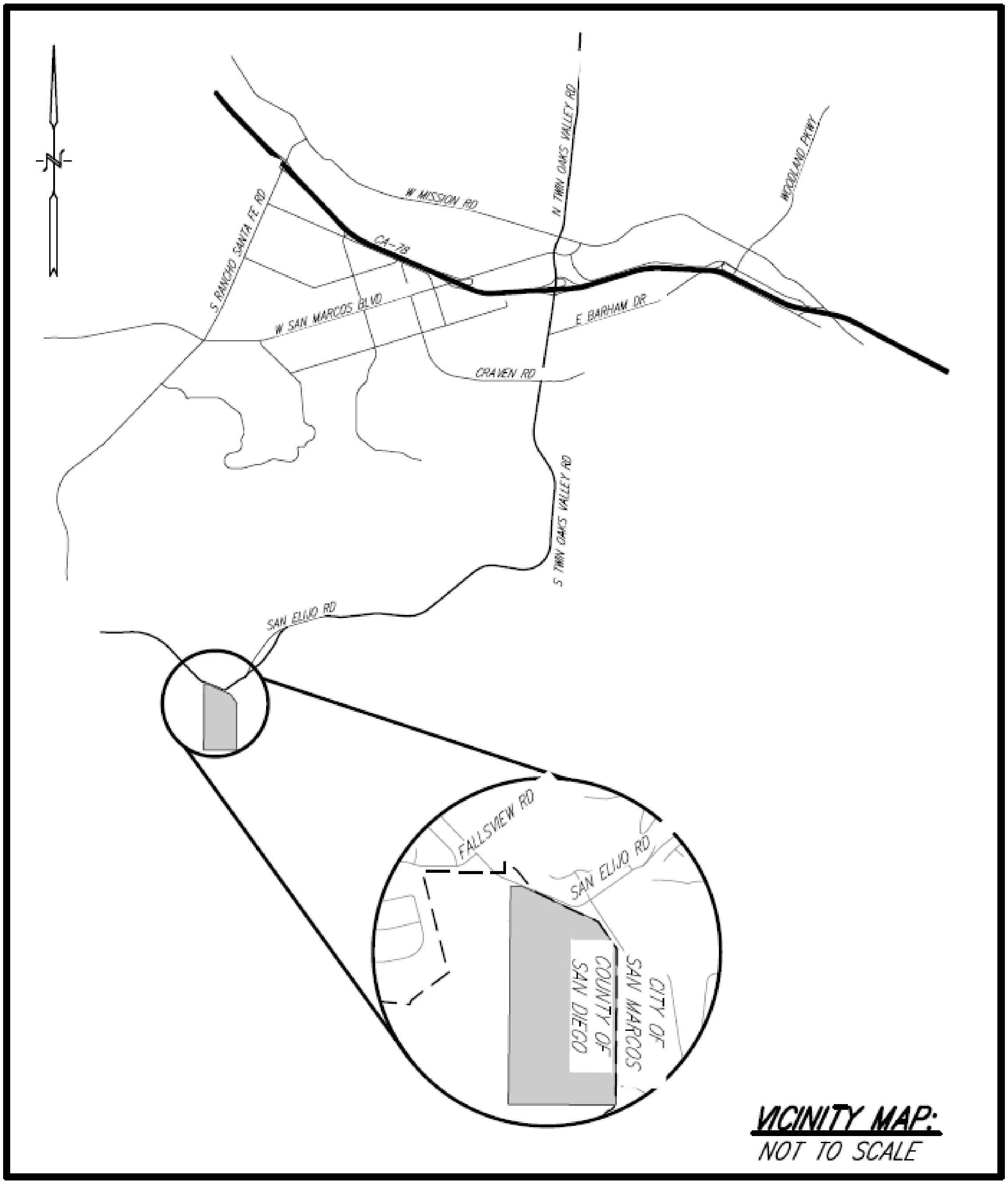
The purpose of this study is to support the grading design for a 76 lot subdivision on a 89 acre parcel of land located in the jurisdictional boundary of the County of San Diego. This study will demonstrate that the post-development 100-year peak runoff will not exceed existing peak runoff rates.

1.2 Project Description

The project proposes to grade a portion of the undeveloped 89-acre site into 76 residential building lots. The project includes the construction of private access streets, utilities, open space areas, and stormwater improvements. The project is limited to the creation of buildable lots only. The improvement of individual lots will be permitted separately.

2.0 VICINITY MAP

The project is located on the southern side of San Elijo Road just east of Falls View Road, and west of the former waste recycling center.



3.0 DESCRIPTION OF WATERSHED

3.1 Pre-Development Topography and Drainage Patterns

The project site is composed entirely of undeveloped natural terrain. The site is tributary to two distinct hydrologic subareas of the Carlsbad Hydrologic Unit. The average slope of the pre-development conditions is determined by following the County standard S-1 and is calculated as 18% for the project overall.

Approximately 34 acres of the discharge from the southern portion of the site starts near the southern limits of the drainage basin and flows mainly in a northeasterly direction. As the northeasterly follows meet the eastern limits of the property, the discharge from the site enters an unnamed tributary of the Escondido Creek flowing in a southerly direction along the eastern property line. The point where the discharge leaves the site is identified as POC-1.

The remaining 45 acres of the southern tributary area flows in a northerly direction where it meets a natural channel flowing in a north westerly direction to a point where it leaves the site along the western boundary. This point is identified as POC-2. After reaching POC-2, the flows continue along their existing offsite flow path in a natural channel until they meet San Elijo road and continue to San Marcos Creek.

Approximately 3 acres of the site along the north eastern portion of the site into an existing brow ditch that carries the water in an easterly direction along the property line and discharge directly to the public storm drain system along San Elijo Road. This point of discharge is identified as POC-3.

The remaining approximately 1 acre of the north western frontage of the site along San Elijo Road flows into two brow ditches that flow westerly and enter the public storm drain system along San Elijo Road tributary to San Marcos Creek. This point is identified as POC-4.

A pre-developed drainage map can be found as Attachment 2 in this report.

3.2 Post-Development Topography and Drainage Patterns

The site is graded such that the distribution of discharge from the site to the respective POCs will remain balanced as much as possible. The area of the project to the southwest will remain open space and will be directed to flow separately from the flow from the developed portions of the site until discharging to the respective POC. The developed portions of the site will all be directed to a stormwater treatment facility. Multiple treatment facilities will be located onsite. The parts of the site that serve as access to the building lots, and the lots themselves will be directed to combination of biofiltration and flow detention facilities. The remainder of the project on the westerly access road, will be treated with Green Street methods (tree wells) sized to meet pollutant treatment and hydromodification goals.

A post-developed drainage map can be found as Attachment 2 in this report.

3.3 Hydrologic Unit Contribution

The project is in the Carlsbad Hydrologic Unit and is bisected by the boundary line between the Batiquitos subarea of the San Marcos hydrologic area (904.51), and the San Elijo subarea of the Escondido Creek hydrologic area (904.61). The northern portion of the site is tributary to San Marcos Creek, and the southern portion of the site is tributary to Escondido Creek.

A map showing the project location with respect to the hydrologic basin areas can be found in Attachment 2 in this report.

4.0 METHODOLOGY

This report is prepared in accordance with the 2003 San Diego County Hydrology Manual (Hydrology Manual). Based on the overall tributary study area, calculations are based on the Rational Method.

4.1 Hydrology Software

The main program is the "San Diego County Rational Hydrology Program" by CIVILCADD/CIVILDESIGN Engineering Software, 1991-2004 Version 7.4, refereed hereafter as "CIVILD". This program specifically utilizes the methods prescribed in the County of San Diego Hydrology Manual and is one of the approved programs for the use in the San Diego area.

4.2 Soils Type Determination

The soils type for the project was determined by mapping the project limits on the EPA Web Soil Survey website. The Web Soil Survey indicates that the entire site is composed of type "D" soils. By observation, Appendix A of the Hydrology Manual supports the use of soil type D in the calculations.

4.3 Isopluvial Value Determination

The isopluvial values for the 100-year 6 hour and 24-hour storm events were determined by plotting the projects location on the respective exhibits from appendix B of the Hydrology Manual.

5.0 CALCULATIONS

5.1 Determination of Drainage Area Parameters

The drainage area parameters are determined by delineating the extents and flow direction of runoff from each of the pre and post development drainage areas and measuring the respective changes in elevation, flow length and drainage area acreage. See Attachment 2 of this report for the respective drainage area exhibits.

5.2 Runoff Coefficient

The runoff coefficients for each of the drainage areas are taken from Table 3-1 of the Hydrology Manual. This table gives values for the runoff coefficient "C" using the total impervious percentage and soil type. The soil type for this site is D, and all values were chosen from Table 3-1 accordingly.

For areas conveying water that has drained through the graded lots, it was found that the total percent impervious is 44%. This value includes roadways and assumes 5,000 sqft of impervious area to be built on each lot. With this information, we can find that our "C" value is 0.60. This value is also represented by the land use category Medium Density Residential (10.9 DU/A or Less). Given that there are only around 3 lots per acre in these sections, we can assume that this value is appropriate to represent most of the site.

The offsite, undeveloped, and pervious graded areas are all 0% impervious. For these areas, the "C" value of 0.35 is used. This is also associated with the category of Undisturbed Natural Terrain (Natural) Permanent Open Space, which is also representative of these areas since they will not be developed.

The driveway section at the northeastern side of the site was calculated to be 80% pervious. For both the pre and post conditions, the "C" value was assigned as 0.79.

The driveway area near the northwestern corner of the site was also given a "C" value based on the percent impervious. This area also includes the biofiltration basin and some contributing graded area. The total impervious percentage is around 28 percent. Because of this, the appropriate "C" value of 0.52 was given.

Table 3-1 is included in the CivilD software and the values chosen based on the program input parameters. Following this, the values used vary depending on the parameters described above and can be found in Attachment 1.

5.3 Manning Roughness Coefficient

Three values for the Manning Roughness Coefficient are used in the hydrology calculations. One for the overland flow travel time calculations, second for the pipe flow friction factor, and third for the street section/gutter flow calculations.

For the overland flow travel times, the n factor is based on section 4.2.1.1 of the Hydrology Manual which describes the basin n factor is the visually estimated mean of the n values (roughness values from Manning's formula) of all the channels within the basin area. n = 0.030: is described as "Drainage area is generally rolling, with rounded ridges and moderate side slopes. Watercourses meander in fairly straight, unimproved channels with some boulders and lodged debris. Ground cover includes scattered brush and grasses. No drainage improvements exist in the area. This was compared to the Hydraulic Design Manual Table A-5, C factors for natural channels which supports the value of 0.030.

For the closed conduit calculations, the value for the roughness coefficient is taken from the Hydraulic Design Manual Table A-2. It is assumed that pipe material of Smooth Plastic Pipe (HPDE and PVC), Spiral Rib Pipe, Reinforced Concrete Pipe (RCP), or a similar material will be used on the project. The Manning's n factor for this class of pipe material is 0.013.

For the paved street surfaces and the gutter flow calculations, a value of 0.013 is used. This is taken from the hydraulic design manual, Table A-1 and Table A-3.

5.4 Rational Method Calculation Summary

The peak runoff values for the 100-year storm are calculated according to the Hydrology Manual rational method. The calculations are performed using the CivilD software. A summary of the initial calculations is summarized in the table below:

Summary Peak 100-Year Runoff

Basin	Pre Area (ac)	Post Area (ac)	Pre T_c (min)	Post T_c (min)	Pre Q (cfs)	Post Q (cfs)	Increase (post-pre) (cfs)
POC-1	36.05	38.56	11.33	10.17	55.43	52.50	-2.93
POC-2	44.68	42.98	12.54	9.84	68.31	66.72	-1.59
POC-3	4.98	4.43	5.44	13.21	11.81	11.60	-0.21
POC-4	1.09	0.72	11.51	6.02	1.76	1.75	-0.01

The following table is a summary of the velocity at various nodes where the water discharges to a POC. These values can be found in Attachment 3. All for all values where the velocity is erosive, a riprap energy dissapator will be used to lower it to a non-erosive velocity.

Summary V_{100} for Nodes Discharging to POC

	Starting Node ID	Ending Node ID	Velocity (FPS)
Pre-Development	102	103	7.4
	202	203	6.38
	302	303	7.013
	402	403	5.24
	502	503	5.56
Post-Development	104	105	5.99
	506	105	3.01
	2002	105	5.71
	1302	1008	5.99
	604	1008	34.04
	1107	1008	13.89
	1403	1404	4.41
	1701	1404	6.087
	1203	1404	4.78
	1902	1404	1.74
	1803	1804	1.67
	2103	1804	0.65

Discharge points with erosive velocities will be fitted with a riprap energy dissipater to bring the velocity down to an acceptable rate.

For runoff coefficient values and intensity values for each POC, please refer to section 5.2 and Attachment 3.

CivilD data and output files can be found in Attachment 3 of this report.

By observation of the results in the summary table, the grading of the site, assuming that the site is used for a medium density residential use, will result in a decrease in the 100-year peak flow runoff value for each respective POC. Both POC-3 and POC-4 are both ultimately tributary to San Marcos Creek. POC-4 enters a public drainage pipe and is directed immediately across San Elijo and is discharged to a natural lined channel. POC-3 enters another public storm drain branch which discharges to a point downstream and in the same channel as POC-4.

6.0 CONCLUSION

Based on the results of this report, the project does not increase the 100-year peak flow rate of stormwater discharge from the site. The project meets the County of San Diego standards for peak flow control and therefore can concluded that this project will not impact the existing downstream storm drainage facilities.

The proposed project would not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site. No significant alteration of any stream or river will occur on this site due to grading operations. All defined drainage channels are due to erosive effects of high velocity runoff from the uphill slopes. The development of the site will help mitigate further erosion downstream.

The proposed project does not substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. No significant alteration of drainage patterns will occur on this project. All defined drainage channels are due to erosive effects of high velocity runoff from the uphill slopes. The development of the site will help mitigate further erosion downstream and all discharge is back to the existing POCs and discharge points.

The proposed project does not create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems. The flows from the project leave the site at less than predeveloped rates per the mitigated flow rates shown.

The proposed project does not place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map, including County Floodplain Maps. No housing is proposed and no FIRM identified flood hazard areas are located on the parcel.

The proposed project does not place structures within a 100-year flood hazard area which would impede or redirect flood flows. No FIRM identified flood hazard areas are located on the parcel.

The proposed project does not expose people or structures to a significant risk of loss, injury or death involving flooding as a result of the failure of a levee or dam. No levees or dams are proposed and all runoff is being mitigated in properly designed flow control basins with redundancies. This will be noted in the conclusion.

7.0 REFERENCES

County of San Diego Hydrology Manual, June 2003
San Diego County Hydraulic Design Manual, July 2014

8.0 Declaration of Responsible Charge

I hereby declare that I am the engineer of work for this project. That I have exercised responsible charge over the design of the project as defined in section 6703 of the business and professions codes, and that the design is consistent with current design.

I understand that the check of the project drawings and specifications by the City of San Marcos is confined to a review only and does not relieve me, as engineer of work, of my responsibilities for project design.

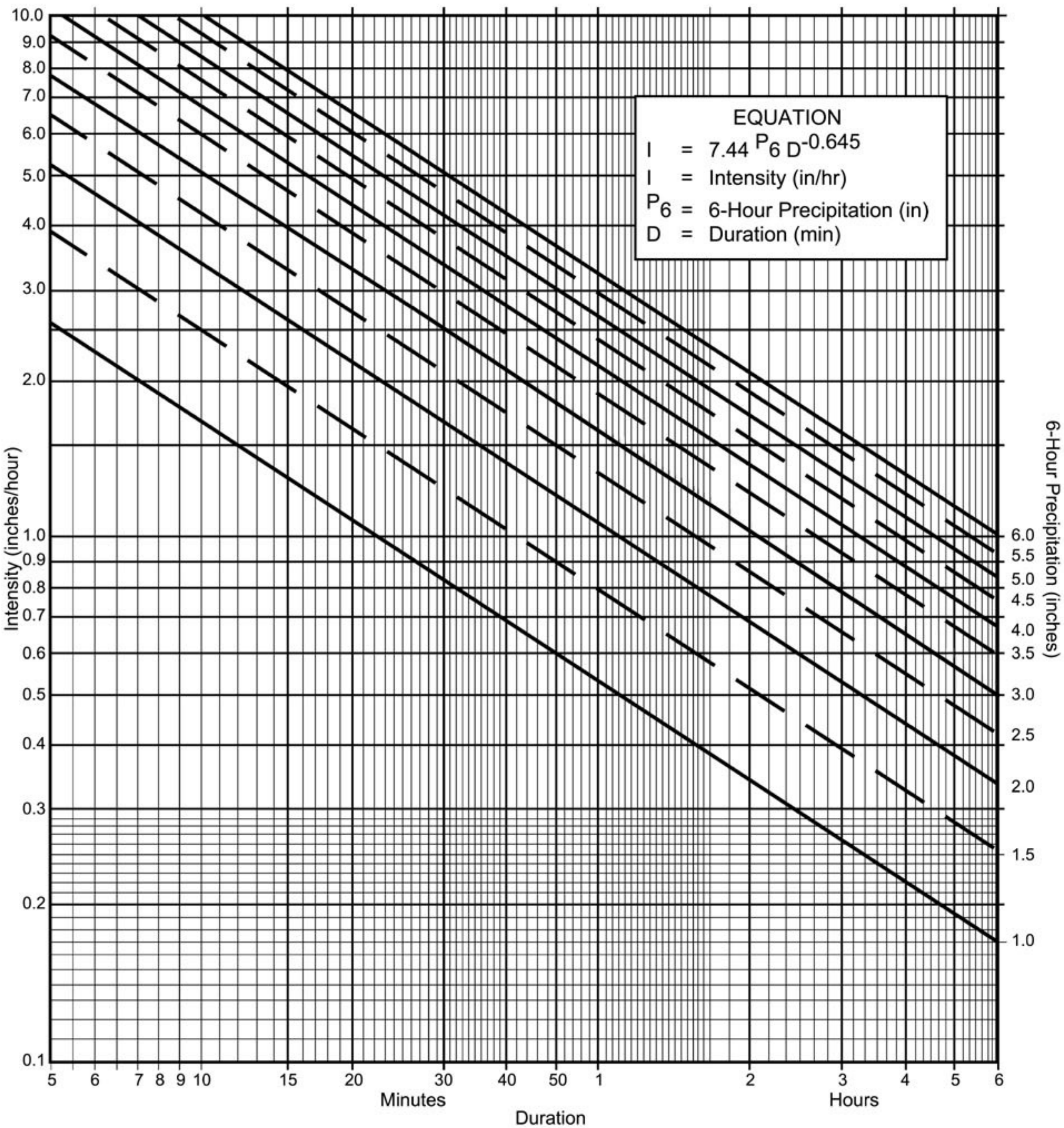
ENGINEER OF WORK
Excel Engineering
440 State Place
Escondido, CA 92029
Tel – (760)745-8118
Fax – (760)745-1890

Project Number: 19-032

____ ____________

Robert D. Dentino, RCE 45629 Date
Registration Expire: December 31, 2022

ATTACHMENT 1



Directions for Application:

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

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

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

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

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

Application Form:

(a) Selected frequency ______ year

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

(c) Adjusted $P_6^{(2)}$ = ______ in.

(d) t_x = ______ min.

(e) I = ______ in./hr.

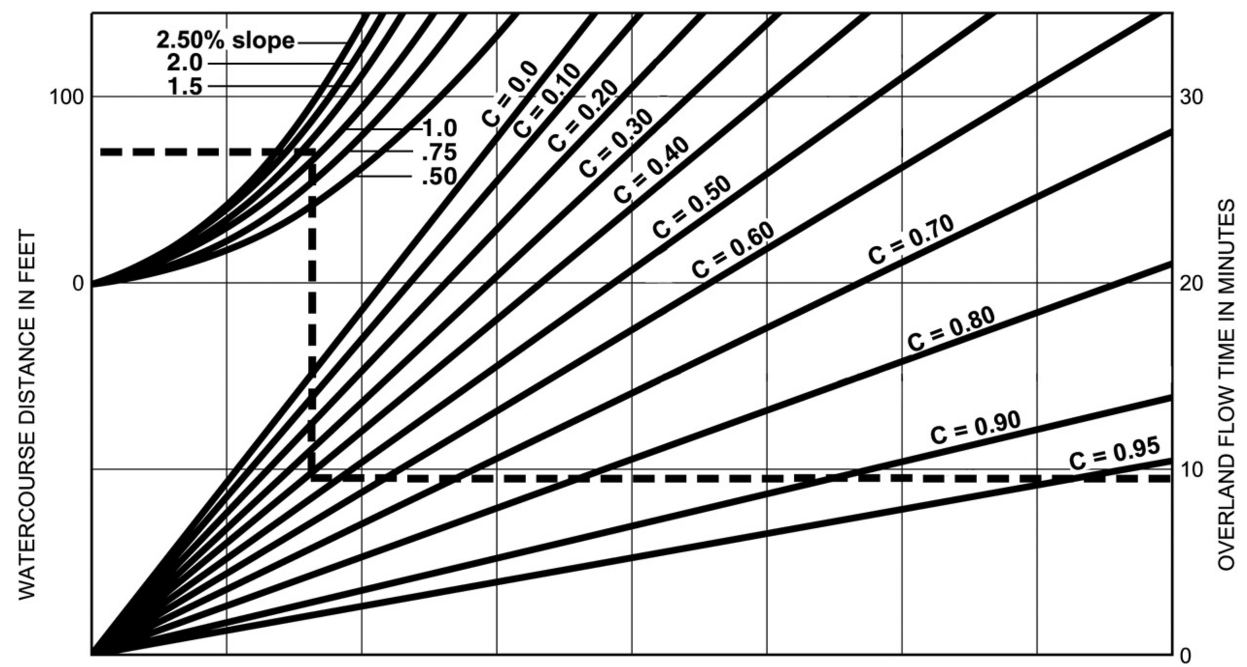
Note: This chart replaces the Intensity-Duration-Frequency curves used since 1965.

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

Intensity-Duration Design Chart - Template

FIGURE

3-1



EXAMPLE:

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

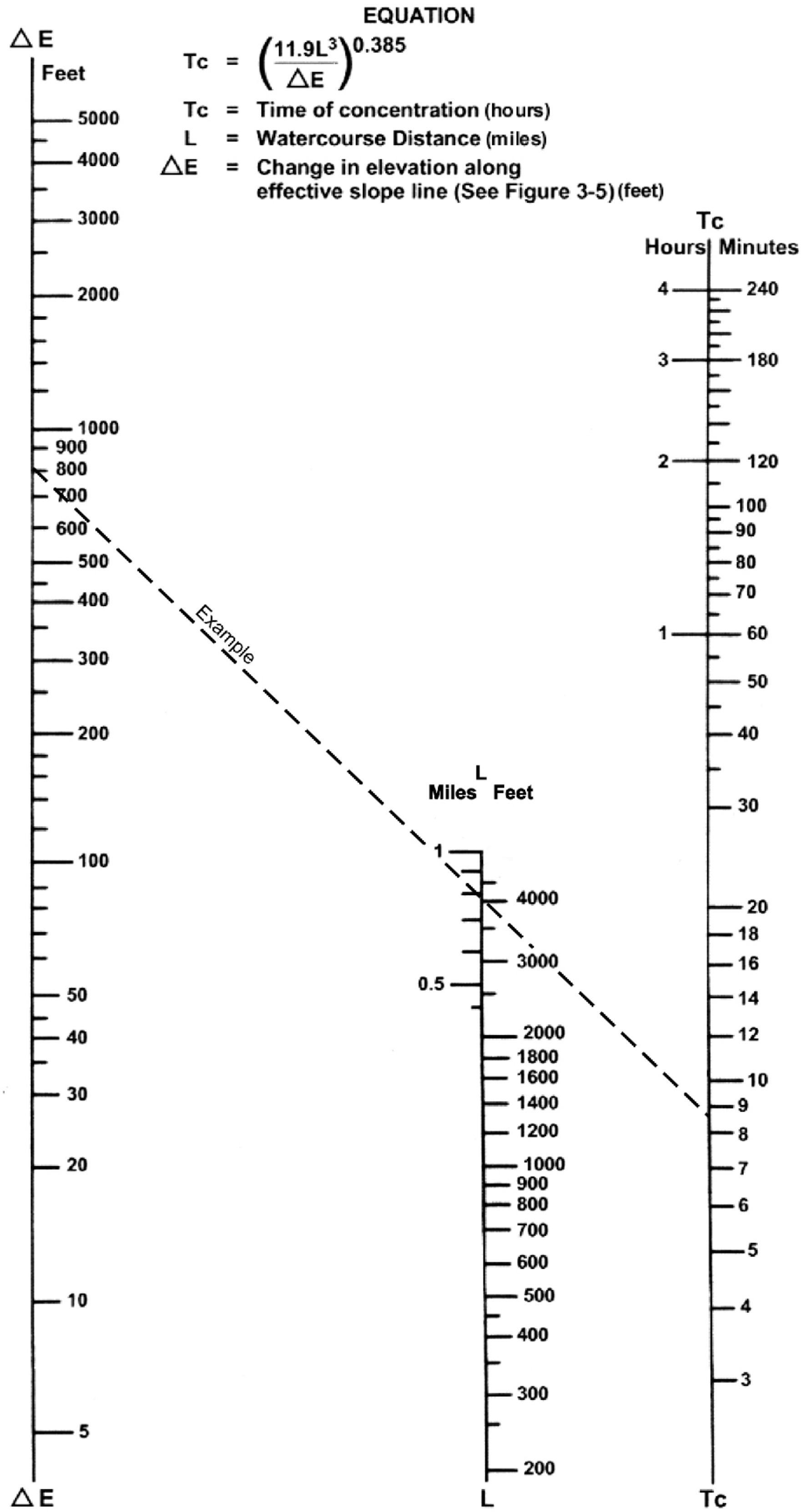
$$T = \frac{1.8\,(1.1-C)\sqrt{D}}{\sqrt[3]{s}}$$

SOURCE: Airport Drainage, Federal Aviation Administration, 1965

Rational Formula - Overland Time of Flow Nomograph

FIGURE

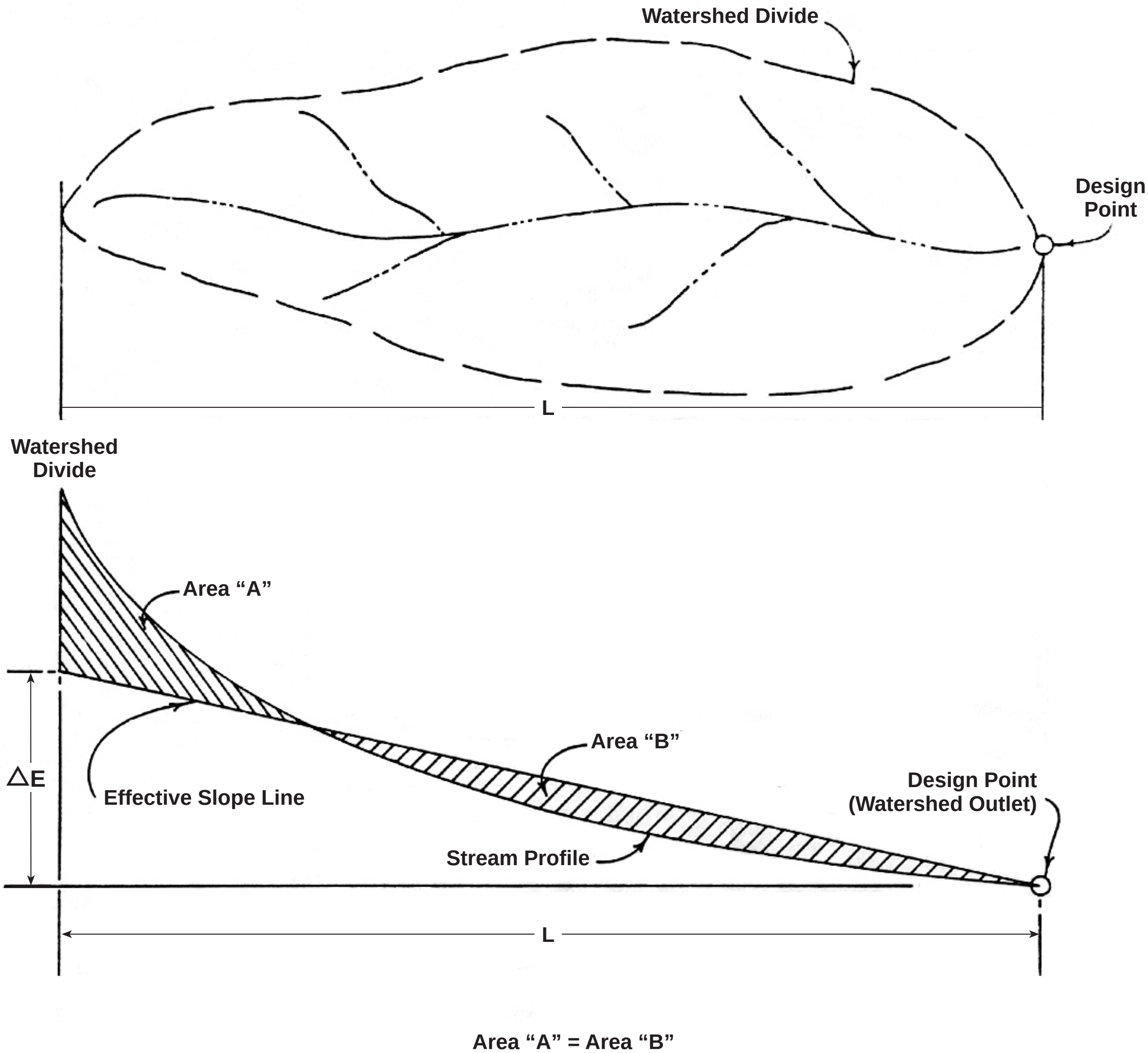
3-3



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

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

FIGURE
3-4



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

FIGURE 3-5

Computation of Effective Slope for Natural Watersheds

Table 3-1
RUNOFF COEFFICIENTS FOR URBAN AREAS

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

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

Table 3-2

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

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

*See Table 3-1 for more detailed description

Table A-2

Table A-2 Average Manning Roughness Coefficients for Closed Conduits[3]

Reinforced Concrete Pipe (RCP)	0.013
Corrugated Metal Pipe and Pipe Arch	
2-3/8 x 1/2 inch Corrugations	
Unlined	0.024
Half Lined	
Full Flow	0.018
d/D>=0.60	0.016
d/D<0.60	0.013
Fully Lined	0.013
3 x 1 inch Corrugations	0.027
6 x 2 inch Corrugations	0.032
Spiral Rib Pipe	0.013
Helically Wound Pipe	
18-inch	0.015
24-inch	0.017
30-inch	0.019
36-inch	0.021
42-inch	0.022
48-inch	0.023
Plastic Pipe (HPDE and PVC)	
Smooth	0.013
Corrugated	0.024
Vitrified Clay Pipe	0.014
Cast-Iron Pipe (Uncoated)	0.013
Steel Pipe	0.011
Brick	0.017
Cast-In-Place Concrete Pipe	
Rough Wood Forms	0.017
Smooth Wood or Steel Forms	0.014

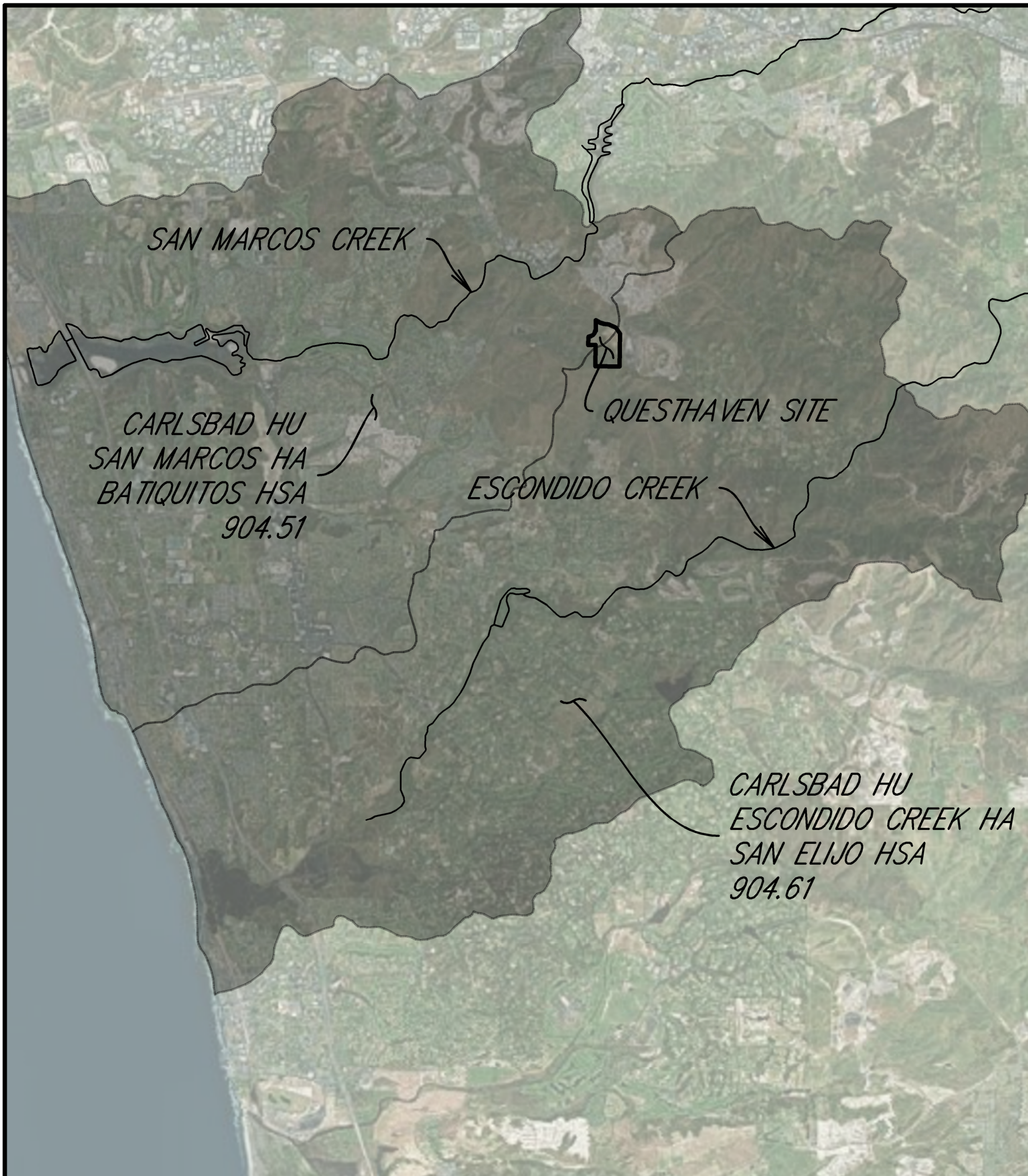
[3] Based on materials and workmanship required by standard specifications.

Table A-5

Table A-5 Average Manning Roughness Coefficients for Natural Channels

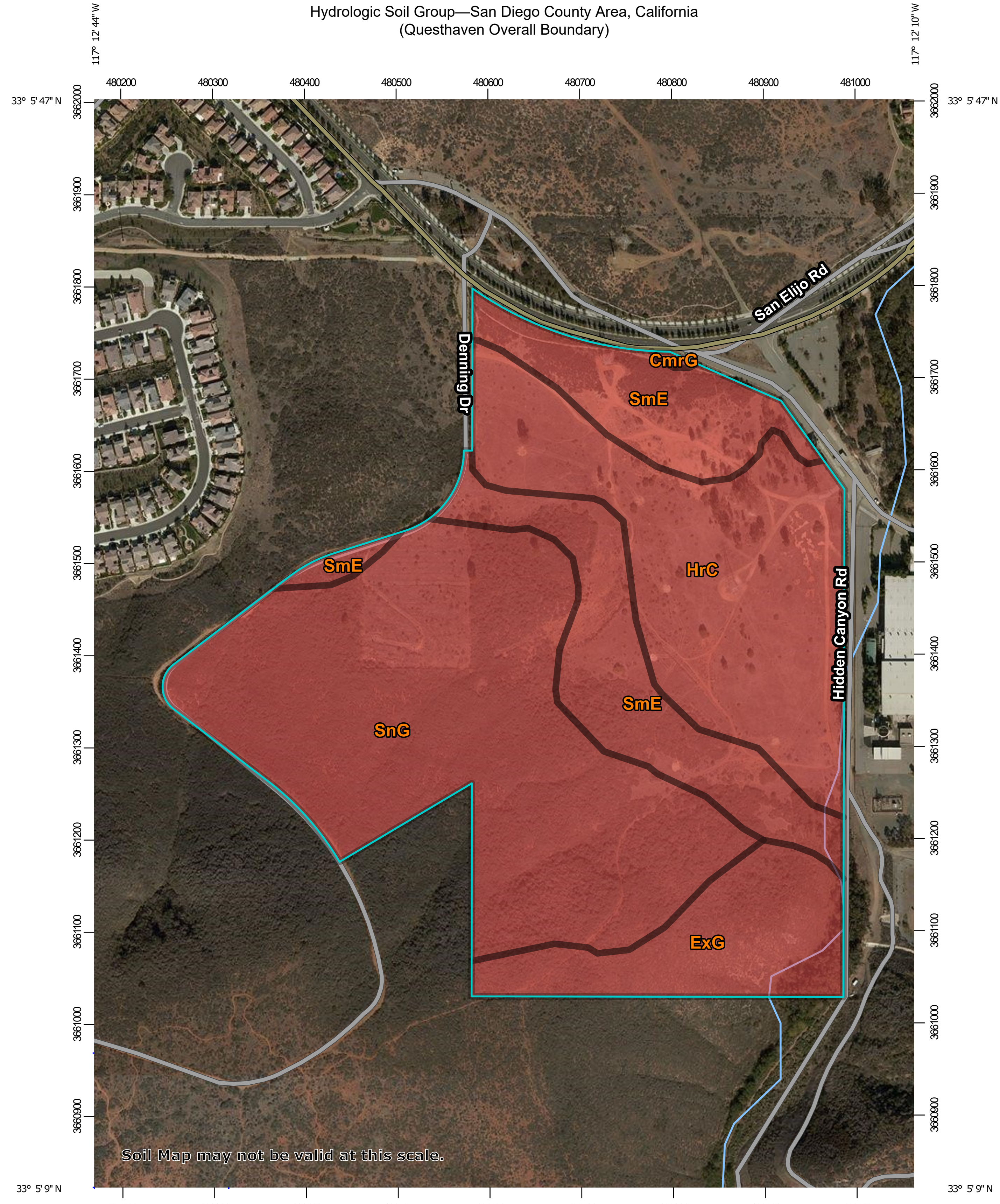
Minor Streams (Surface Width at Flood Stage < 100 ft)	
Fairly Regular Section	
(A) Some Grass and Weeds, Little or No Brush	0.030
(B) Dense Growth of Weeds, Depth of Flow Materially Greater Than Weed Height	0.040
(C) Some Weeds, Light Brush on Banks	0.040
(D) Some Weeds, Heavy Brush on Banks	0.060
(E) For Trees within Channel with Branches Submerged at High Stage, Increase All Above Values By	0.015
Irregular Section, with Pools, Slight Channel Meander	
Channels (A) to (E) Above, Increase All Values By	0.015
Mountain Streams; No Vegetation in Channel, Banks Usually Steep, Trees and Brush along Banks Submerged at High Stage	
(A) Bottom, Gravel, Cobbles and Few Boulders	0.050
(B) Bottom, Cobbles with Large Boulders	0.060
Flood Plains (Adjacent To Natural Streams)	
Pasture, No Brush	
(A) Short Grass	0.030
(B) High Grass	0.040
Cultivated Areas	
(A) No Crop	0.040
(B) Mature Row Crops	0.040
(C) Mature Field Crops	0.050
Heavy Weeds, Scattered Brush	0.050
Light Brush and Trees	0.060
Medium To Dense Brush	0.090
Dense Willows	0.170
Cleared Land with Tree Stumps, 100-150 Per Acre	0.060
Heavy Stand of Timber, Little Undergrowth	
(A) Flood Depth below Branches	0.110
(B) Flood Depth Reaches Branches	0.140

ATTACHMENT 2



QUESTHAVEN HYDROLOGIC AREAS

Hydrologic Soil Group—San Diego County Area, California
(Questhaven Overall Boundary)



Map Scale: 1:5,760 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0, 50, 100, 200, 300

Feet: 0, 250, 500, 1000, 1500

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

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

Soil Rating Lines

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

Soil Rating Points

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: San Diego County Area, California
Survey Area Data: Version 14, Sep 16, 2019

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

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

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CmrG	Cieneba very rocky coarse sandy loam, 30 to 75 percent slopes	D	0.1	0.1%
ExG	Exchequer rocky silt loam, 30 to 70 percent slopes	D	9.5	10.6%
HrC	Huerhuero loam, 2 to 9 percent slopes	D	22.4	25.1%
SmE	San Miguel rocky silt loam, 9 to 30 percent slopes	D	18.8	21.0%
SnG	San Miguel-Exchequer rocky silt loams, 9 to 70 percent slopes	D	38.5	43.1%
Totals for Area of Interest			**89.2**	**100.0%**

Description

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

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

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

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

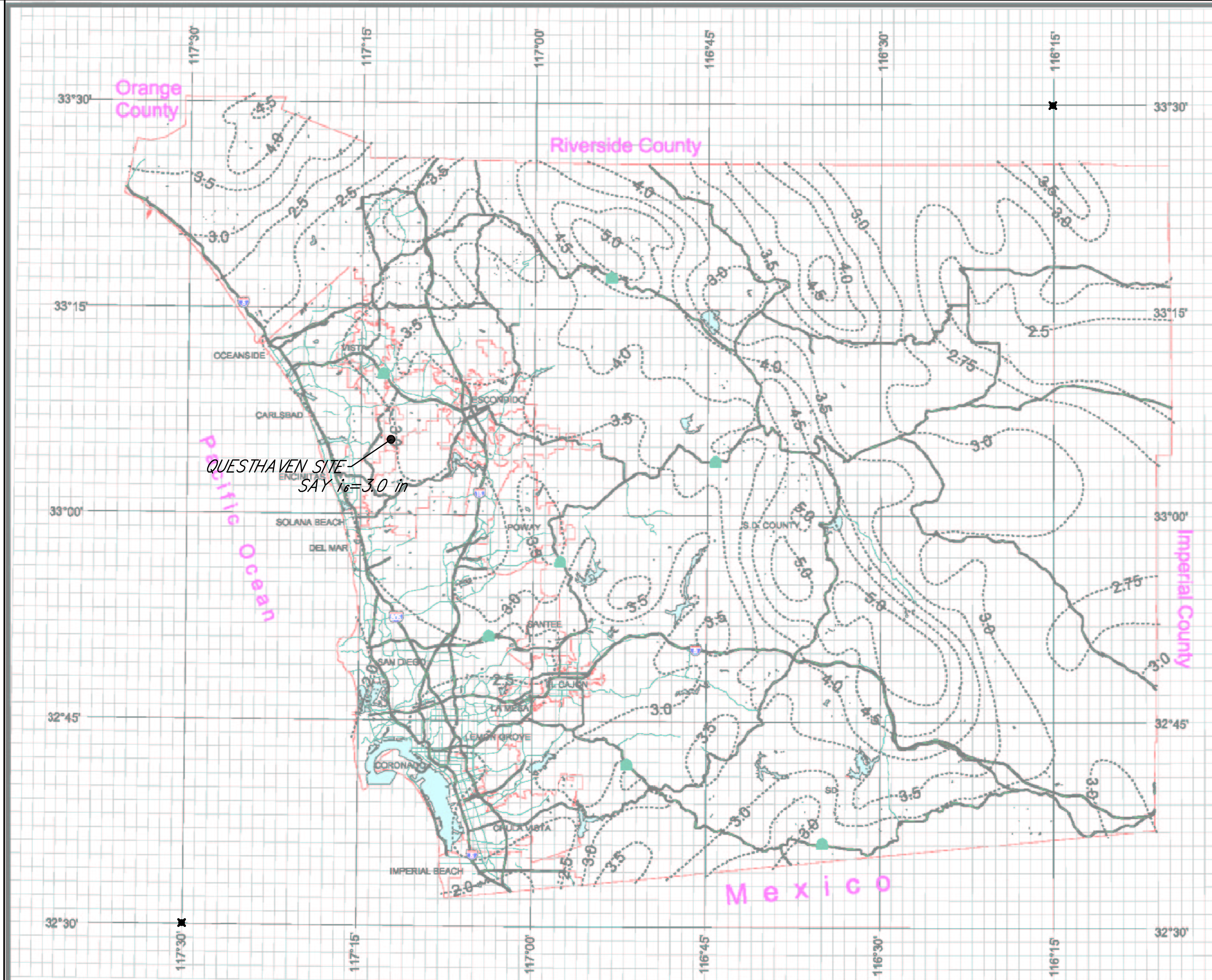
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher



County of San Diego Hydrology Manual

Rainfall Isopluvials

100 Year Rainfall Event - 6 Hours

-------	Isopluvial (inches)

DPW GIS
Department of Public Works Geographic Information Services

SanGIS
We Have San Diego Covered!

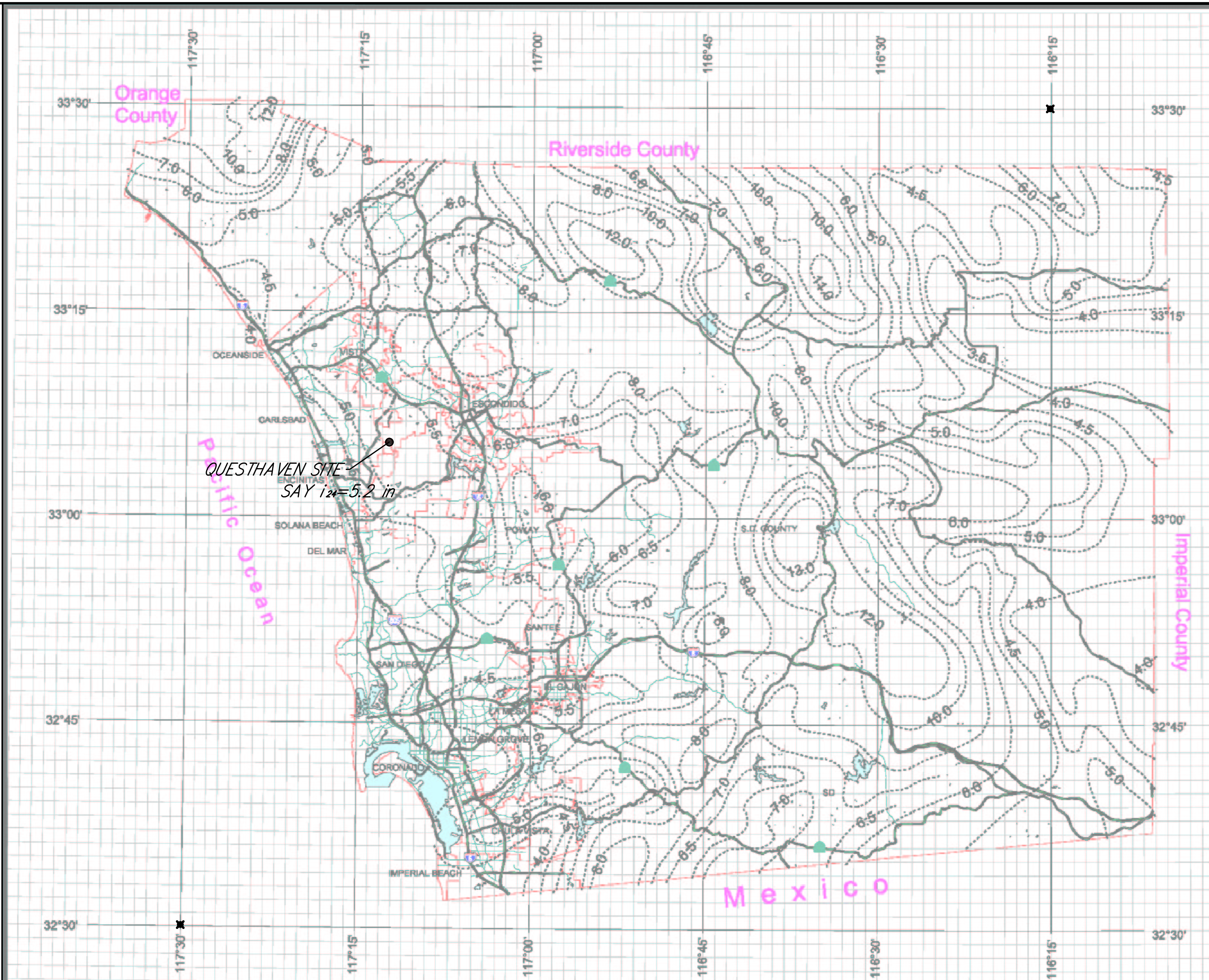
N W E S

3 0 3 Miles

County of San Diego Hydrology Manual

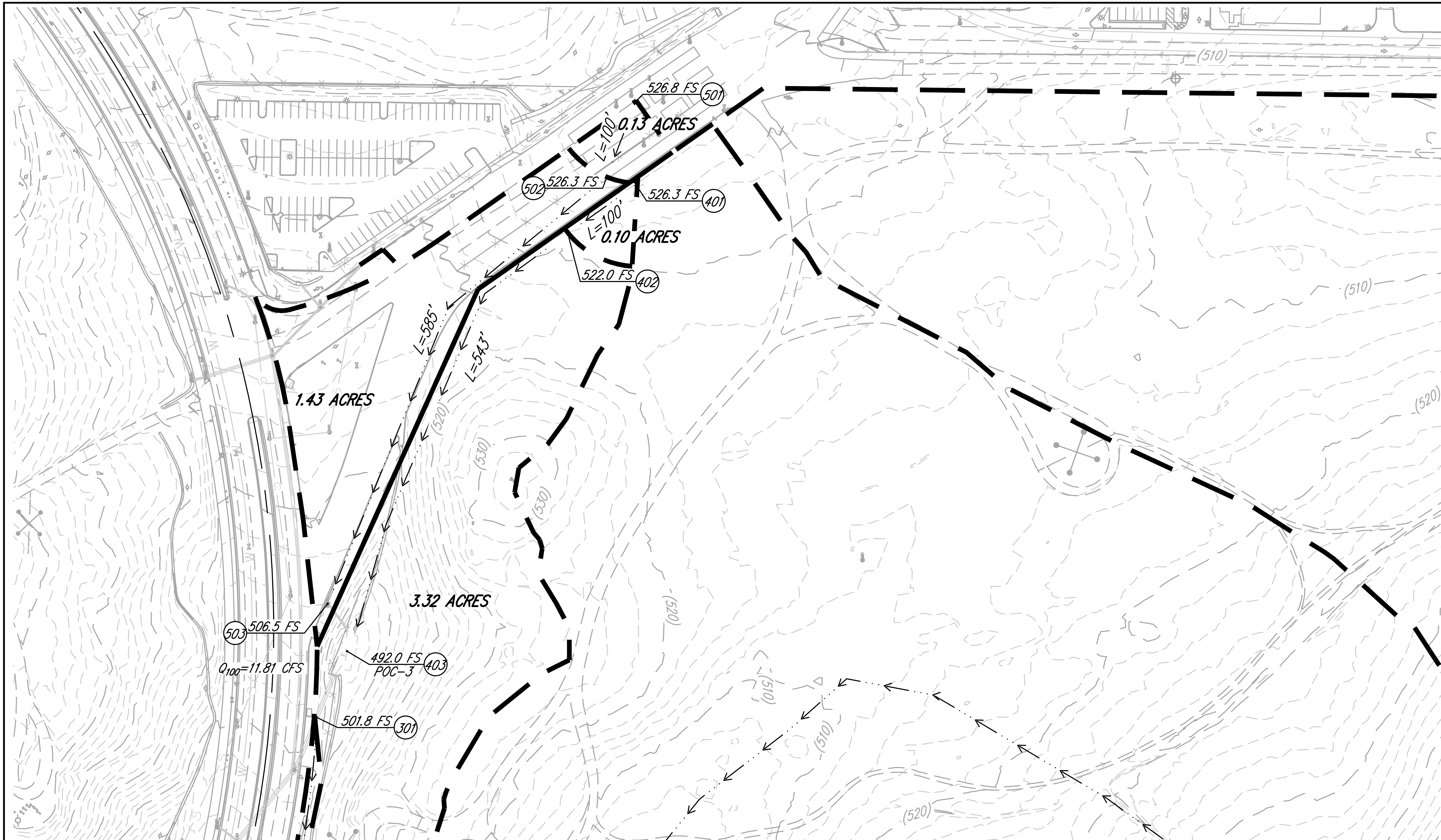
Rainfall Isopluvials

100 Year Rainfall Event - 24 Hours

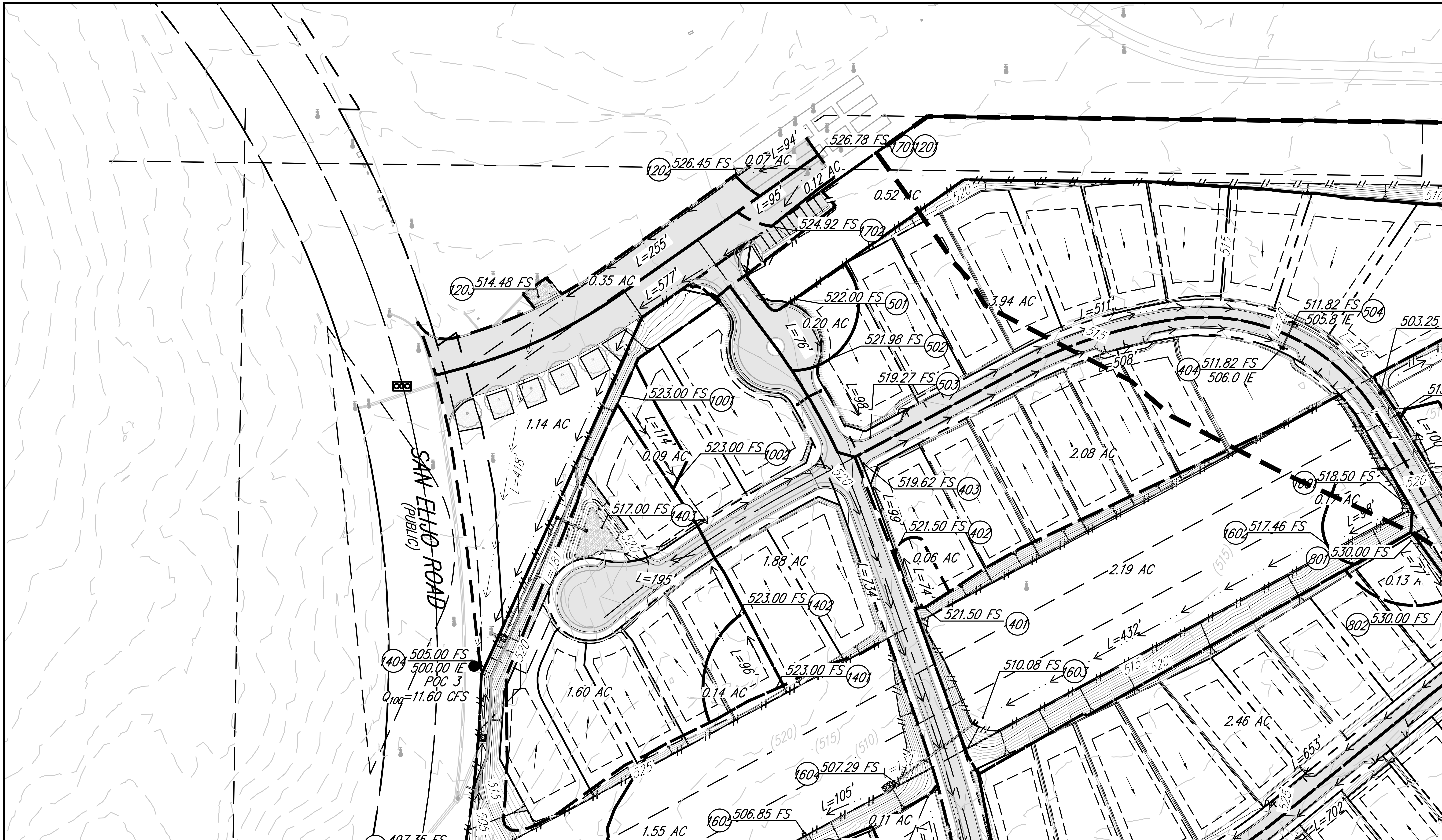


DPW GIS
Department of Public Works
Geographic Information Services

SanGIS
We Have San Diego Covered!



526.8 FS
501
0.13 ACRES
L=100'
502
526.3 FS
526.3 FS
401
L=100'
0.10 ACRES
522.0 FS
402
L=585'
L=543'
1.43 ACRES
3.32 ACRES
503
506.5 FS
492.0 FS
POC-3
403
Q_{100}=11.81 CFS
501.8 FS
301
(510)
(520)
(530)



SAN ELIJO ROAD
(PUBLIC)
1202 526.45 FS
0.07 AC
L=94'
526.78 FS
1201
0.12 AC
L=95'
0.52 AC
524.92 FS 1703
L=255'
1203 514.48 FS
0.35 AC
L=577'
522.00 FS 501
0.20 AC
L=76'
3.94 AC
521.98 FS 502
519.27 FS 503
L=98'
523.00 FS 1001
1.14 AC
L=114'
0.09 AC
523.00 FS 1002
L=418'
517.00 FS 1403
519.62 FS 403
L=99'
521.50 FS 402
0.06 AC
L=74'
1.88 AC
L=181'
L=195'
523.00 FS 1402
L=134'
521.50 FS 401
1404 505.00 FS
500.00 IE
POC 3
Q_{100}=11.60 CFS
L=96'
523.00 FS 1401
1.60 AC
0.14 AC
510.08 FS 1603
2.46 AC
L=653'
1604 507.29 FS
L=132'
L=105'
1605 506.85 FS
1.55 AC
0.11 AC
L=702'
2.08 AC
2.19 AC
L=432'
1602 517.46 FS
801 530.00 FS
802 530.00 FS
0.13 AC
518.50 FS
0.17 AC
511.82 FS 504
505.8 IE
404 511.82 FS
506.0 IE
L=511'
L=508'
L=126'
503.25

ATTACHMENT 3

POC 1

PRE-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 03/17/21
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance   =  100.000(Ft.)
Highest elevation =  901.600(Ft.)
Lowest elevation =  888.100(Ft.)
Elevation difference =   13.500(Ft.) Slope = 13.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  13.50 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.67 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  13.500^(1/3)]=   5.67
Rainfall intensity (I) =      7.289(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.204(CFS)
Total initial stream area =        0.080(Ac.)


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

Estimated mean flow rate at midpoint of channel =     29.714(CFS)
Depth of flow =   0.309(Ft.), Average velocity =   6.229(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
```

```
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             50.00              0.00
    3            100.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     29.714(CFS)
  '     '    flow top width =     30.888(Ft.)
  '     '    velocity=    6.229(Ft/s)
  '     '    area =      4.770(Sq.Ft)
  '     '    Froude number =     2.793

Upstream point elevation =   888.100(Ft.)
Downstream point elevation =   491.000(Ft.)
Flow length =  2080.000(Ft.)
Travel time  =    5.57 min.
Time of concentration =   11.23 min.
Depth of flow =   0.309(Ft.)
Average velocity =   6.229(Ft/s)
Total irregular channel flow =    29.714(CFS)
Irregular channel normal depth above invert elev. =   0.309(Ft.)
Average velocity of channel(s) =   6.229(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.689(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.689(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     12.618
Subarea runoff =     58.959(CFS) for     35.970(Ac.)
Total runoff =     59.163(CFS)  Total area =      36.050(Ac.)
Depth of flow =   0.400(Ft.), Average velocity =   7.399(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      103.000 to Point/Station      103.000
**** 6 HOUR HYDROGRAPH ****
______________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  11.23
Basin Area =    36.05 Acres
6 Hour Rainfall =  3.000 Inches
Runoff Coefficient =  0.350
Peak Discharge =    59.16 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       11               2.255
       22               2.300
       33               2.400
       44               2.454
       55               2.572
       66               2.636
       77               2.779
       88               2.858
       99               3.035
       110               3.135
       121               3.361
```

```
          132                 3.491
          143                 3.795
          154                 3.974
          165                 4.408
          176                 4.674
          187                 5.358
          198                 5.809
          209                 7.101
          220                 8.088
          231                11.875
          242                16.732
          253                59.163
          264                 9.525
          275                 6.373
          286                 4.986
          297                 4.177
          308                 3.635
          319                 3.243
          330                 2.943
          341                 2.705
          352                 2.511
          363                 2.349
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                        6 - H O U R    S T O R M
                   R u n o f f     H y d r o g r a p h
    ---------------------------------------------------------------------
                Hydrograph in   1   Minute intervals ((CFS))

    ---------------------------------------------------------------------
  Time(h+m)  Volume Ac.Ft    Q(CFS)   0        14.8       29.6       44.4       59.2
    ---------------------------------------------------------------------
    0+ 0       0.0000       0.00   Q         |          |          |          |
    0+ 1       0.0003       0.20   Q         |          |          |          |
    0+ 2       0.0008       0.41   Q         |          |          |          |
    0+ 3       0.0017       0.61   Q         |          |          |          |
    0+ 4       0.0028       0.82   Q         |          |          |          |
    0+ 5       0.0042       1.02   Q         |          |          |          |
    0+ 6       0.0059       1.23   Q         |          |          |          |
    0+ 7       0.0079       1.43   Q         |          |          |          |
    0+ 8       0.0102       1.64   VQ        |          |          |          |
    0+ 9       0.0127       1.84   VQ        |          |          |          |
    0+10       0.0155       2.05   VQ        |          |          |          |
    0+11       0.0186       2.25   VQ        |          |          |          |
    0+12       0.0217       2.26   VQ        |          |          |          |
    0+13       0.0249       2.26   VQ        |          |          |          |
    0+14       0.0280       2.27   VQ        |          |          |          |
    0+15       0.0311       2.27   VQ        |          |          |          |
    0+16       0.0342       2.28   VQ        |          |          |          |
    0+17       0.0374       2.28   VQ        |          |          |          |
    0+18       0.0405       2.28   VQ        |          |          |          |
    0+19       0.0437       2.29   VQ        |          |          |          |
    0+20       0.0468       2.29   VQ        |          |          |          |
    0+21       0.0500       2.30   VQ        |          |          |          |
    0+22       0.0532       2.30   VQ        |          |          |          |
    0+23       0.0564       2.31   VQ        |          |          |          |
    0+24       0.0595       2.32   VQ        |          |          |          |
    0+25       0.0628       2.33   VQ        |          |          |          |
    0+26       0.0660       2.34   VQ        |          |          |          |
    0+27       0.0692       2.35   VQ        |          |          |          |
    0+28       0.0724       2.35   VQ        |          |          |          |
    0+29       0.0757       2.36   VQ        |          |          |          |
    0+30       0.0790       2.37    |Q       |          |          |          |
    0+31       0.0822       2.38    |Q       |          |          |          |
    0+32       0.0855       2.39    |Q       |          |          |          |
    0+33       0.0888       2.40    |Q       |          |          |          |
    0+34       0.0922       2.40    |Q       |          |          |          |
```

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    0+35          0.0955        2.41    |Q          |          |          |          |
    0+36          0.0988        2.41    |Q          |          |          |          |
    0+37          0.1021        2.42    |Q          |          |          |          |
    0+38          0.1055        2.42    |Q          |          |          |          |
    0+39          0.1088        2.43    |Q          |          |          |          |
    0+40          0.1122        2.43    |Q          |          |          |          |
    0+41          0.1155        2.44    |Q          |          |          |          |
    0+42          0.1189        2.44    |Q          |          |          |          |
    0+43          0.1223        2.45    |Q          |          |          |          |
    0+44          0.1257        2.45    |Q          |          |          |          |
    0+45          0.1290        2.46    |Q          |          |          |          |
    0+46          0.1325        2.48    |Q          |          |          |          |
    0+47          0.1359        2.49    |Q          |          |          |          |
    0+48          0.1393        2.50    |Q          |          |          |          |
    0+49          0.1428        2.51    |Q          |          |          |          |
    0+50          0.1462        2.52    |Q          |          |          |          |
    0+51          0.1497        2.53    |Q          |          |          |          |
    0+52          0.1532        2.54    |Q          |          |          |          |
    0+53          0.1567        2.55    |QV         |          |          |          |
    0+54          0.1603        2.56    |QV         |          |          |          |
    0+55          0.1638        2.57    |QV         |          |          |          |
    0+56          0.1674        2.58    |QV         |          |          |          |
    0+57          0.1709        2.58    |QV         |          |          |          |
    0+58          0.1745        2.59    |QV         |          |          |          |
    0+59          0.1781        2.60    |QV         |          |          |          |
    1+ 0          0.1816        2.60    |QV         |          |          |          |
    1+ 1          0.1852        2.61    |QV         |          |          |          |
    1+ 2          0.1888        2.61    |QV         |          |          |          |
    1+ 3          0.1924        2.62    |QV         |          |          |          |
    1+ 4          0.1961        2.62    |QV         |          |          |          |
    1+ 5          0.1997        2.63    |QV         |          |          |          |
    1+ 6          0.2033        2.64    |QV         |          |          |          |
    1+ 7          0.2070        2.65    |QV         |          |          |          |
    1+ 8          0.2106        2.66    |QV         |          |          |          |
    1+ 9          0.2143        2.68    |QV         |          |          |          |
    1+10          0.2180        2.69    |QV         |          |          |          |
    1+11          0.2217        2.70    |QV         |          |          |          |
    1+12          0.2255        2.71    |QV         |          |          |          |
    1+13          0.2292        2.73    |QV         |          |          |          |
    1+14          0.2330        2.74    |QV         |          |          |          |
    1+15          0.2368        2.75    |Q  V       |          |          |          |
    1+16          0.2406        2.77    |Q  V       |          |          |          |
    1+17          0.2444        2.78    |Q  V       |          |          |          |
    1+18          0.2483        2.79    |Q  V       |          |          |          |
    1+19          0.2521        2.79    |Q  V       |          |          |          |
    1+20          0.2560        2.80    |Q  V       |          |          |          |
    1+21          0.2598        2.81    |Q  V       |          |          |          |
    1+22          0.2637        2.81    |Q  V       |          |          |          |
    1+23          0.2676        2.82    |Q  V       |          |          |          |
    1+24          0.2715        2.83    |Q  V       |          |          |          |
    1+25          0.2754        2.84    |Q  V       |          |          |          |
    1+26          0.2793        2.84    |Q  V       |          |          |          |
    1+27          0.2833        2.85    |Q  V       |          |          |          |
    1+28          0.2872        2.86    |Q  V       |          |          |          |
    1+29          0.2912        2.87    |Q  V       |          |          |          |
    1+30          0.2951        2.89    |Q  V       |          |          |          |
    1+31          0.2991        2.91    |Q  V       |          |          |          |
    1+32          0.3032        2.92    |Q  V       |          |          |          |
    1+33          0.3072        2.94    |Q  V       |          |          |          |
    1+34          0.3113        2.95    |Q  V       |          |          |          |
    1+35          0.3154        2.97    | Q  V      |          |          |          |
    1+36          0.3195        2.99    | Q  V      |          |          |          |
    1+37          0.3236        3.00    | Q  V      |          |          |          |
    1+38          0.3278        3.02    | Q  V      |          |          |          |
    1+39          0.3320        3.04    | Q  V      |          |          |          |
    1+40          0.3362        3.04    | Q  V      |          |          |          |
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    1+41      0.3404      3.05  | Q V     |         |         |         |
    1+42      0.3446      3.06  | Q V     |         |         |         |
    1+43      0.3488      3.07  | Q V     |         |         |         |
    1+44      0.3530      3.08  | Q V     |         |         |         |
    1+45      0.3573      3.09  | Q V     |         |         |         |
    1+46      0.3616      3.10  | Q V     |         |         |         |
    1+47      0.3659      3.11  | Q V     |         |         |         |
    1+48      0.3701      3.12  | Q V     |         |         |         |
    1+49      0.3745      3.13  | Q V     |         |         |         |
    1+50      0.3788      3.13  | Q V     |         |         |         |
    1+51      0.3831      3.16  | Q V     |         |         |         |
    1+52      0.3875      3.18  | Q V     |         |         |         |
    1+53      0.3919      3.20  | Q  V    |         |         |         |
    1+54      0.3963      3.22  | Q  V    |         |         |         |
    1+55      0.4008      3.24  | Q  V    |         |         |         |
    1+56      0.4053      3.26  | Q  V    |         |         |         |
    1+57      0.4098      3.28  | Q  V    |         |         |         |
    1+58      0.4143      3.30  | Q  V    |         |         |         |
    1+59      0.4189      3.32  | Q  V    |         |         |         |
    2+ 0      0.4235      3.34  | Q  V    |         |         |         |
    2+ 1      0.4281      3.36  | Q  V    |         |         |         |
    2+ 2      0.4328      3.37  | Q  V    |         |         |         |
    2+ 3      0.4374      3.38  | Q  V    |         |         |         |
    2+ 4      0.4421      3.40  | Q  V    |         |         |         |
    2+ 5      0.4468      3.41  | Q  V    |         |         |         |
    2+ 6      0.4515      3.42  | Q  V    |         |         |         |
    2+ 7      0.4563      3.43  | Q  V    |         |         |         |
    2+ 8      0.4610      3.44  | Q  V    |         |         |         |
    2+ 9      0.4658      3.46  | Q  V    |         |         |         |
    2+10      0.4705      3.47  | Q   V   |         |         |         |
    2+11      0.4753      3.48  | Q   V   |         |         |         |
    2+12      0.4801      3.49  | Q   V   |         |         |         |
    2+13      0.4850      3.52  | Q   V   |         |         |         |
    2+14      0.4899      3.55  | Q   V   |         |         |         |
    2+15      0.4948      3.57  | Q   V   |         |         |         |
    2+16      0.4998      3.60  | Q   V   |         |         |         |
    2+17      0.5048      3.63  | Q   V   |         |         |         |
    2+18      0.5098      3.66  | Q   V   |         |         |         |
    2+19      0.5149      3.68  | Q   V   |         |         |         |
    2+20      0.5200      3.71  | Q   V   |         |         |         |
    2+21      0.5251      3.74  | Q   V   |         |         |         |
    2+22      0.5303      3.77  | Q   V   |         |         |         |
    2+23      0.5355      3.79  | Q   V   |         |         |         |
    2+24      0.5408      3.81  | Q   V   |         |         |         |
    2+25      0.5461      3.83  | Q    V  |         |         |         |
    2+26      0.5514      3.84  | Q    V  |         |         |         |
    2+27      0.5567      3.86  | Q    V  |         |         |         |
    2+28      0.5620      3.88  | Q    V  |         |         |         |
    2+29      0.5674      3.89  | Q    V  |         |         |         |
    2+30      0.5728      3.91  | Q    V  |         |         |         |
    2+31      0.5782      3.93  | Q    V  |         |         |         |
    2+32      0.5836      3.94  | Q    V  |         |         |         |
    2+33      0.5891      3.96  | Q    V  |         |         |         |
    2+34      0.5945      3.97  | Q    V  |         |         |         |
    2+35      0.6001      4.01  | Q    V  |         |         |         |
    2+36      0.6056      4.05  | Q    V  |         |         |         |
    2+37      0.6113      4.09  | Q    V  |         |         |         |
    2+38      0.6170      4.13  | Q    V  |         |         |         |
    2+39      0.6227      4.17  | Q    V  |         |         |         |
    2+40      0.6285      4.21  | Q     V |         |         |         |
    2+41      0.6344      4.25  | Q     V |         |         |         |
    2+42      0.6403      4.29  | Q     V |         |         |         |
    2+43      0.6462      4.33  | Q     V |         |         |         |
    2+44      0.6523      4.37  | Q     V |         |         |         |
    2+45      0.6583      4.41  | Q     V |         |         |         |
    2+46      0.6644      4.43  | Q     V |         |         |         |
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2+47       0.6706      4.46   |  Q    V |         |         |         |
2+48       0.6767      4.48   |  Q    V |         |         |         |
2+49       0.6829      4.50   |  Q    V |         |         |         |
2+50       0.6892      4.53   |  Q    V |         |         |         |
2+51       0.6954      4.55   |  Q    V |         |         |         |
2+52       0.7018      4.58   |  Q     V|         |         |         |
2+53       0.7081      4.60   |  Q     V|         |         |         |
2+54       0.7145      4.63   |  Q     V|         |         |         |
2+55       0.7209      4.65   |  Q     V|         |         |         |
2+56       0.7273      4.67   |  Q     V|         |         |         |
2+57       0.7338      4.74   |  Q     V|         |         |         |
2+58       0.7404      4.80   |  Q     V|         |         |         |
2+59       0.7471      4.86   |  Q     V|         |         |         |
3+ 0       0.7539      4.92   |  Q     V|         |         |         |
3+ 1       0.7608      4.98   |  Q     V|         |         |         |
3+ 2       0.7677      5.05   |  Q     V|         |         |         |
3+ 3       0.7748      5.11   |  Q     V|         |         |         |
3+ 4       0.7819      5.17   |  Q      V         |         |         |
3+ 5       0.7891      5.23   |  Q      V         |         |         |
3+ 6       0.7964      5.30   |  Q      V         |         |         |
3+ 7       0.8038      5.36   |  Q      V         |         |         |
3+ 8       0.8112      5.40   |  Q      V         |         |         |
3+ 9       0.8187      5.44   |  Q      V         |         |         |
3+10       0.8263      5.48   |  Q      V         |         |         |
3+11       0.8339      5.52   |  Q      V         |         |         |
3+12       0.8415      5.56   |  Q      V         |         |         |
3+13       0.8492      5.60   |  Q      V         |         |         |
3+14       0.8570      5.65   |  Q      |V        |         |         |
3+15       0.8649      5.69   |  Q      |V        |         |         |
3+16       0.8727      5.73   |  Q      |V        |         |         |
3+17       0.8807      5.77   |  Q      |V        |         |         |
3+18       0.8887      5.81   |  Q      |V        |         |         |
3+19       0.8969      5.93   |   Q     |V        |         |         |
3+20       0.9052      6.04   |   Q     |V        |         |         |
3+21       0.9137      6.16   |   Q     |V        |         |         |
3+22       0.9223      6.28   |   Q     |V        |         |         |
3+23       0.9311      6.40   |   Q     |V        |         |         |
3+24       0.9401      6.51   |   Q     | V       |         |         |
3+25       0.9492      6.63   |   Q     | V       |         |         |
3+26       0.9585      6.75   |   Q     | V       |         |         |
3+27       0.9680      6.87   |   Q     | V       |         |         |
3+28       0.9776      6.98   |   Q     | V       |         |         |
3+29       0.9874      7.10   |   Q     | V       |         |         |
3+30       0.9973      7.19   |   Q     | V       |         |         |
3+31       1.0073      7.28   |   Q     | V       |         |         |
3+32       1.0175      7.37   |   Q     |  V      |         |         |
3+33       1.0277      7.46   |    Q    |  V      |         |         |
3+34       1.0381      7.55   |    Q    |  V      |         |         |
3+35       1.0487      7.64   |    Q    |  V      |         |         |
3+36       1.0593      7.73   |    Q    |  V      |         |         |
3+37       1.0701      7.82   |    Q    |  V      |         |         |
3+38       1.0810      7.91   |    Q    |  V      |         |         |
3+39       1.0920      8.00   |    Q    |   V     |         |         |
3+40       1.1031      8.09   |    Q    |   V     |         |         |
3+41       1.1147      8.43   |    Q    |   V     |         |         |
3+42       1.1268      8.78   |    Q    |   V     |         |         |
3+43       1.1394      9.12   |     Q   |   V     |         |         |
3+44       1.1524      9.47   |     Q   |   V     |         |         |
3+45       1.1659      9.81   |     Q   |   V     |         |         |
3+46       1.1799     10.15   |     Q   |    V    |         |         |
3+47       1.1944     10.50   |      Q  |    V    |         |         |
3+48       1.2093     10.84   |      Q  |    V    |         |         |
3+49       1.2247     11.19   |      Q  |    V    |         |         |
3+50       1.2406     11.53   |      Q  |    V    |         |         |
3+51       1.2570     11.88   |       Q |     V   |         |         |
3+52       1.2739     12.32   |       Q |     V   |         |         |
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  3+53      1.2915     12.76  |       Q |     V   |         |         |
  3+54      1.3097     13.20  |       Q |     V   |         |         |
  3+55      1.3285     13.64  |        Q|      V  |         |         |
  3+56      1.3479     14.08  |        Q|      V  |         |         |
  3+57      1.3679     14.52  |        Q|      V  |         |         |
  3+58      1.3885     14.97  |         Q      V  |         |         |
  3+59      1.4097     15.41  |         Q       V |         |         |
  4+ 0      1.4315     15.85  |         Q       V |         |         |
  4+ 1      1.4540     16.29  |         |Q      V |         |         |
  4+ 2      1.4770     16.73  |         |Q      V |         |         |
  4+ 3      1.5054     20.59  |         |  Q     V|         |         |
  4+ 4      1.5391     24.45  |         |     Q  V|         |         |
  4+ 5      1.5781     28.30  |         |        QV         |         |
  4+ 6      1.6224     32.16  |         |         VQ        |         |
  4+ 7      1.6720     36.02  |         |         |V  Q     |         |
  4+ 8      1.7269     39.88  |         |         | V   Q   |         |
  4+ 9      1.7871     43.73  |         |         | V      Q|         |
  4+10      1.8527     47.59  |         |         |  V      | Q       |
  4+11      1.9235     51.45  |         |         |   V     |   Q     |
  4+12      1.9997     55.31  |         |         |    V    |      Q  |
  4+13      2.0812     59.16  |         |         |     V   |         Q
  4+14      2.1565     54.65  |         |         |      V  |     Q   |
  4+15      2.2256     50.14  |         |         |       V |  Q      |
  4+16      2.2884     45.63  |         |         |        VQ         |
  4+17      2.3450     41.11  |         |         |      Q  V         |
  4+18      2.3954     36.60  |         |         |   Q     V         |
  4+19      2.4396     32.09  |         |         |Q        |V        |
  4+20      2.4776     27.57  |         |       Q |         |V        |
  4+21      2.5094     23.06  |         |    Q    |         | V       |
  4+22      2.5349     18.55  |         | Q       |         | V       |
  4+23      2.5543     14.04  |        Q|         |         | V       |
  4+24      2.5674      9.52  |     Q   |         |         | V       |
  4+25      2.5801      9.24  |     Q   |         |         |  V      |
  4+26      2.5924      8.95  |     Q   |         |         |  V      |
  4+27      2.6044      8.67  |    Q    |         |         |  V      |
  4+28      2.6159      8.38  |    Q    |         |         |  V      |
  4+29      2.6271      8.09  |    Q    |         |         |  V      |
  4+30      2.6378      7.81  |    Q    |         |         |  V      |
  4+31      2.6482      7.52  |    Q    |         |         |  V      |
  4+32      2.6581      7.23  |   Q     |         |         |   V     |
  4+33      2.6677      6.95  |   Q     |         |         |   V     |
  4+34      2.6769      6.66  |   Q     |         |         |   V     |
  4+35      2.6857      6.37  |   Q     |         |         |   V     |
  4+36      2.6943      6.25  |   Q     |         |         |   V     |
  4+37      2.7027      6.12  |   Q     |         |         |   V     |
  4+38      2.7110      5.99  |   Q     |         |         |   V     |
  4+39      2.7190      5.87  |  Q      |         |         |   V     |
  4+40      2.7269      5.74  |  Q      |         |         |    V    |
  4+41      2.7347      5.62  |  Q      |         |         |    V    |
  4+42      2.7422      5.49  |  Q      |         |         |    V    |
  4+43      2.7496      5.36  |  Q      |         |         |    V    |
  4+44      2.7568      5.24  |  Q      |         |         |    V    |
  4+45      2.7639      5.11  |  Q      |         |         |    V    |
  4+46      2.7708      4.99  |  Q      |         |         |    V    |
  4+47      2.7775      4.91  |  Q      |         |         |    V    |
  4+48      2.7842      4.84  |  Q      |         |         |    V    |
  4+49      2.7908      4.77  |  Q      |         |         |    V    |
  4+50      2.7972      4.69  |  Q      |         |         |    V    |
  4+51      2.8036      4.62  |  Q      |         |         |    V    |
  4+52      2.8098      4.54  |  Q      |         |         |     V   |
  4+53      2.8160      4.47  |  Q      |         |         |     V   |
  4+54      2.8221      4.40  | Q       |         |         |     V   |
  4+55      2.8280      4.32  | Q       |         |         |     V   |
  4+56      2.8339      4.25  | Q       |         |         |     V   |
  4+57      2.8396      4.18  | Q       |         |         |     V   |
  4+58      2.8453      4.13  | Q       |         |         |     V   |
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  4+59      2.8509     4.08   | Q       |        |        |     V   |
  5+ 0      2.8565     4.03   | Q       |        |        |     V   |
  5+ 1      2.8619     3.98   | Q       |        |        |     V   |
  5+ 2      2.8674     3.93   | Q       |        |        |     V   |
  5+ 3      2.8727     3.88   | Q       |        |        |     V   |
  5+ 4      2.8780     3.83   | Q       |        |        |     V   |
  5+ 5      2.8832     3.78   | Q       |        |        |      V  |
  5+ 6      2.8883     3.73   | Q       |        |        |      V  |
  5+ 7      2.8934     3.68   | Q       |        |        |      V  |
  5+ 8      2.8984     3.64   | Q       |        |        |      V  |
  5+ 9      2.9034     3.60   | Q       |        |        |      V  |
  5+10      2.9083     3.56   | Q       |        |        |      V  |
  5+11      2.9131     3.53   | Q       |        |        |      V  |
  5+12      2.9180     3.49   | Q       |        |        |      V  |
  5+13      2.9227     3.46   | Q       |        |        |      V  |
  5+14      2.9274     3.42   | Q       |        |        |      V  |
  5+15      2.9321     3.39   | Q       |        |        |      V  |
  5+16      2.9367     3.35   | Q       |        |        |      V  |
  5+17      2.9413     3.31   | Q       |        |        |      V  |
  5+18      2.9458     3.28   | Q       |        |        |      V  |
  5+19      2.9503     3.24   | Q       |        |        |      V  |
  5+20      2.9547     3.22   | Q       |        |        |      V  |
  5+21      2.9591     3.19   | Q       |        |        |      V  |
  5+22      2.9634     3.16   | Q       |        |        |       V |
  5+23      2.9677     3.13   | Q       |        |        |       V |
  5+24      2.9720     3.11   | Q       |        |        |       V |
  5+25      2.9763     3.08   | Q       |        |        |       V |
  5+26      2.9805     3.05   | Q       |        |        |       V |
  5+27      2.9846     3.02   | Q       |        |        |       V |
  5+28      2.9888     3.00   | Q       |        |        |       V |
  5+29      2.9929     2.97   | Q       |        |        |       V |
  5+30      2.9969     2.94   |Q        |        |        |       V |
  5+31      3.0009     2.92   |Q        |        |        |       V |
  5+32      3.0049     2.90   |Q        |        |        |       V |
  5+33      3.0089     2.88   |Q        |        |        |       V |
  5+34      3.0128     2.86   |Q        |        |        |       V |
  5+35      3.0167     2.84   |Q        |        |        |       V |
  5+36      3.0206     2.81   |Q        |        |        |       V |
  5+37      3.0245     2.79   |Q        |        |        |       V |
  5+38      3.0283     2.77   |Q        |        |        |       V |
  5+39      3.0321     2.75   |Q        |        |        |       V |
  5+40      3.0358     2.73   |Q        |        |        |       V |
  5+41      3.0395     2.71   |Q        |        |        |        V|
  5+42      3.0432     2.69   |Q        |        |        |        V|
  5+43      3.0469     2.67   |Q        |        |        |        V|
  5+44      3.0506     2.65   |Q        |        |        |        V|
  5+45      3.0542     2.63   |Q        |        |        |        V|
  5+46      3.0578     2.62   |Q        |        |        |        V|
  5+47      3.0614     2.60   |Q        |        |        |        V|
  5+48      3.0649     2.58   |Q        |        |        |        V|
  5+49      3.0685     2.56   |Q        |        |        |        V|
  5+50      3.0720     2.55   |Q        |        |        |        V|
  5+51      3.0755     2.53   |Q        |        |        |        V|
  5+52      3.0789     2.51   |Q        |        |        |        V|
  5+53      3.0824     2.50   |Q        |        |        |        V|
  5+54      3.0858     2.48   |Q        |        |        |        V|
  5+55      3.0892     2.47   |Q        |        |        |        V|
  5+56      3.0926     2.45   |Q        |        |        |        V|
  5+57      3.0959     2.44   |Q        |        |        |        V|
  5+58      3.0993     2.42   |Q        |        |        |        V|
  5+59      3.1026     2.41   |Q        |        |        |        V|
  6+ 0      3.1059     2.39   |Q        |        |        |        V|
  6+ 1      3.1091     2.38   |Q        |        |        |        V|
  6+ 2      3.1124     2.36   |Q        |        |        |        V|
  6+ 3      3.1156     2.35   |Q        |        |        |         V
-----------------------------------------------------------------------
```

```
End of computations, total study area =          36.050 (Ac.)
```

POC 1

POST-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

    CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

    Rational method hydrology  program based on
    San Diego County Flood Control Division 2003 hydrology manual
        Rational Hydrology Study        Date: 03/11/21
    ------------------------------------------------------------------------
    Questhaven Project
    Job Number 19-038
    POC-1 User Defined Input
    Post-development Calculations
    ------------------------------------------------------------------------
     *********   Hydrology Study Control Information **********

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


    Program License Serial Number 6332

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

    Map data precipitation entered:
    6 hour,  precipitation(inches) =  3.000
    24 hour precipitation(inches) =  5.200
    P6/P24 =    57.7%
    San Diego hydrology manual 'C' values used


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station      401.000 to Point/Station      402.000
    **** INITIAL AREA EVALUATION ****
    ______________________________________________________________________
    Decimal fraction soil group A = 0.000
    Decimal fraction soil group B = 0.000
    Decimal fraction soil group C = 0.000
    Decimal fraction soil group D = 1.000
    [MEDIUM DENSITY RESIDENTIAL                  ]
    (10.9 DU/A or Less      )
    Impervious value, Ai = 0.450
    Sub-Area C Value = 0.600
    Initial subarea total flow distance  =   74.000(Ft.)
    Highest elevation =  521.600(Ft.)
    Lowest elevation =  521.400(Ft.)
    Elevation difference =    0.200(Ft.) Slope =  0.270 %
    INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
    The maximum overland flow distance is 50.00 (Ft)
    for the top area slope value of   0.27 %, in a development type of
     10.9 DU/A or Less
    In Accordance With Figure 3-3
    Initial Area Time of Concentration =   9.85 minutes
    TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
    TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.270^(1/3)]=   9.85
    The initial area total distance of   74.00 (Ft.) entered leaves a
    remaining distance of   24.00 (Ft.)
    Using Figure 3-4, the travel time for this distance is   0.88 minutes
    for a distance of  24.00 (Ft.) and a slope of  0.27 %
    with an elevation difference of   0.06(Ft.) from the end of the top area
    Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
     =    0.880 Minutes
    Tt=[(11.9*0.0045^3)/(  0.06)]^.385=  0.88
    Total initial area Ti =   9.85 minutes from Figure 3-3 formula plus
      0.88 minutes from the Figure 3-4 formula =  10.73 minutes
```

```
Rainfall intensity (I) =      4.831(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =       0.188(CFS)
Total initial stream area =        0.065(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      402.000 to Point/Station      403.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow =   0.094(Ft.), Average velocity =   0.862(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             25.00               0.00
    3             50.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.188(CFS)
  '     '    flow top width =      4.676(Ft.)
  '     '    velocity=    0.862(Ft/s)
  '     '    area =      0.219(Sq.Ft)
  '     '    Froude number =     0.702

Upstream point elevation =   521.400(Ft.)
Downstream point elevation =   519.620(Ft.)
Flow length =    99.000(Ft.)
Travel time  =    1.91 min.
Time of concentration =   12.64 min.
Depth of flow =   0.094(Ft.)
Average velocity =   0.862(Ft/s)
Total irregular channel flow =     0.188(CFS)
Irregular channel normal depth above invert elev. =   0.094(Ft.)
Average velocity of channel(s) =   0.862(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      403.000 to Point/Station      404.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation =   519.620(Ft.)
End of street segment elevation =   511.820(Ft.)
Length of street segment  =   508.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      2.492(CFS)
Depth of flow =   0.169(Ft.), Average velocity =   2.863(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.408(Ft.)
Flow velocity =   2.86(Ft/s)
Travel time =    2.96 min.     TC =   15.60  min.
 Adding area flow to street
Rainfall intensity (I) =      3.795(In/Hr) for a   100.0 year storm
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      3.795(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.286
Subarea runoff =      4.691(CFS) for      2.078(Ac.)
Total runoff =      4.879(CFS)  Total area =       2.143(Ac.)
Street flow at end of street =      4.879(CFS)
Half street flow at end of street =      4.879(CFS)
Depth of flow =   0.221(Ft.), Average velocity =   3.398(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      504.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation =   506.000(Ft.)
Downstream point/station elevation =   505.800(Ft.)
Pipe length   =    29.00(Ft.) Slope =   0.0069  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.879(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.243(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.544(Ft.)
 Minor friction loss =      0.899(Ft.)  K-factor =   1.50
Pipe flow velocity =      6.21(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    15.68 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      404.000 to Point/Station      504.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.143(Ac.)
Runoff from this stream =      4.879(CFS)
Time of concentration =   15.68 min.
Rainfall intensity =     3.782(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      501.000 to Point/Station      502.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =   76.000(Ft.)
Highest elevation =  522.000(Ft.)
Lowest elevation =  521.980(Ft.)
Elevation difference =    0.020(Ft.) Slope =  0.026 %
```

```
Top of Initial Area Slope adjusted by User to  0.100 %
Bottom of Initial Area Slope adjusted by User to  0.100 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.10 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =  13.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.100^(1/3)]=  13.71
The initial area total distance of   76.00 (Ft.) entered leaves a
remaining distance of   26.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   1.37 minutes
for a distance of  26.00 (Ft.) and a slope of  0.10 %
with an elevation difference of   0.03(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    1.371 Minutes
Tt=[(11.9*0.0049^3)/(  0.03)]^.385=  1.37
Total initial area Ti =  13.71 minutes from Figure 3-3 formula plus
  1.37 minutes from the Figure 3-4 formula =  15.08 minutes
Rainfall intensity (I) =      3.878(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.465(CFS)
Total initial stream area =        0.200(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      502.000 to Point/Station      503.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Depth of flow =   0.121(Ft.), Average velocity =   1.269(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             25.00               0.00
    3             50.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.465(CFS)
  '     '    flow top width =      6.055(Ft.)
  '     '    velocity=    1.269(Ft/s)
  '     '    area =      0.367(Sq.Ft)
  '     '    Froude number =     0.909

Upstream point elevation =   521.980(Ft.)
Downstream point elevation =   519.270(Ft.)
Flow length =    98.000(Ft.)
Travel time  =    1.29 min.
Time of concentration =   16.37 min.
Depth of flow =   0.121(Ft.)
Average velocity =   1.269(Ft/s)
Total irregular channel flow =     0.465(CFS)
Irregular channel normal depth above invert elev. =   0.121(Ft.)
Average velocity of channel(s) =   1.269(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =   519.270(Ft.)
End of street segment elevation =   511.820(Ft.)
Length of street segment  =   511.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
```

```
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      4.428(CFS)
Depth of flow =   0.215(Ft.), Average velocity =   3.246(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  11.742(Ft.)
Flow velocity =   3.25(Ft/s)
Travel time =    2.62 min.     TC =   18.99  min.
 Adding area flow to street
Rainfall intensity (I) =      3.342(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      3.342(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      2.484
Subarea runoff =      7.836(CFS) for      3.940(Ac.)
Total runoff =      8.302(CFS)  Total area =       4.140(Ac.)
Street flow at end of street =      8.302(CFS)
Half street flow at end of street =      8.302(CFS)
Depth of flow =   0.269(Ft.), Average velocity =   4.131(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      503.000 to Point/Station      504.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      4.140(Ac.)
Runoff from this stream =      8.302(CFS)
Time of concentration =   18.99 min.
Rainfall intensity =     3.342(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)      (min)                  (In/Hr)


1        4.879     15.68              3.782
2        8.302     18.99              3.342
Qmax(1) =
       1.000 *    1.000 *     4.879) +
       1.000 *    0.825 *     8.302) + =      11.731
Qmax(2) =
       0.884 *    1.000 *     4.879) +
       1.000 *    1.000 *     8.302) + =      12.613

Total of 2 streams to confluence:
Flow rates before confluence point:
```

```
        4.879       8.302
Maximum flow rates at confluence using above data:
        11.731       12.613
Area of streams before confluence:
         2.143        4.140
Results of confluence:
Total flow rate =     12.613(CFS)
Time of concentration =    18.992 min.
Effective stream area after confluence =      6.283(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      504.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   505.800(Ft.)
Downstream point/station elevation =   503.250(Ft.)
Pipe length  =   126.00(Ft.) Slope =   0.0202  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    12.613(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    12.613(CFS)
Normal flow depth in pipe =   10.44(In.)
Flow top width inside pipe =   23.80(In.)
Critical Depth =   15.32(In.)
Pipe flow velocity =      9.62(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    19.21 min.
End of computations, total study area =          6.283 (Ac.)
```

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 03/17/21
------------------------------------------------------------------------
Questhaven Project
Job Number 19-038
POC-1 Main
Post-development Calculations
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****

______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                        ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =   76.000(Ft.)
Highest elevation =  551.000(Ft.)
Lowest elevation =  534.000(Ft.)
Elevation difference =   17.000(Ft.) Slope = 22.368 %
Top of Initial Area Slope adjusted by User to 22.400 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  22.40 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.19 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*( 100.000^.5)/(  22.400^(1/3)]=   3.19
Calculated TC of    3.193 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.237(CFS)
Total initial stream area =        0.050(Ac.)


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Process from Point/Station      202.000 to Point/Station      203.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow =   0.130(Ft.), Average velocity =   0.560(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1               0.00              1.00
    2              25.00              0.00
    3              50.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.237(CFS)
  '     '    flow top width =      6.510(Ft.)
  '     '    velocity=    0.560(Ft/s)
  '     '    area =      0.424(Sq.Ft)
  '     '    Froude number =     0.386

Upstream point elevation =   534.200(Ft.)
Downstream point elevation =   533.800(Ft.)
Flow length =    82.000(Ft.)
Travel time  =    2.44 min.
Time of concentration =    5.64 min.
Depth of flow =   0.130(Ft.)
Average velocity =   0.560(Ft/s)
Total irregular channel flow =     0.237(CFS)
Irregular channel normal depth above invert elev. =   0.130(Ft.)
Average velocity of channel(s) =   0.560(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      204.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation =   534.000(Ft.)
End of street segment elevation =   528.800(Ft.)
Length of street segment  =   528.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      4.468(CFS)
Depth of flow =   0.231(Ft.), Average velocity =   2.870(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.000(Ft.)
Flow velocity =   2.87(Ft/s)
Travel time =    3.07 min.     TC =    8.70  min.
 Adding area flow to street
Rainfall intensity (I) =      5.529(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
```

```
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      5.529(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.584
Subarea runoff =      8.521(CFS) for      2.590(Ac.)
Total runoff =      8.758(CFS)  Total area =      2.640(Ac.)
Street flow at end of street =      8.758(CFS)
Half street flow at end of street =      8.758(CFS)
Depth of flow =   0.296(Ft.), Average velocity =   3.749(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      204.000 to Point/Station      303.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   523.280(Ft.)
Downstream point/station elevation =   522.700(Ft.)
Pipe length  =    29.00(Ft.) Slope =   0.0200  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.758(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.068(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      1.752(Ft.)
 Minor friction loss =      2.896(Ft.)  K-factor =   1.50
Pipe flow velocity =     11.15(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =     8.74 min.


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Process from Point/Station      204.000 to Point/Station      303.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.640(Ac.)
Runoff from this stream =      8.758(CFS)
Time of concentration =    8.74 min.
Rainfall intensity =     5.511(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      301.000 to Point/Station      302.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance   =   93.000(Ft.)
Highest elevation =  533.330(Ft.)
Lowest elevation =  532.810(Ft.)
Elevation difference =    0.520(Ft.) Slope =  0.559 %
Top of Initial Area Slope adjusted by User to  0.500 %
Bottom of Initial Area Slope adjusted by User to  0.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.50 %, in a development type of
 10.9 DU/A or Less
```

```
In Accordance With Figure 3-3
Initial Area Time of Concentration =   8.02 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.500^(1/3)]=   8.02
The initial area total distance of   93.00 (Ft.) entered leaves a
remaining distance of   43.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   1.09 minutes
for a distance of  43.00 (Ft.) and a slope of  0.50 %
with an elevation difference of   0.22(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    1.087 Minutes
Tt=[(11.9*0.0081^3)/(  0.22)]^.385=  1.09
Total initial area Ti =   8.02 minutes from Figure 3-3 formula plus
  1.09 minutes from the Figure 3-4 formula =   9.11 minutes
Rainfall intensity (I) =      5.370(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.445(CFS)
Total initial stream area =        0.138(Ac.)


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Process from Point/Station      302.000 to Point/Station      303.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =   532.810(Ft.)
End of street segment elevation =   528.780(Ft.)
Length of street segment  =   465.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      2.450(CFS)
Depth of flow =   0.188(Ft.), Average velocity =   2.302(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.388(Ft.)
Flow velocity =   2.30(Ft/s)
Travel time =    3.37 min.     TC =   12.47  min.
 Adding area flow to street
Rainfall intensity (I) =      4.384(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                    ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      4.384(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.001
Subarea runoff =      3.942(CFS) for      1.530(Ac.)
Total runoff =      4.387(CFS)  Total area =       1.668(Ac.)
Street flow at end of street =      4.387(CFS)
Half street flow at end of street =      4.387(CFS)
Depth of flow =   0.235(Ft.), Average velocity =   2.742(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.668(Ac.)
Runoff from this stream =      4.387(CFS)
Time of concentration =   12.47 min.
Rainfall intensity =     4.384(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1         8.758      8.74              5.511
2         4.387     12.47              4.384
Qmax(1) =
       1.000 *    1.000 *     8.758) +
       1.000 *    0.701 *     4.387) + =      11.834
Qmax(2) =
       0.795 *    1.000 *     8.758) +
       1.000 *    1.000 *     4.387) + =      11.353

Total of 2 streams to confluence:
Flow rates before confluence point:
       8.758       4.387
Maximum flow rates at confluence using above data:
       11.834       11.353
Area of streams before confluence:
        2.640        1.668
Results of confluence:
Total flow rate =     11.834(CFS)
Time of concentration =     8.745 min.
Effective stream area after confluence =       4.308(Ac.)


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Process from Point/Station      303.000 to Point/Station      505.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   522.700(Ft.)
Downstream point/station elevation =   503.250(Ft.)
Pipe length  =   297.00(Ft.) Slope =   0.0655  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    11.834(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
    18.596(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =     32.757(Ft.)
 Minor friction loss =      5.288(Ft.)  K-factor =   1.50
Pipe flow velocity =     15.07(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     9.07 min.


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Process from Point/Station      303.000 to Point/Station      505.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.308(Ac.)
Runoff from this stream =     11.834(CFS)
Time of concentration =    9.07 min.
```

```
Rainfall intensity =      5.382(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      401.000 to Point/Station      505.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity (I) =       3.342(In/Hr) for a    100.0 year storm
User specified values are as follows:
TC =  18.99 min.  Rain intensity =       3.34(In/Hr)
Total area =         6.280(Ac.)  Total runoff =     12.613(CFS)


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Process from Point/Station      504.000 to Point/Station      505.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =       6.280(Ac.)
Runoff from this stream =      12.613(CFS)
Time of concentration =    18.99 min.
Rainfall intensity =      3.342(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       11.834      9.07             5.382
2       12.613     18.99             3.342
Qmax(1) =
       1.000 *    1.000 *    11.834) +
       1.000 *    0.478 *    12.613) + =      17.861
Qmax(2) =
       0.621 *    1.000 *    11.834) +
       1.000 *    1.000 *    12.613) + =      19.962

Total of 2 streams to confluence:
Flow rates before confluence point:
      11.834      12.613
Maximum flow rates at confluence using above data:
       17.861       19.962
Area of streams before confluence:
        4.308       6.280
Results of confluence:
Total flow rate =      19.962(CFS)
Time of concentration =    18.990 min.
Effective stream area after confluence =      10.588(Ac.)


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Process from Point/Station      505.000 to Point/Station      506.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =    503.250(Ft.)
Downstream point/station elevation =    497.000(Ft.)
Pipe length   =    257.00(Ft.) Slope =    0.0243  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     19.962(CFS)
```

```
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    19.962(CFS)
Normal flow depth in pipe =   12.93(In.)
Flow top width inside pipe =   23.93(In.)
Critical Depth =   19.26(In.)
Pipe flow velocity =     11.58(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    19.36 min.


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Process from Point/Station      505.000 to Point/Station      506.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =     10.588(Ac.)
Runoff from this stream =     19.962(CFS)
Time of concentration =   19.36 min.
Rainfall intensity =     3.301(In/Hr)


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Process from Point/Station     1501.000 to Point/Station     1502.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  522.450(Ft.)
Lowest elevation =  513.780(Ft.)
Elevation difference =    8.670(Ft.) Slope =  8.670 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   8.67 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.38 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*( 100.000^.5)/(   8.670^(1/3)]=   4.38
Calculated TC of    4.381 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.474(CFS)
Total initial stream area =       0.100(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1502.000 to Point/Station      506.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      4.460(CFS)
Depth of flow =   0.280(Ft.), Average velocity =   2.270(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             10.00              0.00
    3             50.00              1.00
```

```
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =       4.460(CFS)
  '     '    flow top width =     14.015(Ft.)
  '     '    velocity=    2.270(Ft/s)
  '     '    area =       1.964(Sq.Ft)
  '     '    Froude number =     1.069

Upstream point elevation =   513.250(Ft.)
Downstream point elevation =   498.970(Ft.)
Flow length =   494.000(Ft.)
Travel time  =    3.63 min.
Time of concentration =    8.01 min.
Depth of flow =   0.280(Ft.)
Average velocity =   2.270(Ft/s)
Total irregular channel flow =     4.460(CFS)
Irregular channel normal depth above invert elev. =   0.280(Ft.)
Average velocity of channel(s) =   2.270(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.834(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.834(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.356  CA =      1.437
Subarea runoff =      7.908(CFS) for      3.934(Ac.)
Total runoff =      8.382(CFS)  Total area =       4.034(Ac.)
Depth of flow =   0.355(Ft.), Average velocity =   2.658(Ft/s)


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Process from Point/Station     1502.000 to Point/Station      506.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      4.034(Ac.)
Runoff from this stream =      8.382(CFS)
Time of concentration =    8.01 min.
Rainfall intensity =      5.834(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.        (CFS)      (min)                  (In/Hr)


1       19.962     19.36              3.301
2        8.382      8.01              5.834
Qmax(1) =
       1.000 *    1.000 *    19.962) +
       0.566 *    1.000 *     8.382) + =      24.706
Qmax(2) =
       1.000 *    0.414 *    19.962) +
       1.000 *    1.000 *     8.382) + =      16.639

Total of 2 streams to confluence:
Flow rates before confluence point:
      19.962       8.382
Maximum flow rates at confluence using above data:
       24.706       16.639
Area of streams before confluence:
```

```
       10.588        4.034
Results of confluence:
Total flow rate =     24.706(CFS)
Time of concentration =    19.360 min.
Effective stream area after confluence =     14.622(Ac.)


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Process from Point/Station      506.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow =   0.565(Ft.), Average velocity =   3.092(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             15.00              0.00
    3             50.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     24.706(CFS)
  '     '    flow top width =     28.266(Ft.)
  '     '    velocity=    3.092(Ft/s)
  '     '    area =      7.990(Sq.Ft)
  '     '    Froude number =     1.025

Upstream point elevation =   498.970(Ft.)
Downstream point elevation =   492.050(Ft.)
Flow length =   329.000(Ft.)
Travel time  =    1.77 min.
Time of concentration =   21.13 min.
Depth of flow =   0.565(Ft.)
Average velocity =   3.092(Ft/s)
Total irregular channel flow =    24.706(CFS)
Irregular channel normal depth above invert elev. =   0.565(Ft.)
Average velocity of channel(s) =   3.092(Ft/s)


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Process from Point/Station      506.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =     14.622(Ac.)
Runoff from this stream =     24.706(CFS)
Time of concentration =   21.13 min.
Rainfall intensity =     3.120(In/Hr)


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Process from Point/Station      101.000 to Point/Station      102.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   85.000(Ft.)
Highest elevation =  901.600(Ft.)
Lowest elevation =  888.100(Ft.)
Elevation difference =   13.500(Ft.) Slope = 15.882 %
```

```
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  15.88 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.37 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  15.882^(1/3)]=   5.37
Rainfall intensity (I) =      7.548(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.185(CFS)
Total initial stream area =        0.070(Ac.)


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Process from Point/Station      102.000 to Point/Station      103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     18.568(CFS)
Depth of flow =   0.247(Ft.), Average velocity =   6.110(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             50.00               0.00
    3            100.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     18.568(CFS)
  '     '    flow top width =     24.654(Ft.)
  '     '    velocity=    6.110(Ft/s)
  '     '    area =      3.039(Sq.Ft)
  '     '    Froude number =     3.067

Upstream point elevation =   888.100(Ft.)
Downstream point elevation =   542.800(Ft.)
Flow length =  1392.000(Ft.)
Travel time  =    3.80 min.
Time of concentration =    9.17 min.
Depth of flow =   0.247(Ft.)
Average velocity =   6.110(Ft/s)
Total irregular channel flow =    18.568(CFS)
Irregular channel normal depth above invert elev. =   0.247(Ft.)
Average velocity of channel(s) =   6.110(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.346(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.346(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      6.895
Subarea runoff =     36.676(CFS) for     19.630(Ac.)
Total runoff =     36.861(CFS)  Total area =      19.700(Ac.)
Depth of flow =   0.319(Ft.), Average velocity =   7.252(Ft/s)


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Process from Point/Station      103.000 to Point/Station      104.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
```

```
Upstream point/station elevation =   541.900(Ft.)
Downstream point/station elevation =   521.180(Ft.)
Pipe length  =   461.00(Ft.) Slope =   0.0449  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    36.861(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    36.861(CFS)
Normal flow depth in pipe =   15.77(In.)
Flow top width inside pipe =   22.78(In.)
Critical depth could not be calculated.
Pipe flow velocity =     16.83(Ft/s)
Travel time through pipe =    0.46 min.
Time of concentration (TC) =    9.62 min.


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Process from Point/Station      104.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow =   0.351(Ft.), Average velocity =   5.985(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             50.00               0.00
    3            100.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     36.861(CFS)
  '     '    flow top width =     35.097(Ft.)
  '     '    velocity=    5.985(Ft/s)
  '     '    area =      6.159(Sq.Ft)
  '     '    Froude number =     2.518

Upstream point elevation =   521.180(Ft.)
Downstream point elevation =   492.050(Ft.)
Flow length =   196.000(Ft.)
Travel time  =    0.55 min.
Time of concentration =   10.17 min.
Depth of flow =   0.351(Ft.)
Average velocity =   5.985(Ft/s)
Total irregular channel flow =    36.861(CFS)
Irregular channel normal depth above invert elev. =   0.351(Ft.)
Average velocity of channel(s) =   5.985(Ft/s)


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Process from Point/Station      104.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area =     19.700(Ac.)
Runoff from this stream =     36.861(CFS)
Time of concentration =   10.17 min.
Rainfall intensity =     5.000(In/Hr)


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Process from Point/Station     2001.000 to Point/Station     2002.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
```

```
[UNDISTURBED NATURAL TERRAIN                   ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  693.950(Ft.)
Lowest elevation =  673.820(Ft.)
Elevation difference =   20.130(Ft.) Slope = 20.130 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  20.13 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.96 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  20.130^(1/3)]=   4.96
Calculated TC of    4.963 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.194(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station      105.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      4.503(CFS)
Depth of flow =   0.193(Ft.), Average velocity =   4.834(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             25.00               0.00
    3             50.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      4.503(CFS)
  '     '    flow top width =      9.652(Ft.)
  '     '    velocity=    4.834(Ft/s)
  '     '    area =      0.932(Sq.Ft)
  '     '    Froude number =     2.742

Upstream point elevation =   673.820(Ft.)
Downstream point elevation =   492.050(Ft.)
Flow length =   844.000(Ft.)
Travel time  =    2.91 min.
Time of concentration =    7.87 min.
Depth of flow =   0.193(Ft.)
Average velocity =   4.834(Ft/s)
Total irregular channel flow =     4.503(CFS)
Irregular channel normal depth above invert elev. =   0.193(Ft.)
Average velocity of channel(s) =   4.834(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.898(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                   ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.898(In/Hr) for a   100.0 year storm
```

```
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.484
Subarea runoff =      8.559(CFS) for      4.170(Ac.)
Total runoff =      8.753(CFS)  Total area =       4.240(Ac.)
Depth of flow =   0.248(Ft.), Average velocity =   5.708(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2002.000 to Point/Station      105.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      4.240(Ac.)
Runoff from this stream =      8.753(CFS)
Time of concentration =    7.87 min.
Rainfall intensity =     5.898(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        24.706     21.13              3.120
2        36.861     10.17              5.000
3         8.753      7.87              5.898
Qmax(1) =
       1.000 *    1.000 *    24.706) +
       0.624 *    1.000 *    36.861) +
       0.529 *    1.000 *     8.753) + =      52.333
Qmax(2) =
       1.000 *    0.481 *    24.706) +
       1.000 *    1.000 *    36.861) +
       0.848 *    1.000 *     8.753) + =      56.170
Qmax(3) =
       1.000 *    0.373 *    24.706) +
       1.000 *    0.774 *    36.861) +
       1.000 *    1.000 *     8.753) + =      46.489

Total of 3 streams to confluence:
Flow rates before confluence point:
      24.706       36.861       8.753
Maximum flow rates at confluence using above data:
       52.333       56.170       46.489
Area of streams before confluence:
       14.622       19.700        4.240
Results of confluence:
Total flow rate =     56.170(CFS)
Time of concentration =    10.170 min.
Effective stream area after confluence =     38.562(Ac.)
End of computations, total study area =          38.562 (Ac.)
```

POC 2

PRE-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 02/09/21
------------------------------------------------------------------------
Questhaven Project
Job Number 19-038
POC-2
Pre-development Calculations
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      201.000 to Point/Station      202.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  822.400(Ft.)
Lowest elevation =  792.200(Ft.)
Elevation difference =   30.200(Ft.) Slope = 30.200 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.20 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.34 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.200^(1/3)]=   4.34
Calculated TC of    4.335 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.360(CFS)
Total initial stream area =        0.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      202.000 to Point/Station      203.000
```

```
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =     34.367(CFS)
Depth of flow =   0.358(Ft.), Average velocity =   5.374(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1               0.00              1.00
    2              50.00              0.00
    3             100.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     34.367(CFS)
  '     '    flow top width =     35.762(Ft.)
  '     '    velocity=    5.374(Ft/s)
  '     '    area =      6.395(Sq.Ft)
  '     '    Froude number =     2.240

Upstream point elevation =   792.200(Ft.)
Downstream point elevation =   482.900(Ft.)
Flow length =  2646.000(Ft.)
Travel time  =    8.21 min.
Time of concentration =   12.54 min.
Depth of flow =   0.358(Ft.)
Average velocity =   5.374(Ft/s)
Total irregular channel flow =    34.367(CFS)
Irregular channel normal depth above invert elev. =   0.358(Ft.)
Average velocity of channel(s) =   5.374(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.368(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.368(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =     15.638
Subarea runoff =     67.946(CFS) for     44.550(Ac.)
Total runoff =     68.306(CFS)  Total area =      44.680(Ac.)
Depth of flow =   0.463(Ft.), Average velocity =   6.381(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      203.000 to Point/Station      203.000
**** 6 HOUR HYDROGRAPH ****

++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  12.54
Basin Area =    44.68 Acres
6 Hour Rainfall =  3.000 Inches
Runoff Coefficient =  0.350
Peak Discharge =    68.31 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       12               2.812
       24               2.875
       36               3.013
       48               3.089
```

```
        60                3.256
        72                3.349
        84                3.556
        96                3.673
        108                3.939
        120                4.091
        132                4.447
        144                4.657
        156                5.164
        168                5.477
        180                6.278
        192                6.807
        204                8.320
        216                9.477
        228               13.915
        240               19.606
        252               68.306
        264               11.161
        276                7.467
        288                5.843
        300                4.894
        312                4.259
        324                3.800
        336                3.449
        348                3.170
        360                2.942
        372                2.752
   ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       6 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
   --------------------------------------------------------------------
               Hydrograph in   1   Minute intervals ((CFS))

   --------------------------------------------------------------------
 Time(h+m) Volume Ac.Ft    Q(CFS)  0       17.1      34.2      51.2      68.3
 ----------------------------------------------------------------------
   0+ 0       0.0000      0.00  Q         |         |         |         |
   0+ 1       0.0003      0.23  Q         |         |         |         |
   0+ 2       0.0010      0.47  Q         |         |         |         |
   0+ 3       0.0019      0.70  Q         |         |         |         |
   0+ 4       0.0032      0.94  Q         |         |         |         |
   0+ 5       0.0048      1.17  Q         |         |         |         |
   0+ 6       0.0068      1.41  Q         |         |         |         |
   0+ 7       0.0090      1.64  Q         |         |         |         |
   0+ 8       0.0116      1.87  VQ        |         |         |         |
   0+ 9       0.0145      2.11  VQ        |         |         |         |
   0+10       0.0178      2.34  VQ        |         |         |         |
   0+11       0.0213      2.58  VQ        |         |         |         |
   0+12       0.0252      2.81  VQ        |         |         |         |
   0+13       0.0291      2.82  VQ        |         |         |         |
   0+14       0.0329      2.82  VQ        |         |         |         |
   0+15       0.0368      2.83  VQ        |         |         |         |
   0+16       0.0407      2.83  VQ        |         |         |         |
   0+17       0.0447      2.84  VQ        |         |         |         |
   0+18       0.0486      2.84  VQ        |         |         |         |
   0+19       0.0525      2.85  VQ        |         |         |         |
   0+20       0.0564      2.85  VQ        |         |         |         |
   0+21       0.0604      2.86  VQ        |         |         |         |
   0+22       0.0643      2.86  VQ        |         |         |         |
   0+23       0.0683      2.87  VQ        |         |         |         |
   0+24       0.0722      2.88  VQ        |         |         |         |
   0+25       0.0762      2.89  VQ        |         |         |         |
   0+26       0.0802      2.90  VQ        |         |         |         |
   0+27       0.0842      2.91  VQ        |         |         |         |
   0+28       0.0882      2.92  VQ        |         |         |         |
   0+29       0.0923      2.93  VQ        |         |         |         |
```

```
  0+30        0.0963       2.94  VQ        |         |         |         |
  0+31        0.1004       2.96  |Q        |         |         |         |
  0+32        0.1045       2.97  |Q        |         |         |         |
  0+33        0.1086       2.98  |Q        |         |         |         |
  0+34        0.1127       2.99  |Q        |         |         |         |
  0+35        0.1168       3.00  |Q        |         |         |         |
  0+36        0.1210       3.01  |Q        |         |         |         |
  0+37        0.1251       3.02  |Q        |         |         |         |
  0+38        0.1293       3.03  |Q        |         |         |         |
  0+39        0.1335       3.03  |Q        |         |         |         |
  0+40        0.1377       3.04  |Q        |         |         |         |
  0+41        0.1419       3.05  |Q        |         |         |         |
  0+42        0.1461       3.05  |Q        |         |         |         |
  0+43        0.1503       3.06  |Q        |         |         |         |
  0+44        0.1545       3.06  |Q        |         |         |         |
  0+45        0.1587       3.07  |Q        |         |         |         |
  0+46        0.1630       3.08  |Q        |         |         |         |
  0+47        0.1672       3.08  |Q        |         |         |         |
  0+48        0.1715       3.09  |Q        |         |         |         |
  0+49        0.1757       3.10  |Q        |         |         |         |
  0+50        0.1800       3.12  |Q        |         |         |         |
  0+51        0.1844       3.13  |Q        |         |         |         |
  0+52        0.1887       3.14  |Q        |         |         |         |
  0+53        0.1930       3.16  |Q        |         |         |         |
  0+54        0.1974       3.17  |QV       |         |         |         |
  0+55        0.2018       3.19  |QV       |         |         |         |
  0+56        0.2062       3.20  |QV       |         |         |         |
  0+57        0.2106       3.21  |QV       |         |         |         |
  0+58        0.2151       3.23  |QV       |         |         |         |
  0+59        0.2195       3.24  |QV       |         |         |         |
  1+ 0        0.2240       3.26  |QV       |         |         |         |
  1+ 1        0.2285       3.26  |QV       |         |         |         |
  1+ 2        0.2330       3.27  |QV       |         |         |         |
  1+ 3        0.2375       3.28  |QV       |         |         |         |
  1+ 4        0.2421       3.29  |QV       |         |         |         |
  1+ 5        0.2466       3.29  |QV       |         |         |         |
  1+ 6        0.2512       3.30  |QV       |         |         |         |
  1+ 7        0.2557       3.31  |QV       |         |         |         |
  1+ 8        0.2603       3.32  |QV       |         |         |         |
  1+ 9        0.2649       3.33  |QV       |         |         |         |
  1+10        0.2695       3.33  |QV       |         |         |         |
  1+11        0.2741       3.34  |QV       |         |         |         |
  1+12        0.2787       3.35  |QV       |         |         |         |
  1+13        0.2833       3.37  |QV       |         |         |         |
  1+14        0.2880       3.38  |QV       |         |         |         |
  1+15        0.2927       3.40  |Q V      |         |         |         |
  1+16        0.2974       3.42  | QV      |         |         |         |
  1+17        0.3021       3.44  | QV      |         |         |         |
  1+18        0.3069       3.45  | QV      |         |         |         |
  1+19        0.3116       3.47  | QV      |         |         |         |
  1+20        0.3164       3.49  | QV      |         |         |         |
  1+21        0.3213       3.50  | QV      |         |         |         |
  1+22        0.3261       3.52  | QV      |         |         |         |
  1+23        0.3310       3.54  | QV      |         |         |         |
  1+24        0.3359       3.56  | QV      |         |         |         |
  1+25        0.3408       3.57  | QV      |         |         |         |
  1+26        0.3457       3.58  | QV      |         |         |         |
  1+27        0.3507       3.59  | QV      |         |         |         |
  1+28        0.3556       3.60  | QV      |         |         |         |
  1+29        0.3606       3.60  | QV      |         |         |         |
  1+30        0.3656       3.61  | QV      |         |         |         |
  1+31        0.3706       3.62  | QV      |         |         |         |
  1+32        0.3756       3.63  | QV      |         |         |         |
  1+33        0.3806       3.64  | QV      |         |         |         |
  1+34        0.3856       3.65  | QV      |         |         |         |
  1+35        0.3907       3.66  | Q V     |         |         |         |
```

1+36	0.3957	3.67	Q V				
1+37	0.4008	3.70	Q V				
1+38	0.4059	3.72	Q V				
1+39	0.4111	3.74	Q V				
1+40	0.4163	3.76	Q V				
1+41	0.4215	3.78	Q V				
1+42	0.4267	3.81	Q V				
1+43	0.4320	3.83	Q V				
1+44	0.4373	3.85	Q V				
1+45	0.4426	3.87	Q V				
1+46	0.4480	3.89	Q V				
1+47	0.4534	3.92	Q V				
1+48	0.4588	3.94	Q V				
1+49	0.4642	3.95	Q V				
1+50	0.4697	3.96	Q V				
1+51	0.4752	3.98	Q V				
1+52	0.4807	3.99	Q V				
1+53	0.4862	4.00	Q V				
1+54	0.4917	4.01	Q V				
1+55	0.4973	4.03	Q V				
1+56	0.5028	4.04	Q V				
1+57	0.5084	4.05	Q V				
1+58	0.5140	4.07	Q V				
1+59	0.5196	4.08	Q V				
2+ 0	0.5253	4.09	Q V				
2+ 1	0.5309	4.12	Q V				
2+ 2	0.5367	4.15	Q V				
2+ 3	0.5424	4.18	Q V				
2+ 4	0.5482	4.21	Q V				
2+ 5	0.5541	4.24	Q V				
2+ 6	0.5599	4.27	Q V				
2+ 7	0.5659	4.30	Q V				
2+ 8	0.5718	4.33	Q V				
2+ 9	0.5778	4.36	Q V				
2+10	0.5839	4.39	Q V				
2+11	0.5900	4.42	Q V				
2+12	0.5961	4.45	Q V				
2+13	0.6022	4.46	Q V				
2+14	0.6084	4.48	Q V				
2+15	0.6146	4.50	Q V				
2+16	0.6208	4.52	Q V				
2+17	0.6271	4.53	Q V				
2+18	0.6333	4.55	Q V				
2+19	0.6396	4.57	Q V				
2+20	0.6459	4.59	Q V				
2+21	0.6523	4.60	Q V				
2+22	0.6587	4.62	Q V				
2+23	0.6650	4.64	Q V				
2+24	0.6715	4.66	Q V				
2+25	0.6779	4.70	Q V				
2+26	0.6845	4.74	Q V				
2+27	0.6910	4.78	Q V				
2+28	0.6977	4.83	Q V				
2+29	0.7044	4.87	Q V				
2+30	0.7112	4.91	Q V				
2+31	0.7180	4.95	Q V				
2+32	0.7249	5.00	Q V				
2+33	0.7318	5.04	Q V				
2+34	0.7388	5.08	Q V				
2+35	0.7459	5.12	Q V				
2+36	0.7530	5.16	Q V				
2+37	0.7601	5.19	Q V				
2+38	0.7673	5.22	Q V				
2+39	0.7745	5.24	Q V				
2+40	0.7818	5.27	Q V				
2+41	0.7891	5.29	Q V				

```
2+42       0.7964      5.32  |  Q    V |         |         |         |
2+43       0.8038      5.35  |  Q    V |         |         |         |
2+44       0.8112      5.37  |  Q    V |         |         |         |
2+45       0.8186      5.40  |  Q    V |         |         |         |
2+46       0.8261      5.42  |  Q    V |         |         |         |
2+47       0.8336      5.45  |  Q    V |         |         |         |
2+48       0.8411      5.48  |  Q    V |         |         |         |
2+49       0.8488      5.54  |  Q    V |         |         |         |
2+50       0.8565      5.61  |  Q    V |         |         |         |
2+51       0.8643      5.68  |  Q    V |         |         |         |
2+52       0.8722      5.74  |  Q    V |         |         |         |
2+53       0.8802      5.81  |  Q     V|         |         |         |
2+54       0.8883      5.88  |  Q     V|         |         |         |
2+55       0.8965      5.94  |  Q     V|         |         |         |
2+56       0.9048      6.01  |  Q     V|         |         |         |
2+57       0.9132      6.08  |  Q     V|         |         |         |
2+58       0.9216      6.14  |  Q     V|         |         |         |
2+59       0.9302      6.21  |  Q     V|         |         |         |
3+ 0       0.9388      6.28  |  Q     V|         |         |         |
3+ 1       0.9475      6.32  |  Q     V|         |         |         |
3+ 2       0.9563      6.37  |  Q     V|         |         |         |
3+ 3       0.9651      6.41  |  Q     V|         |         |         |
3+ 4       0.9740      6.45  |  Q      V         |         |         |
3+ 5       0.9830      6.50  |  Q      V         |         |         |
3+ 6       0.9920      6.54  |  Q      V         |         |         |
3+ 7       1.0011      6.59  |  Q      V         |         |         |
3+ 8       1.0102      6.63  |  Q      V         |         |         |
3+ 9       1.0194      6.67  |  Q      V         |         |         |
3+10       1.0286      6.72  |  Q      V         |         |         |
3+11       1.0380      6.76  |  Q      V         |         |         |
3+12       1.0473      6.81  |  Q      V         |         |         |
3+13       1.0569      6.93  |   Q     V         |         |         |
3+14       1.0666      7.06  |   Q     |V        |         |         |
3+15       1.0765      7.19  |   Q     |V        |         |         |
3+16       1.0866      7.31  |   Q     |V        |         |         |
3+17       1.0968      7.44  |   Q     |V        |         |         |
3+18       1.1072      7.56  |   Q     |V        |         |         |
3+19       1.1178      7.69  |   Q     |V        |         |         |
3+20       1.1286      7.82  |   Q     |V        |         |         |
3+21       1.1395      7.94  |   Q     |V        |         |         |
3+22       1.1507      8.07  |   Q     |V        |         |         |
3+23       1.1619      8.19  |   Q     |V        |         |         |
3+24       1.1734      8.32  |   Q     | V       |         |         |
3+25       1.1850      8.42  |   Q     | V       |         |         |
3+26       1.1967      8.51  |   Q     | V       |         |         |
3+27       1.2086      8.61  |    Q    | V       |         |         |
3+28       1.2206      8.71  |    Q    | V       |         |         |
3+29       1.2327      8.80  |    Q    | V       |         |         |
3+30       1.2449      8.90  |    Q    | V       |         |         |
3+31       1.2573      8.99  |    Q    | V       |         |         |
3+32       1.2699      9.09  |    Q    |  V      |         |         |
3+33       1.2825      9.19  |    Q    |  V      |         |         |
3+34       1.2953      9.28  |    Q    |  V      |         |         |
3+35       1.3082      9.38  |    Q    |  V      |         |         |
3+36       1.3213      9.48  |    Q    |  V      |         |         |
3+37       1.3348      9.85  |    Q    |  V      |         |         |
3+38       1.3489     10.22  |    Q    |  V      |         |         |
3+39       1.3635     10.59  |     Q   |   V     |         |         |
3+40       1.3786     10.96  |     Q   |   V     |         |         |
3+41       1.3942     11.33  |     Q   |   V     |         |         |
3+42       1.4103     11.70  |     Q   |   V     |         |         |
3+43       1.4269     12.07  |      Q  |   V     |         |         |
3+44       1.4440     12.44  |      Q  |   V     |         |         |
3+45       1.4617     12.81  |      Q  |    V    |         |         |
3+46       1.4798     13.18  |      Q  |    V    |         |         |
3+47       1.4985     13.55  |      Q  |    V    |         |         |
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3+48       1.5177     13.91  |       Q |    V    |         |         |
3+49       1.5375     14.39  |       Q |    V    |         |         |
3+50       1.5579     14.86  |       Q |     V   |         |         |
3+51       1.5791     15.34  |       Q |     V   |         |         |
3+52       1.6009     15.81  |        Q|     V   |         |         |
3+53       1.6233     16.29  |        Q|     V   |         |         |
3+54       1.6464     16.76  |        Q|     V   |         |         |
3+55       1.6701     17.23  |         Q      V  |         |         |
3+56       1.6945     17.71  |         Q      V  |         |         |
3+57       1.7195     18.18  |         Q      V  |         |         |
3+58       1.7452     18.66  |         Q       V |         |         |
3+59       1.7716     19.13  |         |Q      V |         |         |
4+ 0       1.7986     19.61  |         |Q      V |         |         |
4+ 1       1.8312     23.66  |         |  Q    V |         |         |
4+ 2       1.8694     27.72  |         |     Q  V|         |         |
4+ 3       1.9132     31.78  |         |       QV|         |         |
4+ 4       1.9625     35.84  |         |         Q         |         |
4+ 5       2.0175     39.90  |         |         V  Q      |         |
4+ 6       2.0780     43.96  |         |         |V   Q    |         |
4+ 7       2.1442     48.01  |         |         | V     Q |         |
4+ 8       2.2159     52.07  |         |         | V       Q         |
4+ 9       2.2932     56.13  |         |         |  V      | Q       |
4+10       2.3761     60.19  |         |         |   V     |    Q    |
4+11       2.4646     64.25  |         |         |    V    |      Q  |
4+12       2.5587     68.31  |         |         |     V   |         Q
4+13       2.6462     63.54  |         |         |      V  |      Q  |
4+14       2.7272     58.78  |         |         |       V |   Q     |
4+15       2.8016     54.02  |         |         |       V |Q        |
4+16       2.8694     49.26  |         |         |       QV|         |
4+17       2.9307     44.50  |         |         |     Q   V         |
4+18       2.9855     39.73  |         |         |  Q      V         |
4+19       3.0336     34.97  |         |         Q         |V        |
4+20       3.0752     30.21  |         |      Q  |         |V        |
4+21       3.1103     25.45  |         |   Q     |         | V       |
4+22       3.1388     20.68  |         | Q       |         | V       |
4+23       3.1607     15.92  |        Q|         |         | V       |
4+24       3.1761     11.16  |     Q   |         |         | V       |
4+25       3.1910     10.85  |     Q   |         |         | V       |
4+26       3.2056     10.55  |     Q   |         |         |  V      |
4+27       3.2197     10.24  |    Q    |         |         |  V      |
4+28       3.2333      9.93  |    Q    |         |         |  V      |
4+29       3.2466      9.62  |    Q    |         |         |  V      |
4+30       3.2594      9.31  |    Q    |         |         |  V      |
4+31       3.2718      9.01  |    Q    |         |         |  V      |
4+32       3.2838      8.70  |    Q    |         |         |  V      |
4+33       3.2954      8.39  |   Q     |         |         |  V      |
4+34       3.3065      8.08  |   Q     |         |         |   V     |
4+35       3.3172      7.77  |   Q     |         |         |   V     |
4+36       3.3275      7.47  |   Q     |         |         |   V     |
4+37       3.3376      7.33  |   Q     |         |         |   V     |
4+38       3.3475      7.20  |   Q     |         |         |   V     |
4+39       3.3572      7.06  |   Q     |         |         |   V     |
4+40       3.3668      6.93  |   Q     |         |         |   V     |
4+41       3.3761      6.79  |  Q      |         |         |   V     |
4+42       3.3853      6.65  |  Q      |         |         |   V     |
4+43       3.3943      6.52  |  Q      |         |         |    V    |
4+44       3.4031      6.38  |  Q      |         |         |    V    |
4+45       3.4117      6.25  |  Q      |         |         |    V    |
4+46       3.4201      6.11  |  Q      |         |         |    V    |
4+47       3.4283      5.98  |  Q      |         |         |    V    |
4+48       3.4364      5.84  |  Q      |         |         |    V    |
4+49       3.4443      5.76  |  Q      |         |         |    V    |
4+50       3.4521      5.68  |  Q      |         |         |    V    |
4+51       3.4599      5.61  |  Q      |         |         |    V    |
4+52       3.4675      5.53  |  Q      |         |         |    V    |
4+53       3.4750      5.45  |  Q      |         |         |    V    |
```

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4+54       3.4824      5.37  |  Q      |         |         |    V    |
4+55       3.4897      5.29  |  Q      |         |         |    V    |
4+56       3.4968      5.21  |  Q      |         |         |     V   |
4+57       3.5039      5.13  |  Q      |         |         |     V   |
4+58       3.5109      5.05  | Q       |         |         |     V   |
4+59       3.5177      4.97  | Q       |         |         |     V   |
5+ 0       3.5244      4.89  | Q       |         |         |     V   |
5+ 1       3.5311      4.84  | Q       |         |         |     V   |
5+ 2       3.5377      4.79  | Q       |         |         |     V   |
5+ 3       3.5442      4.74  | Q       |         |         |     V   |
5+ 4       3.5507      4.68  | Q       |         |         |     V   |
5+ 5       3.5571      4.63  | Q       |         |         |     V   |
5+ 6       3.5634      4.58  | Q       |         |         |     V   |
5+ 7       3.5696      4.52  | Q       |         |         |     V   |
5+ 8       3.5757      4.47  | Q       |         |         |     V   |
5+ 9       3.5818      4.42  | Q       |         |         |     V   |
5+10       3.5878      4.37  | Q       |         |         |      V  |
5+11       3.5938      4.31  | Q       |         |         |      V  |
5+12       3.5997      4.26  | Q       |         |         |      V  |
5+13       3.6055      4.22  | Q       |         |         |      V  |
5+14       3.6112      4.18  | Q       |         |         |      V  |
5+15       3.6169      4.14  | Q       |         |         |      V  |
5+16       3.6226      4.11  | Q       |         |         |      V  |
5+17       3.6282      4.07  | Q       |         |         |      V  |
5+18       3.6337      4.03  | Q       |         |         |      V  |
5+19       3.6392      3.99  | Q       |         |         |      V  |
5+20       3.6447      3.95  | Q       |         |         |      V  |
5+21       3.6501      3.91  | Q       |         |         |      V  |
5+22       3.6554      3.88  | Q       |         |         |      V  |
5+23       3.6607      3.84  | Q       |         |         |      V  |
5+24       3.6659      3.80  | Q       |         |         |      V  |
5+25       3.6711      3.77  | Q       |         |         |      V  |
5+26       3.6763      3.74  | Q       |         |         |      V  |
5+27       3.6814      3.71  | Q       |         |         |      V  |
5+28       3.6865      3.68  | Q       |         |         |       V |
5+29       3.6915      3.65  | Q       |         |         |       V |
5+30       3.6965      3.62  | Q       |         |         |       V |
5+31       3.7015      3.59  | Q       |         |         |       V |
5+32       3.7064      3.57  | Q       |         |         |       V |
5+33       3.7112      3.54  | Q       |         |         |       V |
5+34       3.7161      3.51  | Q       |         |         |       V |
5+35       3.7209      3.48  | Q       |         |         |       V |
5+36       3.7256      3.45  | Q       |         |         |       V |
5+37       3.7303      3.43  | Q       |         |         |       V |
5+38       3.7350      3.40  |Q        |         |         |       V |
5+39       3.7397      3.38  |Q        |         |         |       V |
5+40       3.7443      3.36  |Q        |         |         |       V |
5+41       3.7489      3.33  |Q        |         |         |       V |
5+42       3.7534      3.31  |Q        |         |         |       V |
5+43       3.7580      3.29  |Q        |         |         |       V |
5+44       3.7625      3.26  |Q        |         |         |       V |
5+45       3.7669      3.24  |Q        |         |         |       V |
5+46       3.7713      3.22  |Q        |         |         |       V |
5+47       3.7757      3.19  |Q        |         |         |       V |
5+48       3.7801      3.17  |Q        |         |         |       V |
5+49       3.7845      3.15  |Q        |         |         |        V|
5+50       3.7888      3.13  |Q        |         |         |        V|
5+51       3.7931      3.11  |Q        |         |         |        V|
5+52       3.7973      3.09  |Q        |         |         |        V|
5+53       3.8016      3.08  |Q        |         |         |        V|
5+54       3.8058      3.06  |Q        |         |         |        V|
5+55       3.8099      3.04  |Q        |         |         |        V|
5+56       3.8141      3.02  |Q        |         |         |        V|
5+57       3.8182      3.00  |Q        |         |         |        V|
5+58       3.8223      2.98  |Q        |         |         |        V|
5+59       3.8264      2.96  |Q        |         |         |        V|
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```
    6+ 0        3.8305       2.94   |Q         |         |         |       V|
    6+ 1        3.8345       2.93   |Q         |         |         |       V|
    6+ 2        3.8385       2.91   |Q         |         |         |       V|
    6+ 3        3.8425       2.89   |Q         |         |         |       V|
    6+ 4        3.8465       2.88   |Q         |         |         |       V|
    6+ 5        3.8504       2.86   |Q         |         |         |       V|
    6+ 6        3.8543       2.85   |Q         |         |         |       V|
    6+ 7        3.8582       2.83   |Q         |         |         |       V|
    6+ 8        3.8621       2.82   |Q         |         |         |       V|
    6+ 9        3.8660       2.80   |Q         |         |         |       V|
    6+10        3.8698       2.78   |Q         |         |         |       V|
    6+11        3.8736       2.77   |Q         |         |         |       V|
    6+12        3.8774       2.75   |Q         |         |         |        V
-----------------------------------------------------------------------


    End of computations, total study area =          44.680 (Ac.)
```

POC 2

POST-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 03/11/21
------------------------------------------------------------------------
Questhaven Project
Job Number 19-038
POC-2 User Defined Inut
Post-development Calculations
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

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


Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   92.000(Ft.)
Highest elevation =  822.400(Ft.)
Lowest elevation =  791.500(Ft.)
Elevation difference =   30.900(Ft.) Slope = 33.587 %
Top of Initial Area Slope adjusted by User to 30.900 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.90 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.30 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.900^(1/3)]=   4.30
Calculated TC of    4.302 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.332(CFS)
Total initial stream area =        0.120(Ac.)


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Process from Point/Station      602.000 to Point/Station      603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     12.435(CFS)
Depth of flow =   0.223(Ft.), Average velocity =   4.995(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             50.00               0.00
    3            100.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     12.435(CFS)
  '     '    flow top width =     22.313(Ft.)
  '     '    velocity=    4.995(Ft/s)
  '     '    area =      2.489(Sq.Ft)
  '     '    Froude number =     2.636

Upstream point elevation =   791.500(Ft.)
Downstream point elevation =   545.060(Ft.)
Flow length =  1301.000(Ft.)
Travel time  =    4.34 min.
Time of concentration =    8.64 min.
Depth of flow =   0.223(Ft.)
Average velocity =   4.995(Ft/s)
Total irregular channel flow =    12.435(CFS)
Irregular channel normal depth above invert elev. =   0.223(Ft.)
Average velocity of channel(s) =   4.995(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.553(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.553(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      4.406
Subarea runoff =     24.139(CFS) for     12.470(Ac.)
Total runoff =     24.471(CFS)  Total area =      12.590(Ac.)
Depth of flow =   0.288(Ft.), Average velocity =   5.917(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   545.060(Ft.)
Downstream point/station elevation =   502.700(Ft.)
Pipe length   =   834.00(Ft.) Slope =   0.0508  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.471(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    24.471(CFS)
Normal flow depth in pipe =   11.72(In.)
Flow top width inside pipe =   23.99(In.)
Critical Depth =   20.98(In.)
Pipe flow velocity =     16.06(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =     9.51 min.
```

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++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      603.000 to Point/Station      604.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.590(Ac.)
Runoff from this stream =     24.471(CFS)
Time of concentration =    9.51 min.
Rainfall intensity =     5.222(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1601.000 to Point/Station     1602.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   98.000(Ft.)
Highest elevation =  518.500(Ft.)
Lowest elevation =  517.460(Ft.)
Elevation difference =    1.040(Ft.) Slope =  1.061 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   1.06 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =  11.08 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*(  70.000^.5)/(   1.060^(1/3)]=  11.08
Rainfall intensity (I) =      4.732(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.282(CFS)
Total initial stream area =       0.170(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1602.000 to Point/Station     1603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      1.659(CFS)
Depth of flow =   0.165(Ft.), Average velocity =   1.225(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             50.00               0.00
    3            100.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      1.659(CFS)
  '     '    flow top width =     16.461(Ft.)
  '     '    velocity=    1.225(Ft/s)
  '     '    area =      1.355(Sq.Ft)
  '     '    Froude number =     0.752

Upstream point elevation =   517.460(Ft.)
Downstream point elevation =   510.080(Ft.)
Flow length =   432.000(Ft.)
Travel time  =    5.88 min.
```

```
Time of concentration =   16.96 min.
Depth of flow =   0.165(Ft.)
Average velocity =   1.225(Ft/s)
Total irregular channel flow =     1.659(CFS)
Irregular channel normal depth above invert elev. =   0.165(Ft.)
Average velocity of channel(s) =   1.225(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      3.596(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.596(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.826
Subarea runoff =      2.688(CFS) for      2.190(Ac.)
Total runoff =      2.970(CFS)  Total area =       2.360(Ac.)
Depth of flow =   0.205(Ft.), Average velocity =   1.417(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1603.000 to Point/Station     1604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   510.080(Ft.)
Downstream point/station elevation =   507.290(Ft.)
Pipe length   =   132.00(Ft.) Slope =   0.0211  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.970(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     2.970(CFS)
Normal flow depth in pipe =    4.88(In.)
Flow top width inside pipe =   19.31(In.)
Critical Depth =    7.20(In.)
Pipe flow velocity =      6.50(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =    17.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1604.000 to Point/Station     1605.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.823(CFS)
Depth of flow =   0.413(Ft.), Average velocity =   1.120(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             20.00              0.00
    3             40.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      3.823(CFS)
  '     '    flow top width =     16.528(Ft.)
  '     '    velocity=    1.120(Ft/s)
  '     '    area =      3.415(Sq.Ft)
  '     '    Froude number =     0.434

Upstream point elevation =   507.290(Ft.)
Downstream point elevation =   506.850(Ft.)
Flow length =   105.000(Ft.)
```

```
Travel time  =    1.56 min.
Time of concentration =   18.86 min.
Depth of flow =   0.413(Ft.)
Average velocity =   1.120(Ft/s)
Total irregular channel flow =     3.823(CFS)
Irregular channel normal depth above invert elev. =   0.413(Ft.)
Average velocity of channel(s) =   1.120(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      3.357(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.357(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.369
Subarea runoff =      1.625(CFS) for      1.550(Ac.)
Total runoff =      4.595(CFS)  Total area =       3.910(Ac.)
Depth of flow =   0.443(Ft.), Average velocity =   1.172(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1605.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   506.850(Ft.)
Downstream point/station elevation =   502.710(Ft.)
Pipe length  =   207.00(Ft.) Slope =   0.0200  Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     4.595(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.595(CFS)
Normal flow depth in pipe =    5.90(In.)
Flow top width inside pipe =   20.67(In.)
Critical Depth =    9.04(In.)
Pipe flow velocity =      7.66(Ft/s)
Travel time through pipe =    0.45 min.
Time of concentration (TC) =    19.31 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station      604.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.910(Ac.)
Runoff from this stream =      4.595(CFS)
Time of concentration =   19.31 min.
Rainfall intensity =     3.307(In/Hr)
Summary of stream data:

Stream   Flow rate     TC             Rainfall Intensity
 No.       (CFS)      (min)                   (In/Hr)


1       24.471      9.51             5.222
2        4.595     19.31             3.307
Qmax(1) =
       1.000 *     1.000 *    24.471) +
       1.000 *     0.492 *     4.595) + =      26.733
Qmax(2) =
       0.633 *     1.000 *    24.471) +
       1.000 *     1.000 *     4.595) + =      20.090
```

```
Total of 2 streams to confluence:
Flow rates before confluence point:
      24.471       4.595
Maximum flow rates at confluence using above data:
       26.733       20.090
Area of streams before confluence:
       12.590        3.910
Results of confluence:
Total flow rate =     26.733(CFS)
Time of concentration =     9.508 min.
Effective stream area after confluence =     16.500(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      604.000 to Point/Station     1008.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   502.710(Ft.)
Downstream point/station elevation =   492.280(Ft.)
Pipe length  =   682.00(Ft.) Slope =   0.0153  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.733(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
   400.406(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =    383.850(Ft.)
 Minor friction loss =     26.985(Ft.)  K-factor =   1.50
Pipe flow velocity =     34.04(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     9.84 min.
End of computations, total study area =          16.500 (Ac.)
```

```
        San Diego County Rational Hydrology Program

    CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

    Rational method hydrology  program based on
    San Diego County Flood Control Division 2003 hydrology manual
        Rational Hydrology Study        Date: 03/17/21
    ------------------------------------------------------------------------




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

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


    Program License Serial Number 6332

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

    Map data precipitation entered:
    6 hour,  precipitation(inches) =  3.000
    24 hour precipitation(inches) =  5.200
    P6/P24 =    57.7%
    San Diego hydrology manual 'C' values used


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station     1001.000 to Point/Station     1002.000
    **** INITIAL AREA EVALUATION ****
    ________________________________________________________________________
    Decimal fraction soil group A = 0.000
    Decimal fraction soil group B = 0.000
    Decimal fraction soil group C = 0.000
    Decimal fraction soil group D = 1.000
    [MEDIUM DENSITY RESIDENTIAL                  ]
    (10.9 DU/A or Less      )
    Impervious value, Ai = 0.450
    Sub-Area C Value = 0.600
    Initial subarea total flow distance  =  114.000(Ft.)
    Highest elevation =  523.100(Ft.)
    Lowest elevation =  523.000(Ft.)
    Elevation difference =    0.100(Ft.) Slope =  0.088 %
    Top of Initial Area Slope adjusted by User to  0.001 %
    Bottom of Initial Area Slope adjusted by User to  0.001 %
    INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
    The maximum overland flow distance is 50.00 (Ft)
    for the top area slope value of   0.00 %, in a development type of
     10.9 DU/A or Less
    In Accordance With Figure 3-3
    Initial Area Time of Concentration =  63.64 minutes
    TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
    TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.001^(1/3)]=  63.64
    The initial area total distance of  114.00 (Ft.) entered leaves a
    remaining distance of   64.00 (Ft.)
    Using Figure 3-4, the travel time for this distance is  16.16 minutes
    for a distance of  64.00 (Ft.) and a slope of  0.00 %
    with an elevation difference of   0.00(Ft.) from the end of the top area
    Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
     =   16.157 Minutes
    Tt=[(11.9*0.0121^3)/(  0.00)]^.385= 16.16
```

```
Total initial area Ti =  63.64 minutes from Figure 3-3 formula plus
 16.16 minutes from the Figure 3-4 formula =  79.80 minutes
Rainfall intensity (I) =      1.324(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.072(CFS)
Total initial stream area =        0.090(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1002.000 to Point/Station     1003.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =   523.000(Ft.)
End of street segment elevation =   516.390(Ft.)
Length of street segment  =   734.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      0.734(CFS)
Depth of flow =   0.113(Ft.), Average velocity =   1.720(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.643(Ft.)
Flow velocity =   1.72(Ft/s)
Travel time =    7.11 min.     TC =   86.91  min.
 Adding area flow to street
Rainfall intensity (I) =      1.253(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      1.253(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.182
Subarea runoff =      1.410(CFS) for      1.880(Ac.)
Total runoff =      1.481(CFS)  Total area =       1.970(Ac.)
Street flow at end of street =      1.481(CFS)
Half street flow at end of street =      1.481(CFS)
Depth of flow =   0.152(Ft.), Average velocity =   2.056(Ft/s)
Flow width (from curb towards crown)=   8.573(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   512.000(Ft.)
Downstream point/station elevation =    510.920(Ft.)
Pipe length  =    54.00(Ft.) Slope =   0.0200  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.481(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     1.481(CFS)
Normal flow depth in pipe =    3.52(In.)
```

```
Flow top width inside pipe =   16.97(In.)
Critical depth could not be calculated.
Pipe flow velocity =      5.19(Ft/s)
Travel time through pipe =    0.17 min.
Time of concentration (TC) =    87.08 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1003.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****

______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.970(Ac.)
Runoff from this stream =      1.481(CFS)
Time of concentration =   87.08 min.
Rainfall intensity =     1.252(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      801.000 to Point/Station      802.000
**** INITIAL AREA EVALUATION ****

______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                     ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =   77.000(Ft.)
Highest elevation =  530.000(Ft.)
Lowest elevation =  529.900(Ft.)
Elevation difference =    0.100(Ft.) Slope =  0.130 %
Top of Initial Area Slope adjusted by User to  0.100 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.10 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =  13.71 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.100^(1/3)]=  13.71
Rainfall intensity (I) =      4.124(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.322(CFS)
Total initial stream area =        0.130(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      802.000 to Point/Station      803.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

______________________________________________________________________
Top of street segment elevation =   530.000(Ft.)
End of street segment elevation =   517.390(Ft.)
Length of street segment  =   653.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
```

```
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      2.971(CFS)
Depth of flow =   0.173(Ft.), Average velocity =   3.261(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.622(Ft.)
Flow velocity =   3.26(Ft/s)
Travel time =    3.34 min.      TC =   17.05  min.
 Adding area flow to street
Rainfall intensity (I) =      3.583(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                    ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      3.583(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.553
Subarea runoff =      5.242(CFS) for      2.458(Ac.)
Total runoff =      5.564(CFS)  Total area =       2.588(Ac.)
Street flow at end of street =      5.564(CFS)
Half street flow at end of street =      5.564(CFS)
Depth of flow =   0.223(Ft.), Average velocity =   3.836(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station     1004.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   511.420(Ft.)
Downstream point/station elevation =   510.920(Ft.)
Pipe length  =     25.00(Ft.) Slope =   0.0200  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.564(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     1.278(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      0.609(Ft.)
 Minor friction loss =      1.169(Ft.)  K-factor =   1.50
Critical depth could not be calculated.
Pipe flow velocity =      7.08(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    17.11 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      803.000 to Point/Station     1004.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.588(Ac.)
Runoff from this stream =      5.564(CFS)
Time of concentration =   17.11 min.
Rainfall intensity =     3.575(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.        (CFS)       (min)                 (In/Hr)
```

```
1        1.481     87.08             1.252
2        5.564     17.11             3.575
Qmax(1) =
       1.000 *    1.000 *     1.481) +
       0.350 *    1.000 *     5.564) + =        3.429
Qmax(2) =
       1.000 *    0.196 *     1.481) +
       1.000 *    1.000 *     5.564) + =        5.855

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.481       5.564
Maximum flow rates at confluence using above data:
        3.429        5.855
Area of streams before confluence:
        1.970        2.588
Results of confluence:
Total flow rate =       5.855(CFS)
Time of concentration =    17.107 min.
Effective stream area after confluence =      4.558(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   510.920(Ft.)
Downstream point/station elevation =   510.340(Ft.)
Pipe length  =    29.00(Ft.) Slope =   0.0200  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =      5.855(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =      5.855(CFS)
Normal flow depth in pipe =     7.85(In.)
Flow top width inside pipe =   17.85(In.)
Critical Depth =   11.21(In.)
Pipe flow velocity =      7.91(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    17.17 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1004.000 to Point/Station     1005.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      4.558(Ac.)
Runoff from this stream =      5.855(CFS)
Time of concentration =   17.17 min.
Rainfall intensity =     3.567(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      701.000 to Point/Station      702.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  557.000(Ft.)
Lowest elevation =  530.000(Ft.)
```

```
Elevation difference =   27.000(Ft.) Slope = 27.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  27.00 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.00 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*( 100.000^.5)/(  27.000^(1/3)]=   3.00
Calculated TC of    3.000 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =       0.451(CFS)
Total initial stream area =        0.095(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      702.000 to Point/Station      703.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Depth of flow =   0.144(Ft.), Average velocity =   0.874(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             25.00              0.00
    3             50.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.451(CFS)
  '     '    flow top width =      7.178(Ft.)
  '     '    velocity=    0.874(Ft/s)
  '     '    area =      0.515(Sq.Ft)
  '     '    Froude number =     0.575

Upstream point elevation =   530.000(Ft.)
Downstream point elevation =   528.630(Ft.)
Flow length =   131.000(Ft.)
Travel time  =    2.50 min.
Time of concentration =    5.50 min.
Depth of flow =   0.144(Ft.)
Average velocity =   0.874(Ft/s)
Total irregular channel flow =     0.451(CFS)
Irregular channel normal depth above invert elev. =   0.144(Ft.)
Average velocity of channel(s) =   0.874(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station     1005.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation =   528.630(Ft.)
End of street segment elevation =   516.750(Ft.)
Length of street segment  =   702.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
```

```
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      6.630(CFS)
Depth of flow =   0.241(Ft.), Average velocity =   3.952(Ft/s)
Note:  depth of flow exceeds top of street crown.
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  12.000(Ft.)
Flow velocity =   3.95(Ft/s)
Travel time =    2.96 min.      TC =    8.46  min.
 Adding area flow to street
Rainfall intensity (I) =      5.632(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                     ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      5.632(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      2.289
Subarea runoff =     12.440(CFS) for      3.720(Ac.)
Total runoff =     12.891(CFS)  Total area =       3.815(Ac.)
Street flow at end of street =     12.891(CFS)
Half street flow at end of street =     12.891(CFS)
Depth of flow =   0.310(Ft.), Average velocity =   5.145(Ft/s)
Note:  depth of flow exceeds top of street crown.
Flow width (from curb towards crown)=  12.000(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      703.000 to Point/Station     1005.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.815(Ac.)
Runoff from this stream =     12.891(CFS)
Time of concentration =    8.46 min.
Rainfall intensity =     5.632(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        5.855     17.17               3.567
2       12.891      8.46               5.632
Qmax(1) =
       1.000 *    1.000 *     5.855) +
       0.633 *    1.000 *    12.891) + =      14.020
Qmax(2) =
       1.000 *    0.493 *     5.855) +
       1.000 *    1.000 *    12.891) + =      15.775

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.855      12.891
Maximum flow rates at confluence using above data:
       14.020       15.775
Area of streams before confluence:
        4.558        3.815
Results of confluence:
Total flow rate =     15.775(CFS)
Time of concentration =     8.457 min.
```

```
Effective stream area after confluence =      8.373(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1006.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

______________________________________________________________________
Upstream point/station elevation =   510.340(Ft.)
Downstream point/station elevation =   490.000(Ft.)
Pipe length   =    30.00(Ft.) Slope =   0.6780  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    15.775(CFS)
Given pipe size =     18.00(In.)
Calculated individual pipe flow  =    15.775(CFS)
Normal flow depth in pipe =    5.20(In.)
Flow top width inside pipe =   16.32(In.)
Critical Depth =   17.05(In.)
Pipe flow velocity =     37.22(Ft/s)
Travel time through pipe =    0.01 min.
Time of concentration (TC) =     8.47 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1005.000 to Point/Station     1006.000
**** CONFLUENCE OF MINOR STREAMS ****

______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      8.373(Ac.)
Runoff from this stream =     15.775(CFS)
Time of concentration =    8.47 min.
Rainfall intensity =     5.626(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      902.000
**** INITIAL AREA EVALUATION ****

______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                    ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance   =   76.000(Ft.)
Highest elevation =  518.000(Ft.)
Lowest elevation =  517.900(Ft.)
Elevation difference =    0.100(Ft.) Slope =  0.132 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.13 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =  12.50 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.132^(1/3)]=  12.50
The initial area total distance of   76.00 (Ft.) entered leaves a
remaining distance of   26.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   1.23 minutes
for a distance of  26.00 (Ft.) and a slope of  0.13 %
with an elevation difference of   0.03(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    1.232 Minutes
Tt=[(11.9*0.0049^3)/(  0.03)]^.385=  1.23
Total initial area Ti =  12.50 minutes from Figure 3-3 formula plus
  1.23 minutes from the Figure 3-4 formula =  13.73 minutes
```

```
Rainfall intensity (I) =      4.120(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.277(CFS)
Total initial stream area =        0.112(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      903.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

______________________________________________________________________
Depth of flow =   0.097(Ft.), Average velocity =   1.171(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             25.00               0.00
    3             50.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.277(CFS)
  '     '    flow top width =      4.861(Ft.)
  '     '    velocity=    1.171(Ft/s)
  '     '    area =      0.236(Sq.Ft)
  '     '    Froude number =     0.936

Upstream point elevation =   518.000(Ft.)
Downstream point elevation =   515.160(Ft.)
Flow length =    90.000(Ft.)
Travel time  =    1.28 min.
Time of concentration =   15.01 min.
Depth of flow =   0.097(Ft.)
Average velocity =   1.171(Ft/s)
Total irregular channel flow =     0.277(CFS)
Irregular channel normal depth above invert elev. =   0.097(Ft.)
Average velocity of channel(s) =   1.171(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station     1006.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

______________________________________________________________________
Top of street segment elevation =   515.160(Ft.)
End of street segment elevation =   490.000(Ft.)
Length of street segment   =   642.000(Ft.)
Height of curb above gutter flowline   =    6.0(In.)
Width of half street (curb to crown)   =  12.000(Ft.)
Distance from crown to crossfall grade break   =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line   =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =    1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      3.276(CFS)
Depth of flow =   0.156(Ft.), Average velocity =   4.354(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.758(Ft.)
Flow velocity =   4.35(Ft/s)
Travel time =    2.46 min.     TC =   17.47  min.
 Adding area flow to street
Rainfall intensity (I) =      3.527(In/Hr) for a   100.0 year storm
```

```
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                    ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      3.527(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.759
Subarea runoff =      5.928(CFS) for      2.820(Ac.)
Total runoff =      6.205(CFS)  Total area =       2.932(Ac.)
Street flow at end of street =      6.205(CFS)
Half street flow at end of street =      6.205(CFS)
Depth of flow =   0.202(Ft.), Average velocity =   5.116(Ft/s)
Flow width (from curb towards crown)=  11.080(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station     1006.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.932(Ac.)
Runoff from this stream =      6.205(CFS)
Time of concentration =   17.47 min.
Rainfall intensity =     3.527(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1       15.775      8.47             5.626
2        6.205     17.47             3.527
Qmax(1) =
       1.000 *    1.000 *    15.775) +
       1.000 *    0.485 *     6.205) + =      18.784
Qmax(2) =
       0.627 *    1.000 *    15.775) +
       1.000 *    1.000 *     6.205) + =      16.095

Total of 2 streams to confluence:
Flow rates before confluence point:
      15.775       6.205
Maximum flow rates at confluence using above data:
       18.784       16.095
Area of streams before confluence:
        8.373        2.932
Results of confluence:
Total flow rate =     18.784(CFS)
Time of concentration =     8.471 min.
Effective stream area after confluence =     11.305(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1007.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   490.000(Ft.)
Downstream point/station elevation =   486.820(Ft.)
Pipe length   =    159.00(Ft.) Slope =   0.0200  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.784(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    18.784(CFS)
```

```
Normal flow depth in pipe =   13.22(In.)
Flow top width inside pipe =   23.88(In.)
Critical Depth =   18.71(In.)
Pipe flow velocity =     10.59(Ft/s)
Travel time through pipe =    0.25 min.
Time of concentration (TC) =     8.72 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1006.000 to Point/Station     1007.000
**** CONFLUENCE OF MINOR STREAMS ****

______________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     11.305(Ac.)
Runoff from this stream =     18.784(CFS)
Time of concentration =    8.72 min.
Rainfall intensity =     5.521(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1101.000 to Point/Station     1102.000
**** INITIAL AREA EVALUATION ****

______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Initial subarea total flow distance  =   86.000(Ft.)
Highest elevation =  524.090(Ft.)
Lowest elevation =  518.000(Ft.)
Elevation difference =    6.090(Ft.) Slope =  7.081 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   7.08 %, in a development type of
 10.9 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.69 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.6000)*( 100.000^.5)/(   7.081^(1/3)]=   4.69
Calculated TC of    4.687 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.654(CFS)
Total initial stream area =        0.138(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1102.000 to Point/Station     1103.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

______________________________________________________________________
Depth of flow =   0.252(Ft.), Average velocity =   0.411(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             25.00              0.00
    3             50.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.654(CFS)
```

```
  '     '    flow top width =     12.623(Ft.)
  '     '    velocity=    0.411(Ft/s)
  '     '    area =      1.593(Sq.Ft)
  '     '    Froude number =     0.204

Upstream point elevation =   518.000(Ft.)
Downstream point elevation =   517.900(Ft.)
Flow length =    92.000(Ft.)
Travel time  =    3.73 min.
Time of concentration =    8.42 min.
Depth of flow =   0.252(Ft.)
Average velocity =   0.411(Ft/s)
Total irregular channel flow =     0.654(CFS)
Irregular channel normal depth above invert elev. =   0.252(Ft.)
Average velocity of channel(s) =   0.411(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1103.000 to Point/Station     1104.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =   518.000(Ft.)
End of street segment elevation =   490.000(Ft.)
Length of street segment  =   680.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      4.027(CFS)
Depth of flow =   0.168(Ft.), Average velocity =   4.673(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   9.362(Ft.)
Flow velocity =   4.67(Ft/s)
Travel time =    2.43 min.     TC =   10.85  min.
 Adding area flow to street
Rainfall intensity (I) =      4.797(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      4.797(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.525
Subarea runoff =      6.659(CFS) for      2.403(Ac.)
Total runoff =      7.313(CFS)  Total area =       2.541(Ac.)
Street flow at end of street =      7.313(CFS)
Half street flow at end of street =      7.313(CFS)
Depth of flow =   0.214(Ft.), Average velocity =   5.431(Ft/s)
Flow width (from curb towards crown)=  11.667(Ft.)


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Process from Point/Station     1104.000 to Point/Station     1007.000
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**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation =   490.000(Ft.)
Downstream point/station elevation =   486.820(Ft.)
Pipe length  =   124.00(Ft.) Slope =   0.0256  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.313(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.063(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =      5.223(Ft.)
 Minor friction loss =      2.020(Ft.)  K-factor =   1.50
Pipe flow velocity =      9.31(Ft/s)
Travel time through pipe =    0.22 min.
Time of concentration (TC) =    11.07 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1104.000 to Point/Station     1007.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.541(Ac.)
Runoff from this stream =      7.313(CFS)
Time of concentration =   11.07 min.
Rainfall intensity =     4.735(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1       18.784      8.72             5.521
2        7.313     11.07             4.735
Qmax(1) =
       1.000 *    1.000 *    18.784) +
       1.000 *    0.788 *     7.313) + =      24.546
Qmax(2) =
       0.858 *    1.000 *    18.784) +
       1.000 *    1.000 *     7.313) + =      23.421

Total of 2 streams to confluence:
Flow rates before confluence point:
      18.784       7.313
Maximum flow rates at confluence using above data:
       24.546      23.421
Area of streams before confluence:
       11.305        2.541
Results of confluence:
Total flow rate =     24.546(CFS)
Time of concentration =     8.721 min.
Effective stream area after confluence =     13.846(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1007.000 to Point/Station     1008.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation =   486.820(Ft.)
Downstream point/station elevation =   483.110(Ft.)
Pipe length  =    70.00(Ft.) Slope =   0.0530  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.546(CFS)
Given pipe size =     18.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
     4.605(Ft.)  at the headworks or inlet of the pipe(s)
```

```
 Pipe friction loss =      3.821(Ft.)
 Minor friction loss =      4.494(Ft.)  K-factor =   1.50
Pipe flow velocity =     13.89(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =     8.80 min.


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Process from Point/Station     1007.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =     13.846(Ac.)
Runoff from this stream =      24.546(CFS)
Time of concentration =    8.80 min.
Rainfall intensity =     5.487(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station     1008.000
**** USER DEFINED FLOW INFORMATION AT A POINT ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                  ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity (I) =      5.108(In/Hr) for a   100.0 year storm
User specified values are as follows:
TC =   9.84 min.  Rain intensity =       5.11(In/Hr)
Total area =        16.500(Ac.)  Total runoff =    26.733(CFS)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      601.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area =     16.500(Ac.)
Runoff from this stream =      26.733(CFS)
Time of concentration =    9.84 min.
Rainfall intensity =     5.108(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.        (CFS)      (min)                  (In/Hr)


1       24.546      8.80             5.487
2       26.733      9.84             5.108
Qmax(1) =
       1.000 *    1.000 *    24.546) +
       1.000 *    0.895 *    26.733) + =      48.467
Qmax(2) =
       0.931 *    1.000 *    24.546) +
       1.000 *    1.000 *    26.733) + =      49.581

Total of 2 streams to confluence:
Flow rates before confluence point:
      24.546      26.733
Maximum flow rates at confluence using above data:
       48.467       49.581
Area of streams before confluence:
```

```
        13.846       16.500
Results of confluence:
Total flow rate =     49.581(CFS)
Time of concentration =     9.840 min.
Effective stream area after confluence =     30.346(Ac.)


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Process from Point/Station     1301.000 to Point/Station     1302.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  100.000(Ft.)
Highest elevation =  772.500(Ft.)
Lowest elevation =  745.000(Ft.)
Elevation difference =   27.500(Ft.) Slope = 27.500 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  27.50 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.47 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  27.500^(1/3)]=   4.47
Calculated TC of    4.473 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.304(CFS)
Total initial stream area =        0.110(Ac.)


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Process from Point/Station     1302.000 to Point/Station     1008.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =     10.313(CFS)
Depth of flow =   0.319(Ft.), Average velocity =   5.057(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             20.00              0.00
    3             40.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     10.313(CFS)
  '     '    flow top width =     12.773(Ft.)
  '     '    velocity=    5.057(Ft/s)
  '     '    area =      2.039(Sq.Ft)
  '     '    Froude number =     2.230

Upstream point elevation =   745.000(Ft.)
Downstream point elevation =   483.110(Ft.)
Flow length =  2173.000(Ft.)
Travel time  =    7.16 min.
Time of concentration =   11.63 min.
Depth of flow =   0.319(Ft.)
```

```
Average velocity =   5.057(Ft/s)
Total irregular channel flow =    10.313(CFS)
Irregular channel normal depth above invert elev. =   0.319(Ft.)
Average velocity of channel(s) =   5.057(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.584(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.584(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      4.420
Subarea runoff =     19.961(CFS) for     12.520(Ac.)
Total runoff =     20.266(CFS)  Total area =      12.630(Ac.)
Depth of flow =   0.411(Ft.), Average velocity =   5.987(Ft/s)


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Process from Point/Station     1008.000 to Point/Station     1008.000
**** CONFLUENCE OF MINOR STREAMS ****

______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =     12.630(Ac.)
Runoff from this stream =     20.266(CFS)
Time of concentration =   11.63 min.
Rainfall intensity =     4.584(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)       (min)                  (In/Hr)


1        24.546      8.80               5.487
2        26.733      9.84               5.108
3        20.266     11.63               4.584
Qmax(1) =
       1.000 *    1.000 *    24.546) +
       1.000 *    0.895 *    26.733) +
       1.000 *    0.757 *    20.266) + =      63.804
Qmax(2) =
       0.931 *    1.000 *    24.546) +
       1.000 *    1.000 *    26.733) +
       1.000 *    0.846 *    20.266) + =      66.721
Qmax(3) =
       0.835 *    1.000 *    24.546) +
       0.898 *    1.000 *    26.733) +
       1.000 *    1.000 *    20.266) + =      64.769

Total of 3 streams to confluence:
Flow rates before confluence point:
      24.546      26.733      20.266
Maximum flow rates at confluence using above data:
       63.804       66.721       64.769
Area of streams before confluence:
       13.846       16.500       12.630
Results of confluence:
Total flow rate =     66.721(CFS)
Time of concentration =     9.840 min.
Effective stream area after confluence =     42.976(Ac.)
End of computations, total study area =          42.976 (Ac.)
```

POC 3

PRE-DEVELOPMENT

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        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2014 Version 9.0

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 03/11/21
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Questhaven Project
Job Number 19-038
POC-2 User Defined Inut
Post-development Calculations
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 *********   Hydrology Study Control Information **********

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Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


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Process from Point/Station      601.000 to Point/Station      602.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   92.000(Ft.)
Highest elevation =  822.400(Ft.)
Lowest elevation =  791.500(Ft.)
Elevation difference =   30.900(Ft.) Slope = 33.587 %
Top of Initial Area Slope adjusted by User to 30.900 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of  30.90 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   4.30 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(  30.900^(1/3)]=   4.30
Calculated TC of    4.302 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.332(CFS)
Total initial stream area =        0.120(Ac.)


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Process from Point/Station      602.000 to Point/Station      603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =     12.435(CFS)
Depth of flow =   0.223(Ft.), Average velocity =   4.995(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00               1.00
    2             50.00               0.00
    3            100.00               1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =     12.435(CFS)
  '     '    flow top width =     22.313(Ft.)
  '     '    velocity=    4.995(Ft/s)
  '     '    area =      2.489(Sq.Ft)
  '     '    Froude number =     2.636

Upstream point elevation =   791.500(Ft.)
Downstream point elevation =   545.060(Ft.)
Flow length =  1301.000(Ft.)
Travel time  =    4.34 min.
Time of concentration =    8.64 min.
Depth of flow =   0.223(Ft.)
Average velocity =   4.995(Ft/s)
Total irregular channel flow =    12.435(CFS)
Irregular channel normal depth above invert elev. =   0.223(Ft.)
Average velocity of channel(s) =   4.995(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.553(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space    )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      5.553(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      4.406
Subarea runoff =     24.139(CFS) for     12.470(Ac.)
Total runoff =     24.471(CFS)  Total area =      12.590(Ac.)
Depth of flow =   0.288(Ft.), Average velocity =   5.917(Ft/s)


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Process from Point/Station      603.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation =   545.060(Ft.)
Downstream point/station elevation =   502.700(Ft.)
Pipe length   =   834.00(Ft.) Slope =   0.0508  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.471(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =    24.471(CFS)
Normal flow depth in pipe =   11.72(In.)
Flow top width inside pipe =   23.99(In.)
Critical Depth =   20.98(In.)
Pipe flow velocity =     16.06(Ft/s)
Travel time through pipe =    0.87 min.
Time of concentration (TC) =     9.51 min.
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Process from Point/Station      603.000 to Point/Station      604.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =     12.590(Ac.)
Runoff from this stream =     24.471(CFS)
Time of concentration =    9.51 min.
Rainfall intensity =     5.222(In/Hr)


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Process from Point/Station     1601.000 to Point/Station     1602.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =   98.000(Ft.)
Highest elevation =  518.500(Ft.)
Lowest elevation =  517.460(Ft.)
Elevation difference =    1.040(Ft.) Slope =  1.061 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 70.00 (Ft)
for the top area slope value of   1.06 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =  11.08 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*(  70.000^.5)/(   1.060^(1/3)]=  11.08
Rainfall intensity (I) =      4.732(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.282(CFS)
Total initial stream area =       0.170(Ac.)


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Process from Point/Station     1602.000 to Point/Station     1603.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      1.659(CFS)
Depth of flow =   0.165(Ft.), Average velocity =   1.225(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             50.00              0.00
    3            100.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      1.659(CFS)
  '     '    flow top width =     16.461(Ft.)
  '     '    velocity=    1.225(Ft/s)
  '     '    area =      1.355(Sq.Ft)
  '     '    Froude number =     0.752

Upstream point elevation =   517.460(Ft.)
Downstream point elevation =   510.080(Ft.)
Flow length =   432.000(Ft.)
Travel time  =    5.88 min.
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Time of concentration =   16.96 min.
Depth of flow =   0.165(Ft.)
Average velocity =   1.225(Ft/s)
Total irregular channel flow =     1.659(CFS)
Irregular channel normal depth above invert elev. =   0.165(Ft.)
Average velocity of channel(s) =   1.225(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      3.596(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.596(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.826
Subarea runoff =      2.688(CFS) for      2.190(Ac.)
Total runoff =      2.970(CFS)  Total area =       2.360(Ac.)
Depth of flow =   0.205(Ft.), Average velocity =   1.417(Ft/s)


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Process from Point/Station     1603.000 to Point/Station     1604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

______________________________________________________________________
Upstream point/station elevation =   510.080(Ft.)
Downstream point/station elevation =   507.290(Ft.)
Pipe length   =   132.00(Ft.) Slope =   0.0211  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.970(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     2.970(CFS)
Normal flow depth in pipe =    4.88(In.)
Flow top width inside pipe =   19.31(In.)
Critical Depth =    7.20(In.)
Pipe flow velocity =      6.50(Ft/s)
Travel time through pipe =    0.34 min.
Time of concentration (TC) =    17.29 min.


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Process from Point/Station     1604.000 to Point/Station     1605.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      3.823(CFS)
Depth of flow =   0.413(Ft.), Average velocity =   1.120(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             20.00              0.00
    3             40.00              1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      3.823(CFS)
  '     '    flow top width =     16.528(Ft.)
  '     '    velocity=    1.120(Ft/s)
  '     '    area =      3.415(Sq.Ft)
  '     '    Froude number =     0.434

Upstream point elevation =   507.290(Ft.)
Downstream point elevation =   506.850(Ft.)
Flow length =   105.000(Ft.)
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Travel time  =    1.56 min.
Time of concentration =   18.86 min.
Depth of flow =   0.413(Ft.)
Average velocity =   1.120(Ft/s)
Total irregular channel flow =     3.823(CFS)
Irregular channel normal depth above invert elev. =   0.413(Ft.)
Average velocity of channel(s) =   1.120(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      3.357(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.357(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      1.369
Subarea runoff =      1.625(CFS) for      1.550(Ac.)
Total runoff =      4.595(CFS)  Total area =       3.910(Ac.)
Depth of flow =   0.443(Ft.), Average velocity =   1.172(Ft/s)


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Process from Point/Station     1605.000 to Point/Station      604.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   506.850(Ft.)
Downstream point/station elevation =   502.710(Ft.)
Pipe length  =   207.00(Ft.) Slope =   0.0200  Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     4.595(CFS)
Given pipe size =     24.00(In.)
Calculated individual pipe flow  =     4.595(CFS)
Normal flow depth in pipe =    5.90(In.)
Flow top width inside pipe =   20.67(In.)
Critical Depth =    9.04(In.)
Pipe flow velocity =      7.66(Ft/s)
Travel time through pipe =    0.45 min.
Time of concentration (TC) =    19.31 min.


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Process from Point/Station      604.000 to Point/Station      604.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      3.910(Ac.)
Runoff from this stream =      4.595(CFS)
Time of concentration =   19.31 min.
Rainfall intensity =     3.307(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)      (min)                  (In/Hr)


1       24.471      9.51             5.222
2        4.595     19.31             3.307
Qmax(1) =
       1.000 *    1.000 *    24.471) +
       1.000 *    0.492 *     4.595) + =      26.733
Qmax(2) =
       0.633 *    1.000 *    24.471) +
       1.000 *    1.000 *     4.595) + =      20.090
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Total of 2 streams to confluence:
Flow rates before confluence point:
      24.471       4.595
Maximum flow rates at confluence using above data:
       26.733       20.090
Area of streams before confluence:
       12.590        3.910
Results of confluence:
Total flow rate =     26.733(CFS)
Time of concentration =     9.508 min.
Effective stream area after confluence =     16.500(Ac.)


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Process from Point/Station      604.000 to Point/Station     1008.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   502.710(Ft.)
Downstream point/station elevation =   492.280(Ft.)
Pipe length  =   682.00(Ft.) Slope =   0.0153  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    26.733(CFS)
Given pipe size =     12.00(In.)
NOTE: Normal flow is pressure flow in user selected pipe size.
The approximate hydraulic grade line above the pipe invert is
   400.406(Ft.)  at the headworks or inlet of the pipe(s)
 Pipe friction loss =    383.850(Ft.)
 Minor friction loss =     26.985(Ft.)  K-factor =   1.50
Pipe flow velocity =     34.04(Ft/s)
Travel time through pipe =    0.33 min.
Time of concentration (TC) =     9.84 min.
End of computations, total study area =         16.500 (Ac.)
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POC 3

POST-DEVELOPMENT

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        San Diego County Rational Hydrology Program

    CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

    Rational method hydrology  program based on
    San Diego County Flood Control Division 2003 hydrology manual
        Rational Hydrology Study        Date: 03/15/21
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     *********   Hydrology Study Control Information **********

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    Program License Serial Number 6332

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

    Map data precipitation entered:
    6 hour,  precipitation(inches) =  3.000
    24 hour precipitation(inches) =  5.200
    P6/P24 =    57.7%
    San Diego hydrology manual 'C' values used


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station     1401.000 to Point/Station     1402.000
    **** INITIAL AREA EVALUATION ****
    ______________________________________________________________________
    Decimal fraction soil group A = 0.000
    Decimal fraction soil group B = 0.000
    Decimal fraction soil group C = 0.000
    Decimal fraction soil group D = 1.000
    [MEDIUM DENSITY RESIDENTIAL                  ]
    (10.9 DU/A or Less      )
    Impervious value, Ai = 0.450
    Sub-Area C Value = 0.600
    Initial subarea total flow distance  =   96.000(Ft.)
    Highest elevation =  523.100(Ft.)
    Lowest elevation =  522.900(Ft.)
    Elevation difference =    0.200(Ft.) Slope =  0.208 %
    INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
    The maximum overland flow distance is 50.00 (Ft)
    for the top area slope value of   0.21 %, in a development type of
     10.9 DU/A or Less
    In Accordance With Figure 3-3
    Initial Area Time of Concentration =  10.71 minutes
    TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
    TC = [1.8*(1.1-0.6000)*(  50.000^.5)/(   0.210^(1/3)]=  10.71
    The initial area total distance of   96.00 (Ft.) entered leaves a
    remaining distance of   46.00 (Ft.)
    Using Figure 3-4, the travel time for this distance is   1.60 minutes
    for a distance of  46.00 (Ft.) and a slope of  0.21 %
    with an elevation difference of   0.10(Ft.) from the end of the top area
    Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
     =    1.599 Minutes
    Tt=[(11.9*0.0087^3)/(  0.10)]^.385=  1.60
    Total initial area Ti =  10.71 minutes from Figure 3-3 formula plus
      1.60 minutes from the Figure 3-4 formula =  12.31 minutes
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Rainfall intensity (I) =      4.422(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.600
Subarea runoff =      0.371(CFS)
Total initial stream area =       0.140(Ac.)


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Process from Point/Station     1402.000 to Point/Station     1403.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________
Top of street segment elevation =   523.000(Ft.)
End of street segment elevation =   517.000(Ft.)
Length of street segment  =   195.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      2.418(CFS)
Depth of flow =   0.144(Ft.), Average velocity =   3.683(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.193(Ft.)
Flow velocity =   3.68(Ft/s)
Travel time =    0.88 min.     TC =   13.19  min.
 Adding area flow to street
Rainfall intensity (I) =      4.228(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(10.9 DU/A or Less      )
Impervious value, Ai = 0.450
Sub-Area C Value = 0.600
Rainfall intensity =      4.228(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.600  CA =      1.044
Subarea runoff =      4.043(CFS) for      1.600(Ac.)
Total runoff =      4.414(CFS)  Total area =       1.740(Ac.)
Street flow at end of street =      4.414(CFS)
Half street flow at end of street =      4.414(CFS)
Depth of flow =   0.185(Ft.), Average velocity =   4.289(Ft/s)
Flow width (from curb towards crown)=  10.217(Ft.)


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Process from Point/Station     1403.000 to Point/Station     1404.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   517.000(Ft.)
Downstream point/station elevation =   500.000(Ft.)
Pipe length  =   181.00(Ft.) Slope =   0.0939  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.414(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     4.414(CFS)
Normal flow depth in pipe =    5.31(In.)
Flow top width inside pipe =   11.92(In.)
Critical Depth =   10.57(In.)
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Pipe flow velocity =     13.16(Ft/s)
Travel time through pipe =    0.23 min.
Time of concentration (TC) =    13.42 min.


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Process from Point/Station     1404.000 to Point/Station     1404.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.740(Ac.)
Runoff from this stream =      4.414(CFS)
Time of concentration =   13.42 min.
Rainfall intensity =     4.182(In/Hr)


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Process from Point/Station     1701.000 to Point/Station     1702.000
**** INITIAL AREA EVALUATION ****

Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[INDUSTRIAL area type                        ]
(General Industrial      )
Impervious value, Ai = 0.950
Sub-Area C Value = 0.870
Initial subarea total flow distance   =   95.000(Ft.)
Highest elevation =  526.780(Ft.)
Lowest elevation =  524.920(Ft.)
Elevation difference =    1.860(Ft.) Slope =  1.958 %
Top of Initial Area Slope adjusted by User to  1.000 %
Bottom of Initial Area Slope adjusted by User to  1.000 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 60.00 (Ft)
for the top area slope value of   1.00 %, in a development type of
 General Industrial
In Accordance With Figure 3-3
Initial Area Time of Concentration =   3.21 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.8700)*(  60.000^.5)/(   1.000^(1/3)]=   3.21
The initial area total distance of   95.00 (Ft.) entered leaves a
remaining distance of   35.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   0.71 minutes
for a distance of  35.00 (Ft.) and a slope of  1.00 %
with an elevation difference of   0.35(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    0.710 Minutes
Tt=[(11.9*0.0066^3)/(  0.35)]^.385=  0.71
Total initial area Ti =   3.21 minutes from Figure 3-3 formula plus
  0.71 minutes from the Figure 3-4 formula =   3.92 minutes
Calculated TC of    3.917 minutes is less than 5 minutes,
 resetting TC to 5.0 minutes for rainfall intensity calculations
Rainfall intensity (I) =      7.904(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.870
Subarea runoff =      0.523(CFS)
Total initial stream area =        0.076(Ac.)


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Process from Point/Station     1702.000 to Point/Station     1404.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****

Estimated mean flow rate at midpoint of channel =      3.861(CFS)
Depth of flow =   0.222(Ft.), Average velocity =   5.219(Ft/s)
```

```
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1               0.00              1.00
    2              10.00              0.50
    3              10.10              0.00
    4              25.00              0.50
Manning's 'N' friction factor =   0.012
-----------------------------------------------------------------
Sub-Channel flow  =      3.861(CFS)
  '     '    flow top width =      6.662(Ft.)
  '     '    velocity=    5.219(Ft/s)
  '     '    area =      0.740(Sq.Ft)
  '     '    Froude number =     2.760

Upstream point elevation =   524.920(Ft.)
Downstream point elevation =   505.000(Ft.)
Flow length =   577.000(Ft.)
Travel time  =    1.84 min.
Time of concentration =    5.76 min.
Depth of flow =   0.222(Ft.)
Average velocity =   5.219(Ft/s)
Total irregular channel flow =     3.861(CFS)
Irregular channel normal depth above invert elev. =   0.222(Ft.)
Average velocity of channel(s) =   5.219(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      7.215(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Rainfall intensity =      7.215(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.795  CA =      0.990
Subarea runoff =      6.623(CFS) for      1.170(Ac.)
Total runoff =      7.146(CFS)  Total area =       1.246(Ac.)
Depth of flow =   0.280(Ft.), Average velocity =   6.087(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1404.000 to Point/Station     1404.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      1.246(Ac.)
Runoff from this stream =      7.146(CFS)
Time of concentration =    5.76 min.
Rainfall intensity =     7.215(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1201.000 to Point/Station     1202.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
```

```
Sub-Area C Value = 0.790
Initial subarea total flow distance  =   94.000(Ft.)
Highest elevation =  526.780(Ft.)
Lowest elevation =  526.450(Ft.)
Elevation difference =    0.330(Ft.) Slope =  0.351 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.35 %, in a development type of
 43.0 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.59 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.7900)*(  50.000^.5)/(   0.351^(1/3)]=   5.59
The initial area total distance of   94.00 (Ft.) entered leaves a
remaining distance of   44.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   1.27 minutes
for a distance of  44.00 (Ft.) and a slope of  0.35 %
with an elevation difference of   0.15(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    1.268 Minutes
Tt=[(11.9*0.0083^3)/(  0.15)]^.385=  1.27
Total initial area Ti =   5.59 minutes from Figure 3-3 formula plus
  1.27 minutes from the Figure 3-4 formula =   6.86 minutes
Rainfall intensity (I) =      6.445(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.790
Subarea runoff =      0.356(CFS)
Total initial stream area =        0.070(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1202.000 to Point/Station     1203.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      1.204(CFS)
Depth of flow =   0.135(Ft.), Average velocity =   4.376(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00              1.00
    2             10.00              0.50
    3             10.10              0.00
    4             25.00              0.50
Manning's 'N' friction factor =   0.012
-----------------------------------------------------------------
Sub-Channel flow  =      1.204(CFS)
  '     '    flow top width =      4.063(Ft.)
  '     '    velocity=    4.376(Ft/s)
  '     '    area =      0.275(Sq.Ft)
  '     '    Froude number =     2.964

Upstream point elevation =   526.450(Ft.)
Downstream point elevation =   514.480(Ft.)
Flow length =   255.000(Ft.)
Travel time  =    0.97 min.
Time of concentration =    7.83 min.
Depth of flow =   0.135(Ft.)
Average velocity =   4.376(Ft/s)
Total irregular channel flow =     1.204(CFS)
Irregular channel normal depth above invert elev. =   0.135(Ft.)
Average velocity of channel(s) =   4.376(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      5.917(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
```

```
Decimal fraction soil group D = 1.000
[HIGH DENSITY RESIDENTIAL                    ]
(43.0 DU/A or Less      )
Impervious value, Ai = 0.800
Sub-Area C Value = 0.790
Rainfall intensity =      5.917(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.790  CA =      0.332
Subarea runoff =      1.607(CFS) for      0.350(Ac.)
Total runoff =      1.963(CFS)  Total area =       0.420(Ac.)
Depth of flow =   0.163(Ft.), Average velocity =   4.945(Ft/s)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1203.000 to Point/Station     1404.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****
______________________________________________________________________
Upstream point/station elevation =   493.500(Ft.)
Downstream point/station elevation =   489.000(Ft.)
Pipe length   =   418.00(Ft.) Slope =   0.0108  Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.963(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     1.963(CFS)
Normal flow depth in pipe =    6.22(In.)
Flow top width inside pipe =   11.99(In.)
Critical Depth =    7.17(In.)
Pipe flow velocity =      4.78(Ft/s)
Travel time through pipe =    1.46 min.
Time of concentration (TC) =     9.29 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1404.000 to Point/Station     1404.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      0.420(Ac.)
Runoff from this stream =      1.963(CFS)
Time of concentration =    9.29 min.
Rainfall intensity =     5.300(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1901.000 to Point/Station     1902.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance   =   92.000(Ft.)
Highest elevation =  519.900(Ft.)
Lowest elevation =  513.500(Ft.)
Elevation difference =    6.400(Ft.) Slope =  6.957 %
Top of Initial Area Slope adjusted by User to  6.100 %
Bottom of Initial Area Slope adjusted by User to  6.100 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 100.00 (Ft)
for the top area slope value of   6.10 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =   7.39 minutes
```

```
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   6.100^(1/3)]=   7.39
The initial area total distance of   92.00 (Ft.) entered leaves a
remaining distance of    0.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   1.27 minutes
for a distance of   0.00 (Ft.) and a slope of  6.10 %
with an elevation difference of   0.15(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    1.268 Minutes
Tt=[(11.9*0.0000^3)/(  0.15)]^.385=  1.27
Total initial area Ti =   7.39 minutes from Figure 3-3 formula plus
  1.27 minutes from the Figure 3-4 formula =   8.66 minutes
Rainfall intensity (I) =      5.548(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.117(CFS)
Total initial stream area =        0.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1902.000 to Point/Station     1404.000
**** IRREGULAR CHANNEL FLOW TRAVEL TIME ****
______________________________________________________________________
Estimated mean flow rate at midpoint of channel =      0.845(CFS)
Depth of flow =   0.194(Ft.), Average velocity =   1.502(Ft/s)
    ******* Irregular Channel Data ***********
-----------------------------------------------------------------
Information entered for subchannel number 1 :
Point number      'X' coordinate     'Y' coordinate
    1              0.00             1.00
    2             15.00             0.00
    3             30.00             1.00
Manning's 'N' friction factor =   0.030
-----------------------------------------------------------------
Sub-Channel flow  =      0.845(CFS)
  '     '    flow top width =      5.810(Ft.)
  '     '    velocity=    1.502(Ft/s)
  '     '    area =      0.563(Sq.Ft)
  '     '    Froude number =     0.850

Upstream point elevation =   513.500(Ft.)
Downstream point elevation =   505.000(Ft.)
Flow length =   410.000(Ft.)
Travel time  =    4.55 min.
Time of concentration =   13.21 min.
Depth of flow =   0.194(Ft.)
Average velocity =   1.502(Ft/s)
Total irregular channel flow =     0.845(CFS)
Irregular channel normal depth above invert elev. =   0.194(Ft.)
Average velocity of channel(s) =   1.502(Ft/s)
 Adding area flow to channel
Rainfall intensity (I) =      4.225(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.225(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.357
Subarea runoff =      1.392(CFS) for      0.960(Ac.)
Total runoff =      1.508(CFS)  Total area =      1.020(Ac.)
Depth of flow =   0.241(Ft.), Average velocity =   1.736(Ft/s)
```

```
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1404.000 to Point/Station     1404.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________
Along Main Stream number: 1 in normal stream number 4
Stream flow area =      1.020(Ac.)
Runoff from this stream =      1.508(CFS)
Time of concentration =   13.21 min.
Rainfall intensity =     4.225(In/Hr)
Summary of stream data:

Stream   Flow rate      TC             Rainfall Intensity
 No.       (CFS)      (min)                     (In/Hr)


1        4.414     13.42              4.182
2        7.146      5.76              7.215
3        1.963      9.29              5.300
4        1.508     13.21              4.225
Qmax(1) =
       1.000 *    1.000 *      4.414) +
       0.580 *    1.000 *      7.146) +
       0.789 *    1.000 *      1.963) +
       0.990 *    1.000 *      1.508) + =      11.598
Qmax(2) =
       1.000 *    0.429 *      4.414) +
       1.000 *    1.000 *      7.146) +
       1.000 *    0.620 *      1.963) +
       1.000 *    0.436 *      1.508) + =      10.916
Qmax(3) =
       1.000 *    0.692 *      4.414) +
       0.735 *    1.000 *      7.146) +
       1.000 *    1.000 *      1.963) +
       1.000 *    0.703 *      1.508) + =      11.331
Qmax(4) =
       1.000 *    0.984 *      4.414) +
       0.586 *    1.000 *      7.146) +
       0.797 *    1.000 *      1.963) +
       1.000 *    1.000 *      1.508) + =      11.602

Total of 4 streams to confluence:
Flow rates before confluence point:
       4.414       7.146       1.963       1.508
Maximum flow rates at confluence using above data:
       11.598       10.916       11.331       11.602
Area of streams before confluence:
        1.740        1.246        0.420        1.020
Results of confluence:
Total flow rate =     11.602(CFS)
Time of concentration =    13.207 min.
Effective stream area after confluence =      4.426(Ac.)
End of computations, total study area =          4.426 (Ac.)
```

POC 4

PRE-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

    CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

    Rational method hydrology  program based on
    San Diego County Flood Control Division 2003 hydrology manual
        Rational Hydrology Study        Date: 03/15/21
    ------------------------------------------------------------------------




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

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


    Program License Serial Number 6332

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

    Map data precipitation entered:
    6 hour,  precipitation(inches) =  3.000
    24 hour precipitation(inches) =  5.200
    P6/P24 =    57.7%
    San Diego hydrology manual 'C' values used


    ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
    Process from Point/Station      301.000 to Point/Station      302.000
    **** INITIAL AREA EVALUATION ****
    ______________________________________________________________________
    Decimal fraction soil group A = 0.000
    Decimal fraction soil group B = 0.000
    Decimal fraction soil group C = 0.000
    Decimal fraction soil group D = 1.000
    [UNDISTURBED NATURAL TERRAIN                 ]
    (Permanent Open Space   )
    Impervious value, Ai = 0.000
    Sub-Area C Value = 0.350
    Initial subarea total flow distance  =  263.000(Ft.)
    Highest elevation =  501.800(Ft.)
    Lowest elevation =  492.600(Ft.)
    Elevation difference =    9.200(Ft.) Slope =  3.498 %
    INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
    The maximum overland flow distance is 100.00 (Ft)
    for the top area slope value of   3.50 %, in a development type of
     Permanent Open Space
    In Accordance With Figure 3-3
    Initial Area Time of Concentration =   8.89 minutes
    TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
    TC = [1.8*(1.1-0.3500)*( 100.000^.5)/(   3.500^(1/3)]=   8.89
    The initial area total distance of  263.00 (Ft.) entered leaves a
    remaining distance of  163.00 (Ft.)
    Using Figure 3-4, the travel time for this distance is   1.43 minutes
    for a distance of 163.00 (Ft.) and a slope of  3.50 %
    with an elevation difference of   5.71(Ft.) from the end of the top area
    Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
     =    1.434 Minutes
    Tt=[(11.9*0.0309^3)/(  5.71)]^.385=  1.43
    Total initial area Ti =   8.89 minutes from Figure 3-3 formula plus
      1.43 minutes from the Figure 3-4 formula =  10.33 minutes
```

```
Rainfall intensity (I) =      4.951(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.168(CFS)
Total initial stream area =        0.097(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      303.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   492.600(Ft.)
Downstream point elevation =   471.800(Ft.)
Channel length thru subarea  =   429.000(Ft.)
Channel base width  =    0.500(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      0.996(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.996(CFS)
Depth of flow =   0.228(Ft.), Average velocity =   6.014(Ft/s)
Channel flow top width =    0.955(Ft.)
Flow Velocity =    6.01(Ft/s)
Travel time  =    1.19 min.
Time of concentration =   11.51 min.
Critical depth =      0.383(Ft.)
 Adding area flow to channel
Rainfall intensity (I) =      4.615(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      4.615(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.381
Subarea runoff =      1.591(CFS) for      0.992(Ac.)
Total runoff =      1.759(CFS)  Total area =       1.089(Ac.)
Depth of flow =   0.310(Ft.), Average velocity =   7.013(Ft/s)
Critical depth =      0.520(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      302.000 to Point/Station      302.000
**** 6 HOUR HYDROGRAPH ****
______________________________________________________________________
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Hydrograph Data - Section 6, San Diego County Hydrology manual, June 2003


Time of Concentration =  11.51
Basin Area =     1.09 Acres
6 Hour Rainfall =  3.000 Inches
Runoff Coefficient =  0.350
Peak Discharge =     1.76 CFS
     Time (Min)     Discharge (CFS)
       0               0.000
       11               0.068
       22               0.069
       33               0.072
       44               0.074
       55               0.078
       66               0.080
```

```
          77                0.084
          88                0.086
          99                0.092
          110                0.095
          121                0.102
          132                0.105
          143                0.115
          154                0.120
          165                0.133
          176                0.141
          187                0.162
          198                0.175
          209                0.214
          220                0.244
          231                0.359
          242                0.505
          253                1.759
          264                0.288
          275                0.193
          286                0.151
          297                0.126
          308                0.110
          319                0.098
          330                0.089
          341                0.082
          352                0.076
          363                0.071
    +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
                       6 - H O U R    S T O R M
                  R u n o f f      H y d r o g r a p h
    ---------------------------------------------------------------------
               Hydrograph in   1   Minute intervals ((CFS))

    ---------------------------------------------------------------------
  Time(h+m) Volume Ac.Ft    Q(CFS)  0         0.4       0.9       1.3       1.8
  -----------------------------------------------------------------------
    0+ 0       0.0000      0.00  Q         |         |         |         |
    0+ 1       0.0000      0.01  Q         |         |         |         |
    0+ 2       0.0000      0.01  Q         |         |         |         |
    0+ 3       0.0001      0.02  Q         |         |         |         |
    0+ 4       0.0001      0.02  Q         |         |         |         |
    0+ 5       0.0001      0.03  Q         |         |         |         |
    0+ 6       0.0002      0.04  Q         |         |         |         |
    0+ 7       0.0002      0.04  Q         |         |         |         |
    0+ 8       0.0003      0.05  VQ        |         |         |         |
    0+ 9       0.0004      0.06  VQ        |         |         |         |
    0+10       0.0005      0.06  VQ        |         |         |         |
    0+11       0.0006      0.07  VQ        |         |         |         |
    0+12       0.0007      0.07  VQ        |         |         |         |
    0+13       0.0008      0.07  VQ        |         |         |         |
    0+14       0.0008      0.07  VQ        |         |         |         |
    0+15       0.0009      0.07  VQ        |         |         |         |
    0+16       0.0010      0.07  VQ        |         |         |         |
    0+17       0.0011      0.07  VQ        |         |         |         |
    0+18       0.0012      0.07  VQ        |         |         |         |
    0+19       0.0013      0.07  VQ        |         |         |         |
    0+20       0.0014      0.07  VQ        |         |         |         |
    0+21       0.0015      0.07  VQ        |         |         |         |
    0+22       0.0016      0.07  VQ        |         |         |         |
    0+23       0.0017      0.07  VQ        |         |         |         |
    0+24       0.0018      0.07  VQ        |         |         |         |
    0+25       0.0019      0.07  VQ        |         |         |         |
    0+26       0.0020      0.07  VQ        |         |         |         |
    0+27       0.0021      0.07  VQ        |         |         |         |
    0+28       0.0022      0.07  VQ        |         |         |         |
    0+29       0.0023      0.07  VQ        |         |         |         |
```

```
 0+30      0.0024      0.07  |Q          |          |          |          |
 0+31      0.0025      0.07  |Q          |          |          |          |
 0+32      0.0026      0.07  |Q          |          |          |          |
 0+33      0.0027      0.07  |Q          |          |          |          |
 0+34      0.0028      0.07  |Q          |          |          |          |
 0+35      0.0029      0.07  |Q          |          |          |          |
 0+36      0.0030      0.07  |Q          |          |          |          |
 0+37      0.0031      0.07  |Q          |          |          |          |
 0+38      0.0032      0.07  |Q          |          |          |          |
 0+39      0.0033      0.07  |Q          |          |          |          |
 0+40      0.0034      0.07  |Q          |          |          |          |
 0+41      0.0035      0.07  |Q          |          |          |          |
 0+42      0.0036      0.07  |Q          |          |          |          |
 0+43      0.0037      0.07  |Q          |          |          |          |
 0+44      0.0038      0.07  |Q          |          |          |          |
 0+45      0.0039      0.07  |Q          |          |          |          |
 0+46      0.0040      0.07  |Q          |          |          |          |
 0+47      0.0041      0.08  |Q          |          |          |          |
 0+48      0.0042      0.08  |Q          |          |          |          |
 0+49      0.0043      0.08  |Q          |          |          |          |
 0+50      0.0044      0.08  |Q          |          |          |          |
 0+51      0.0045      0.08  |Q          |          |          |          |
 0+52      0.0046      0.08  |Q          |          |          |          |
 0+53      0.0047      0.08  |QV         |          |          |          |
 0+54      0.0048      0.08  |QV         |          |          |          |
 0+55      0.0049      0.08  |QV         |          |          |          |
 0+56      0.0051      0.08  |QV         |          |          |          |
 0+57      0.0052      0.08  |QV         |          |          |          |
 0+58      0.0053      0.08  |QV         |          |          |          |
 0+59      0.0054      0.08  |QV         |          |          |          |
 1+ 0      0.0055      0.08  |QV         |          |          |          |
 1+ 1      0.0056      0.08  |QV         |          |          |          |
 1+ 2      0.0057      0.08  |QV         |          |          |          |
 1+ 3      0.0058      0.08  |QV         |          |          |          |
 1+ 4      0.0059      0.08  |QV         |          |          |          |
 1+ 5      0.0060      0.08  |QV         |          |          |          |
 1+ 6      0.0061      0.08  |QV         |          |          |          |
 1+ 7      0.0063      0.08  |QV         |          |          |          |
 1+ 8      0.0064      0.08  |QV         |          |          |          |
 1+ 9      0.0065      0.08  |QV         |          |          |          |
 1+10      0.0066      0.08  |QV         |          |          |          |
 1+11      0.0067      0.08  |QV         |          |          |          |
 1+12      0.0068      0.08  |QV         |          |          |          |
 1+13      0.0069      0.08  |QV         |          |          |          |
 1+14      0.0070      0.08  |Q V        |          |          |          |
 1+15      0.0072      0.08  |Q V        |          |          |          |
 1+16      0.0073      0.08  |Q V        |          |          |          |
 1+17      0.0074      0.08  |Q V        |          |          |          |
 1+18      0.0075      0.08  |Q V        |          |          |          |
 1+19      0.0076      0.08  |Q V        |          |          |          |
 1+20      0.0077      0.08  |Q V        |          |          |          |
 1+21      0.0078      0.08  |Q V        |          |          |          |
 1+22      0.0080      0.09  |Q V        |          |          |          |
 1+23      0.0081      0.09  |Q V        |          |          |          |
 1+24      0.0082      0.09  |Q V        |          |          |          |
 1+25      0.0083      0.09  |Q V        |          |          |          |
 1+26      0.0084      0.09  |Q V        |          |          |          |
 1+27      0.0086      0.09  |Q V        |          |          |          |
 1+28      0.0087      0.09  |Q V        |          |          |          |
 1+29      0.0088      0.09  |Q V        |          |          |          |
 1+30      0.0089      0.09  |Q V        |          |          |          |
 1+31      0.0090      0.09  |Q V        |          |          |          |
 1+32      0.0092      0.09  | QV        |          |          |          |
 1+33      0.0093      0.09  | QV        |          |          |          |
 1+34      0.0094      0.09  | Q V       |          |          |          |
 1+35      0.0095      0.09  | Q V       |          |          |          |
```

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    1+36       0.0097      0.09  | Q V     |         |         |         |
    1+37       0.0098      0.09  | Q V     |         |         |         |
    1+38       0.0099      0.09  | Q V     |         |         |         |
    1+39       0.0100      0.09  | Q V     |         |         |         |
    1+40       0.0102      0.09  | Q V     |         |         |         |
    1+41       0.0103      0.09  | Q V     |         |         |         |
    1+42       0.0104      0.09  | Q V     |         |         |         |
    1+43       0.0105      0.09  | Q V     |         |         |         |
    1+44       0.0107      0.09  | Q V     |         |         |         |
    1+45       0.0108      0.09  | Q V     |         |         |         |
    1+46       0.0109      0.09  | Q V     |         |         |         |
    1+47       0.0111      0.09  | Q V     |         |         |         |
    1+48       0.0112      0.09  | Q V     |         |         |         |
    1+49       0.0113      0.09  | Q V     |         |         |         |
    1+50       0.0114      0.09  | Q V     |         |         |         |
    1+51       0.0116      0.10  | Q V     |         |         |         |
    1+52       0.0117      0.10  | Q V     |         |         |         |
    1+53       0.0118      0.10  | Q  V    |         |         |         |
    1+54       0.0120      0.10  | Q  V    |         |         |         |
    1+55       0.0121      0.10  | Q  V    |         |         |         |
    1+56       0.0122      0.10  | Q  V    |         |         |         |
    1+57       0.0124      0.10  | Q  V    |         |         |         |
    1+58       0.0125      0.10  | Q  V    |         |         |         |
    1+59       0.0127      0.10  | Q  V    |         |         |         |
    2+ 0       0.0128      0.10  | Q  V    |         |         |         |
    2+ 1       0.0129      0.10  | Q  V    |         |         |         |
    2+ 2       0.0131      0.10  | Q  V    |         |         |         |
    2+ 3       0.0132      0.10  | Q  V    |         |         |         |
    2+ 4       0.0134      0.10  | Q  V    |         |         |         |
    2+ 5       0.0135      0.10  | Q  V    |         |         |         |
    2+ 6       0.0136      0.10  | Q  V    |         |         |         |
    2+ 7       0.0138      0.10  | Q  V    |         |         |         |
    2+ 8       0.0139      0.10  | Q  V    |         |         |         |
    2+ 9       0.0141      0.10  | Q   V   |         |         |         |
    2+10       0.0142      0.10  | Q   V   |         |         |         |
    2+11       0.0144      0.11  | Q   V   |         |         |         |
    2+12       0.0145      0.11  | Q   V   |         |         |         |
    2+13       0.0147      0.11  | Q   V   |         |         |         |
    2+14       0.0148      0.11  | Q   V   |         |         |         |
    2+15       0.0149      0.11  | Q   V   |         |         |         |
    2+16       0.0151      0.11  | Q   V   |         |         |         |
    2+17       0.0152      0.11  | Q   V   |         |         |         |
    2+18       0.0154      0.11  | Q   V   |         |         |         |
    2+19       0.0156      0.11  | Q   V   |         |         |         |
    2+20       0.0157      0.11  | Q   V   |         |         |         |
    2+21       0.0159      0.11  | Q   V   |         |         |         |
    2+22       0.0160      0.11  | Q   V   |         |         |         |
    2+23       0.0162      0.11  | Q   V   |         |         |         |
    2+24       0.0163      0.12  | Q   V   |         |         |         |
    2+25       0.0165      0.12  | Q    V  |         |         |         |
    2+26       0.0167      0.12  | Q    V  |         |         |         |
    2+27       0.0168      0.12  | Q    V  |         |         |         |
    2+28       0.0170      0.12  | Q    V  |         |         |         |
    2+29       0.0171      0.12  | Q    V  |         |         |         |
    2+30       0.0173      0.12  | Q    V  |         |         |         |
    2+31       0.0175      0.12  | Q    V  |         |         |         |
    2+32       0.0176      0.12  | Q    V  |         |         |         |
    2+33       0.0178      0.12  | Q    V  |         |         |         |
    2+34       0.0180      0.12  | Q    V  |         |         |         |
    2+35       0.0181      0.12  | Q    V  |         |         |         |
    2+36       0.0183      0.12  | Q    V  |         |         |         |
    2+37       0.0185      0.12  | Q    V  |         |         |         |
    2+38       0.0186      0.12  | Q    V  |         |         |         |
    2+39       0.0188      0.13  | Q     V |         |         |         |
    2+40       0.0190      0.13  | Q     V |         |         |         |
    2+41       0.0192      0.13  | Q     V |         |         |         |
```

```
2+42       0.0193      0.13   | Q     V |         |         |         |
2+43       0.0195      0.13   | Q     V |         |         |         |
2+44       0.0197      0.13   |  Q    V |         |         |         |
2+45       0.0199      0.13   |  Q    V |         |         |         |
2+46       0.0201      0.13   |  Q    V |         |         |         |
2+47       0.0203      0.13   |  Q    V |         |         |         |
2+48       0.0204      0.14   |  Q    V |         |         |         |
2+49       0.0206      0.14   |  Q    V |         |         |         |
2+50       0.0208      0.14   |  Q    V |         |         |         |
2+51       0.0210      0.14   |  Q    V |         |         |         |
2+52       0.0212      0.14   |  Q     V|         |         |         |
2+53       0.0214      0.14   |  Q     V|         |         |         |
2+54       0.0216      0.14   |  Q     V|         |         |         |
2+55       0.0218      0.14   |  Q     V|         |         |         |
2+56       0.0220      0.14   |  Q     V|         |         |         |
2+57       0.0222      0.14   |  Q     V|         |         |         |
2+58       0.0224      0.14   |  Q     V|         |         |         |
2+59       0.0226      0.15   |  Q     V|         |         |         |
3+ 0       0.0228      0.15   |  Q     V|         |         |         |
3+ 1       0.0230      0.15   |  Q     V|         |         |         |
3+ 2       0.0232      0.15   |  Q     V|         |         |         |
3+ 3       0.0234      0.15   |  Q     V|         |         |         |
3+ 4       0.0236      0.16   |  Q      V         |         |         |
3+ 5       0.0238      0.16   |  Q      V         |         |         |
3+ 6       0.0241      0.16   |  Q      V         |         |         |
3+ 7       0.0243      0.16   |  Q      V         |         |         |
3+ 8       0.0245      0.16   |  Q      V         |         |         |
3+ 9       0.0247      0.16   |  Q      V         |         |         |
3+10       0.0250      0.17   |  Q      V         |         |         |
3+11       0.0252      0.17   |  Q      V         |         |         |
3+12       0.0254      0.17   |  Q      V         |         |         |
3+13       0.0257      0.17   |  Q      V         |         |         |
3+14       0.0259      0.17   |  Q      |V        |         |         |
3+15       0.0261      0.17   |  Q      |V        |         |         |
3+16       0.0264      0.17   |  Q      |V        |         |         |
3+17       0.0266      0.17   |  Q      |V        |         |         |
3+18       0.0268      0.18   |  Q      |V        |         |         |
3+19       0.0271      0.18   |   Q     |V        |         |         |
3+20       0.0273      0.18   |   Q     |V        |         |         |
3+21       0.0276      0.19   |   Q     |V        |         |         |
3+22       0.0279      0.19   |   Q     |V        |         |         |
3+23       0.0281      0.19   |   Q     | V       |         |         |
3+24       0.0284      0.20   |   Q     | V       |         |         |
3+25       0.0287      0.20   |   Q     | V       |         |         |
3+26       0.0290      0.20   |   Q     | V       |         |         |
3+27       0.0292      0.21   |   Q     | V       |         |         |
3+28       0.0295      0.21   |   Q     | V       |         |         |
3+29       0.0298      0.21   |   Q     | V       |         |         |
3+30       0.0301      0.22   |   Q     | V       |         |         |
3+31       0.0304      0.22   |    Q    | V       |         |         |
3+32       0.0307      0.22   |    Q    |  V      |         |         |
3+33       0.0310      0.23   |    Q    |  V      |         |         |
3+34       0.0314      0.23   |    Q    |  V      |         |         |
3+35       0.0317      0.23   |    Q    |  V      |         |         |
3+36       0.0320      0.23   |    Q    |  V      |         |         |
3+37       0.0323      0.24   |    Q    |  V      |         |         |
3+38       0.0327      0.24   |    Q    |  V      |         |         |
3+39       0.0330      0.24   |    Q    |   V     |         |         |
3+40       0.0333      0.24   |    Q    |   V     |         |         |
3+41       0.0337      0.25   |    Q    |   V     |         |         |
3+42       0.0340      0.27   |     Q   |   V     |         |         |
3+43       0.0344      0.28   |     Q   |   V     |         |         |
3+44       0.0348      0.29   |     Q   |   V     |         |         |
3+45       0.0352      0.30   |     Q   |    V    |         |         |
3+46       0.0356      0.31   |     Q   |    V    |         |         |
3+47       0.0361      0.32   |      Q  |    V    |         |         |
```

```
3+48       0.0365      0.33  |      Q  |    V    |         |         |
3+49       0.0370      0.34  |      Q  |    V    |         |         |
3+50       0.0375      0.35  |      Q  |    V    |         |         |
3+51       0.0380      0.36  |       Q |     V   |         |         |
3+52       0.0385      0.37  |       Q |     V   |         |         |
3+53       0.0390      0.39  |       Q |     V   |         |         |
3+54       0.0396      0.40  |        Q|     V   |         |         |
3+55       0.0401      0.41  |        Q|      V  |         |         |
3+56       0.0407      0.43  |        Q|      V  |         |         |
3+57       0.0413      0.44  |        Q|      V  |         |         |
3+58       0.0419      0.45  |         Q      V  |         |         |
3+59       0.0426      0.47  |         Q       V |         |         |
4+ 0       0.0432      0.48  |         Q       V |         |         |
4+ 1       0.0439      0.49  |         |Q      V |         |         |
4+ 2       0.0446      0.51  |         |Q       V|         |         |
4+ 3       0.0455      0.62  |         |   Q    V|         |         |
4+ 4       0.0465      0.73  |         |     Q  V|         |         |
4+ 5       0.0476      0.85  |         |        QV         |         |
4+ 6       0.0490      0.96  |         |         VQ        |         |
4+ 7       0.0505      1.08  |         |         |V  Q     |         |
4+ 8       0.0521      1.19  |         |         | V    Q  |         |
4+ 9       0.0539      1.30  |         |         |  V     Q|         |
4+10       0.0558      1.42  |         |         |  V      | Q       |
4+11       0.0579      1.53  |         |         |   V     |   Q     |
4+12       0.0602      1.65  |         |         |    V    |      Q  |
4+13       0.0626      1.76  |         |         |     V   |         Q
4+14       0.0649      1.63  |         |         |      V  |     Q   |
4+15       0.0669      1.49  |         |         |       V |  Q      |
4+16       0.0688      1.36  |         |         |        VQ         |
4+17       0.0705      1.22  |         |         |      Q  V         |
4+18       0.0720      1.09  |         |         |   Q     V         |
4+19       0.0733      0.96  |         |         |Q        |V        |
4+20       0.0744      0.82  |         |       Q |         |V        |
4+21       0.0754      0.69  |         |    Q    |         | V       |
4+22       0.0762      0.56  |         | Q       |         | V       |
4+23       0.0767      0.42  |        Q|         |         | V       |
4+24       0.0771      0.29  |     Q   |         |         | V       |
4+25       0.0775      0.28  |     Q   |         |         |  V      |
4+26       0.0779      0.27  |     Q   |         |         |  V      |
4+27       0.0782      0.26  |    Q    |         |         |  V      |
4+28       0.0786      0.25  |    Q    |         |         |  V      |
4+29       0.0789      0.24  |    Q    |         |         |  V      |
4+30       0.0793      0.24  |    Q    |         |         |  V      |
4+31       0.0796      0.23  |    Q    |         |         |  V      |
4+32       0.0799      0.22  |   Q     |         |         |   V     |
4+33       0.0802      0.21  |   Q     |         |         |   V     |
4+34       0.0804      0.20  |   Q     |         |         |   V     |
4+35       0.0807      0.19  |   Q     |         |         |   V     |
4+36       0.0810      0.19  |   Q     |         |         |   V     |
4+37       0.0812      0.18  |   Q     |         |         |   V     |
4+38       0.0815      0.18  |   Q     |         |         |   V     |
4+39       0.0817      0.18  |   Q     |         |         |   V     |
4+40       0.0820      0.17  |  Q      |         |         |   V     |
4+41       0.0822      0.17  |  Q      |         |         |    V    |
4+42       0.0824      0.17  |  Q      |         |         |    V    |
4+43       0.0826      0.16  |  Q      |         |         |    V    |
4+44       0.0829      0.16  |  Q      |         |         |    V    |
4+45       0.0831      0.15  |  Q      |         |         |    V    |
4+46       0.0833      0.15  |  Q      |         |         |    V    |
4+47       0.0835      0.15  |  Q      |         |         |    V    |
4+48       0.0837      0.15  |  Q      |         |         |    V    |
4+49       0.0839      0.14  |  Q      |         |         |    V    |
4+50       0.0841      0.14  |  Q      |         |         |    V    |
4+51       0.0843      0.14  |  Q      |         |         |    V    |
4+52       0.0845      0.14  |  Q      |         |         |     V   |
4+53       0.0846      0.14  |  Q      |         |         |     V   |
```

```
   4+54       0.0848       0.13  |  Q      |         |         |     V   |
   4+55       0.0850       0.13  | Q       |         |         |     V   |
   4+56       0.0852       0.13  | Q       |         |         |     V   |
   4+57       0.0854       0.13  | Q       |         |         |     V   |
   4+58       0.0855       0.12  | Q       |         |         |     V   |
   4+59       0.0857       0.12  | Q       |         |         |     V   |
   5+ 0       0.0859       0.12  | Q       |         |         |     V   |
   5+ 1       0.0860       0.12  | Q       |         |         |     V   |
   5+ 2       0.0862       0.12  | Q       |         |         |     V   |
   5+ 3       0.0864       0.12  | Q       |         |         |     V   |
   5+ 4       0.0865       0.12  | Q       |         |         |     V   |
   5+ 5       0.0867       0.11  | Q       |         |         |      V  |
   5+ 6       0.0868       0.11  | Q       |         |         |      V  |
   5+ 7       0.0870       0.11  | Q       |         |         |      V  |
   5+ 8       0.0871       0.11  | Q       |         |         |      V  |
   5+ 9       0.0873       0.11  | Q       |         |         |      V  |
   5+10       0.0874       0.11  | Q       |         |         |      V  |
   5+11       0.0876       0.11  | Q       |         |         |      V  |
   5+12       0.0877       0.11  | Q       |         |         |      V  |
   5+13       0.0879       0.10  | Q       |         |         |      V  |
   5+14       0.0880       0.10  | Q       |         |         |      V  |
   5+15       0.0881       0.10  | Q       |         |         |      V  |
   5+16       0.0883       0.10  | Q       |         |         |      V  |
   5+17       0.0884       0.10  | Q       |         |         |      V  |
   5+18       0.0886       0.10  | Q       |         |         |      V  |
   5+19       0.0887       0.10  | Q       |         |         |      V  |
   5+20       0.0888       0.10  | Q       |         |         |      V  |
   5+21       0.0890       0.10  | Q       |         |         |      V  |
   5+22       0.0891       0.10  | Q       |         |         |       V |
   5+23       0.0892       0.09  | Q       |         |         |       V |
   5+24       0.0894       0.09  | Q       |         |         |       V |
   5+25       0.0895       0.09  | Q       |         |         |       V |
   5+26       0.0896       0.09  | Q       |         |         |       V |
   5+27       0.0897       0.09  | Q       |         |         |       V |
   5+28       0.0899       0.09  | Q       |         |         |       V |
   5+29       0.0900       0.09  | Q       |         |         |       V |
   5+30       0.0901       0.09  | Q       |         |         |       V |
   5+31       0.0902       0.09  | Q       |         |         |       V |
   5+32       0.0903       0.09  |Q        |         |         |       V |
   5+33       0.0905       0.09  |Q        |         |         |       V |
   5+34       0.0906       0.09  |Q        |         |         |       V |
   5+35       0.0907       0.09  |Q        |         |         |       V |
   5+36       0.0908       0.08  |Q        |         |         |       V |
   5+37       0.0909       0.08  |Q        |         |         |       V |
   5+38       0.0911       0.08  |Q        |         |         |       V |
   5+39       0.0912       0.08  |Q        |         |         |       V |
   5+40       0.0913       0.08  |Q        |         |         |       V |
   5+41       0.0914       0.08  |Q        |         |         |        V|
   5+42       0.0915       0.08  |Q        |         |         |        V|
   5+43       0.0916       0.08  |Q        |         |         |        V|
   5+44       0.0917       0.08  |Q        |         |         |        V|
   5+45       0.0918       0.08  |Q        |         |         |        V|
   5+46       0.0919       0.08  |Q        |         |         |        V|
   5+47       0.0921       0.08  |Q        |         |         |        V|
   5+48       0.0922       0.08  |Q        |         |         |        V|
   5+49       0.0923       0.08  |Q        |         |         |        V|
   5+50       0.0924       0.08  |Q        |         |         |        V|
   5+51       0.0925       0.08  |Q        |         |         |        V|
   5+52       0.0926       0.08  |Q        |         |         |        V|
   5+53       0.0927       0.08  |Q        |         |         |        V|
   5+54       0.0928       0.07  |Q        |         |         |        V|
   5+55       0.0929       0.07  |Q        |         |         |        V|
   5+56       0.0930       0.07  |Q        |         |         |        V|
   5+57       0.0931       0.07  |Q        |         |         |        V|
   5+58       0.0932       0.07  |Q        |         |         |        V|
   5+59       0.0933       0.07  |Q        |         |         |        V|
```

```
    6+ 0        0.0934       0.07  |Q         |         |         |       V|
    6+ 1        0.0935       0.07  |Q         |         |         |       V|
    6+ 2        0.0936       0.07  |Q         |         |         |       V|
    6+ 3        0.0937       0.07  |Q         |         |         |        V
----------------------------------------------------------------------




    End of computations, total study area =           1.089 (Ac.)
```

POC 4
POST-DEVELOPMENT

```
        San Diego County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c)1991-2019 Version 9.1

Rational method hydrology  program based on
San Diego County Flood Control Division 2003 hydrology manual
    Rational Hydrology Study        Date: 03/16/21
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 *********   Hydrology Study Control Information **********

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Program License Serial Number 6332

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

Map data precipitation entered:
6 hour,  precipitation(inches) =  3.000
24 hour precipitation(inches) =  5.200
P6/P24 =    57.7%
San Diego hydrology manual 'C' values used


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1801.000 to Point/Station     1802.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Initial subarea total flow distance  =   70.000(Ft.)
Highest elevation =  494.950(Ft.)
Lowest elevation =  489.000(Ft.)
Elevation difference =    5.950(Ft.) Slope =  8.500 %
Top 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
 4.3 DU/A or Less
In Accordance With Figure 3-3
Initial Area Time of Concentration =   5.22 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.5200)*( 100.000^.5)/(   8.000^(1/3)]=   5.22
Rainfall intensity (I) =      7.688(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.520
Subarea runoff =      0.240(CFS)
Total initial stream area =        0.060(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1802.000 to Point/Station     1803.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
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Top of street segment elevation =   489.000(Ft.)
End of street segment elevation =   478.200(Ft.)
Length of street segment  =   137.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  12.000(Ft.)
Distance from crown to crossfall grade break  =  10.500(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [2] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.025
Gutter width =   1.500(Ft.)
Gutter hike from flowline =  0.125(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      0.879(CFS)
Depth of flow =   0.057(Ft.), Average velocity =   3.356(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   3.817(Ft.)
Flow velocity =   3.36(Ft/s)
Travel time =    0.68 min.     TC =    5.90  min.
 Adding area flow to street
Rainfall intensity (I) =      7.104(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[MEDIUM DENSITY RESIDENTIAL                  ]
(4.3 DU/A or Less       )
Impervious value, Ai = 0.300
Sub-Area C Value = 0.520
Rainfall intensity =      7.104(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.520  CA =     0.239
Subarea runoff =      1.459(CFS) for      0.400(Ac.)
Total runoff =      1.699(CFS)  Total area =       0.460(Ac.)
Street flow at end of street =      1.699(CFS)
Half street flow at end of street =      0.850(CFS)
Depth of flow =   0.076(Ft.), Average velocity =   3.994(Ft/s)
Flow width (from curb towards crown)=   4.769(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1803.000 to Point/Station     1804.000
**** PIPEFLOW TRAVEL TIME (User specified size) ****

Upstream point/station elevation =   476.372(Ft.)
Downstream point/station elevation =   475.500(Ft.)
Pipe length  =    44.00(Ft.) Slope =   0.0198  Manning's N = 0.012
No. of pipes = 1  Required pipe flow  =     1.699(CFS)
Given pipe size =     12.00(In.)
Calculated individual pipe flow  =     1.699(CFS)
Normal flow depth in pipe =    4.61(In.)
Flow top width inside pipe =   11.67(In.)
Critical Depth =    6.65(In.)
Pipe flow velocity =      6.12(Ft/s)
Travel time through pipe =    0.12 min.
Time of concentration (TC) =     6.02 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1803.000 to Point/Station     1804.000
**** CONFLUENCE OF MINOR STREAMS ****
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```
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      0.460(Ac.)
Runoff from this stream =      1.699(CFS)
Time of concentration =    6.02 min.
Rainfall intensity =     7.012(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2101.000 to Point/Station     2102.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Initial subarea total flow distance  =  145.000(Ft.)
Highest elevation =  497.300(Ft.)
Lowest elevation =  493.740(Ft.)
Elevation difference =    3.560(Ft.) Slope =  2.455 %
Top of Initial Area Slope adjusted by User to  0.150 %
Bottom of Initial Area Slope adjusted by User to  0.150 %
INITIAL AREA TIME OF CONCENTRATION CALCULATIONS:
The maximum overland flow distance is 50.00 (Ft)
for the top area slope value of   0.15 %, in a development type of
 Permanent Open Space
In Accordance With Figure 3-3
Initial Area Time of Concentration =  17.97 minutes
TC = [1.8*(1.1-C)*distance(Ft.)^.5)/(% slope^(1/3)]
TC = [1.8*(1.1-0.3500)*(  50.000^.5)/(   0.150^(1/3)]=  17.97
The initial area total distance of  145.00 (Ft.) entered leaves a
remaining distance of   95.00 (Ft.)
Using Figure 3-4, the travel time for this distance is   3.18 minutes
for a distance of  95.00 (Ft.) and a slope of  0.15 %
with an elevation difference of   0.14(Ft.) from the end of the top area
Tt = [11.9*length(Mi)^3)/(elevation change(Ft.))]^.385 *60(min/hr)
 =    3.182 Minutes
Tt=[(11.9*0.0180^3)/(  0.14)]^.385=  3.18
Total initial area Ti =  17.97 minutes from Figure 3-3 formula plus
  3.18 minutes from the Figure 3-4 formula =  21.15 minutes
Rainfall intensity (I) =      3.118(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.350
Subarea runoff =      0.073(CFS)
Total initial stream area =        0.067(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2102.000 to Point/Station     2103.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   493.740(Ft.)
Downstream point elevation =   490.000(Ft.)
Channel length thru subarea  =    67.000(Ft.)
Channel base width  =    0.500(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Estimated mean flow rate at midpoint of channel =      0.098(CFS)
Manning's 'N'    = 0.015
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.098(CFS)
Depth of flow =   0.057(Ft.), Average velocity =   3.087(Ft/s)
Channel flow top width =    0.614(Ft.)
Flow Velocity =    3.09(Ft/s)
```

```
Travel time  =    0.36 min.
Time of concentration =   21.51 min.
Critical depth =      0.099(Ft.)
 Adding area flow to channel
Rainfall intensity (I) =      3.084(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Rainfall intensity =      3.084(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.039
Subarea runoff =      0.048(CFS) for      0.045(Ac.)
Total runoff =      0.121(CFS)  Total area =       0.112(Ac.)
Depth of flow =   0.065(Ft.), Average velocity =   3.318(Ft/s)
Critical depth =      0.113(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2103.000 to Point/Station     1804.000
**** IMPROVED CHANNEL TRAVEL TIME ****
______________________________________________________________________
Upstream point elevation =   490.000(Ft.)
Downstream point elevation =   477.090(Ft.)
Channel length thru subarea  =   247.000(Ft.)
Channel base width  =    0.500(Ft.)
Slope or 'Z' of left channel bank =   1.000
Slope or 'Z' of right channel bank =   1.000
Manning's 'N'    = 0.150
Maximum depth of channel  =    2.000(Ft.)
Flow(q) thru subarea =      0.121(CFS)
Depth of flow =   0.248(Ft.), Average velocity =   0.652(Ft/s)
Channel flow top width =    0.996(Ft.)
Flow Velocity =    0.65(Ft/s)
Travel time  =    6.32 min.
Time of concentration =   27.83 min.
Critical depth =      0.113(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     1804.000 to Point/Station     1804.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________
Rainfall intensity (I) =      2.612(In/Hr) for a   100.0 year storm
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
[UNDISTURBED NATURAL TERRAIN                 ]
(Permanent Open Space   )
Impervious value, Ai = 0.000
Sub-Area C Value = 0.350
Time of concentration =    27.83 min.
Rainfall intensity =      2.612(In/Hr) for a   100.0 year storm
Effective runoff coefficient used for total area
(Q=KCIA) is C = 0.350  CA =      0.092
Subarea runoff =      0.119(CFS) for      0.150(Ac.)
Total runoff =      0.240(CFS)  Total area =       0.262(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station     2103.000 to Point/Station     1804.000
```

```
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.262(Ac.)
Runoff from this stream =      0.240(CFS)
Time of concentration =   27.83 min.
Rainfall intensity =     2.612(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                 (In/Hr)


1        1.699      6.02             7.012
2        0.240     27.83             2.612
Qmax(1) =
       1.000 *    1.000 *     1.699) +
       1.000 *    0.216 *     0.240) + =       1.751
Qmax(2) =
       0.373 *    1.000 *     1.699) +
       1.000 *    1.000 *     0.240) + =       0.873

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.699       0.240
Maximum flow rates at confluence using above data:
        1.751        0.873
Area of streams before confluence:
        0.460        0.262
Results of confluence:
Total flow rate =      1.751(CFS)
Time of concentration =     6.020 min.
Effective stream area after confluence =      0.722(Ac.)
End of computations, total study area =          0.722 (Ac.)
```

End of Report

6.0 General Requirements

- Use this attachment to document all proposed (1) self-mitigating, (2) de minimis, and (3) self-retaining DMAs. Indicate under "DMA Compliance Option" below which design options will be used to satisfy structural performance requirements for one or more DMA.

DMA Compliance Option	Required Sub-attachments or Printouts	BMPDM Design Resources
☒ **Self-mitigating**	• Sub-attachment 6.1	• BMPDM Section 5.2.1
☐ **De minimis**	• Sub-attachment 6.2	• BMPDM Section 5.2.2
☒ **Self-retaining**[1]	• Sub-attachment 6.3	• BMPDM Section 5.2.3 (all options)
<u>**SSD-BMP Type(s)**</u>		
☐ **Impervious Area Dispersion**	• DCV calculations from SSD-BMP tool • Dispersion Areas calculations from SSD-BMP tool	• Fact Sheet SD-B (Appendix E.8) • Appendix I
☒ **Tree Wells**	• DCV calculations from SSD-BMP tool • Tree Well calculations from SSD-BMP tool	• Fact Sheet SD-A (Appendix E.7) • Appendix I

- Submit this cover page and all "Required Sub-attachments or Printouts" listed for each selected DMA compliance option.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Each constructed feature must <u>fully</u> satisfy the requirements described in these resources, and any other guidance identified by the County.
- <u>DMA Exhibits and Construction Plans</u>: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

[1] If "Self-retaining" is selected, also choose the types of Significant Site Design BMPs (SSD-BMPs) to be used. SSD-BMPs are Site Design BMPs that are sized and constructed to fully satisfy all applicable Structural Performance Standards for a DMA.

6.1 Self-mitigating DMAs (complete this page once for ALL self-mitigating DMAs)

Self-mitigating DMAs consist of natural or landscaped areas that drain directly offsite or to the public storm drain system. These DMAs are excluded from DCV calculations.

- Provide the information requested below for each proposed self-mitigating DMA. Add rows or copy the table if additional entries are needed.

DMA #	*a. DMA Area (ft²)*	*Incidental Impervious Area*		*Permit # and Sheet #*
		b. Size(ft²)	*c. % (b/a*100)*	
DMA-5	35,187	0	0	
DMA-6	20,250	0	0	
DMA-7	6,974	0	0	
DMA-8	13,406	0	0	
DMA-9	4,023	0	0	
DMA-10	8,674	0	0	

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required for all DMAs listed.
- "Incidental Impervious Area" calculations are required only where applicable (see below).
- Each self-mitigating DMA must <u>fully</u> satisfy all design requirements and restrictions described in BMPDM Section 5.2.1 and any other guidance or instruction identified by the County. Check the boxes below to confirm that all required conditions are satisfied <u>for every DMA listed</u>.

☒ Each DMA is hydraulically separate from other DMAs that contain permanent storm water pollutant control BMPs.

<u>Natural and Landscaped Areas</u>

☒ Each DMA consists solely of natural or landscaped areas, except for incidental impervious areas (see below).

☒ Each area drains directly offsite or to the public storm drain system.

☒ Soils are undisturbed native topsoil, or disturbed soils that have been amended and aerated to promote water retention characteristics equivalent to undisturbed native topsoil.

☒ Vegetation is native and/or non-native/non-invasive drought tolerant species that do not require regular application of fertilizers and pesticides.

<u>Incidental Impervious Areas (if applicable; see above)</u>

Minor impervious areas may be permitted within the DMA if they satisfy the following criteria:

☒ They are not hydraulically connected to other impervious areas (unless it is a storm water conveyance system such as a brow ditch).

☒ They comprise less than 5% of the total DMA. Calculate the % incidental impervious area in the table above (c= b/a). DMAs are <u>not</u> self-mitigating if this area is 5% or greater.

6.3 Self-retaining DMAs using Significant Site Design BMPs

Self-retaining DMAs use Site Design BMPs to fully-retain the entire DCV, at a minimum. Site Design BMPs that fully retain the DCV, at a minimum, therefore replacing the need for a Structural BMP (S-BMP), are classified as Significant Site Design BMPs (SSD-BMPs). To satisfy pollutant control requirements only, self-retaining means retention of the entire DCV. However, under some circumstances, a self-retaining DMA can also satisfy hydromodification management requirements by implementing BMPs that retain a greater volume of runoff.

- Provide the information requested below for each proposed self-retaining DMA. Add rows or copy the table if additional entries are needed.

DMA #	DMA Area (ft^2)	**BMP Type** (choose one per DMA)		*Permit # and Sheet #*
		Dispersion Area (Att. 6.3.1)	**Tree Wells (Att. 6.3.2)**	
DMA-4B	28,559	☐	☒	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	
		☐	☐	

- "DMA #", "DMA Area", and "Permit # and Sheet #" are required.
- Select one BMP Type per DMA. Provide detailed documentation for each DMA in Attachments 6.3.1 (Impervious Dispersion Areas) and/or 6.3.2 (Tree Wells) below.
- Each self-retaining DMA must <u>fully</u> satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, applicable BMPDM Appendix E Fact Sheets, BMPDM Appendix I, and any other guidance or instruction identified by the County.

6.3.2 Self-retaining DMAs with Tree Wells

Trees wells can provide a variety of benefits such as interception and increased infiltration of rainfall, reduced erosion, energy conservation, air quality improvement, and aesthetic enhancement. They can also be used to satisfy both pollutant control and hydromodification management performance standards for a DMA.

- Each self-retaining DMA with tree wells must fully satisfy all design requirements and restrictions described in BMPDM Section 5.2.3, Fact Sheet SD-A: Tree Wells, and any other guidance or instruction identified by the County.
- For pollutant control only, the DMA must retain the entire DCV. For hydromodification management, an additional volume must be retained in accordance with the sizing requirements presented in the DCV multiplier table in Fact Sheet SD-A.
- Documentation of compliance with applicable conditions must be submitted using the ***Summary Sheet for Self-retaining DMAs with Tree Wells*** on the next page. One version of this Summary Sheet must be completed for each applicable DMA.
- If both pollutant control and hydromodification standards apply, the soil depth of all tree wells in the DMA must be selected before determining the Required Retention Volume (RRV). Each tree well must be constructed to the selected depth. For pollutant control only, tree wells within a DMA may be constructed to different soil depths.
- In most cases tree wells must use Amended Soil per Fact Sheet SD-F. However, Structural Soil is required in some cases (e.g., placing the tree well next to a curb). See ***Structural Requirements for Confined Tree Well Soil Volume*** in Fact Sheet SD-A for additional explanation. If applicable, list the DMAs and Tree Well #s below for all tree wells requiring Structural Soil.

DMA #	Tree Wells Requiring Structural Soil (list Tree Well #s)

- The Design Capture Volume (DCV) must be known for each DMA in order to determine the volume to be mitigated by the tree wells. Instructions for DCV calculation are provided in BMPDM Appendix I.1. An automated version of Worksheet I.1 (Calculation of Design Capture Volume) is available at www.sandiegocounty.gov/stormwater under the Development Resources tab.

Summary Sheet for Self-retaining DMAs with Tree Wells

Attach Printouts from SSD-BMP tool below

- DCV calculations from SSD-BMP tool
- Tree Wells calculations from SSD-BMP tool

SSD-BMP Automated Worksheet I-1: Step 1. Calculation of Design Capture Volume (V1.0)				
Category	**#**	**Description**	*i*	**Units**
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	DMA-4B	unitless
	2	85th Percentile 24-hr Storm Depth	0.60	inches
	3	Is Hydromodification Control Applicable?	Yes	yes/no
	4	Impervious Surfaces <u>Not Directed to Dispersion Area</u> (C=0.90)	19,935	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)	8,624	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
SSD-BMPs Proposed	11	Does Tributary Incorporate Dispersion and/or Rain Barrels?		yes/no
	12	Does Tributary Incorporate Tree Wells?	Yes	yes/no
Dispersion Area & Rain Barrel Inputs (Optional)	13	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)		sq-ft
	14	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)		sq-ft
	15	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)		sq-ft
	16	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)		sq-ft
	17	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)		sq-ft
	18	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)		sq-ft
	19	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)		sq-ft
	20	Number of Rain Barrels Proposed per SD-E		#
	21	Average Rain Barrel Size		gal
Initial Runoff Factor Calculation	22	Total Tributary Area	28,559	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.66	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	unitless
	25	Initial Weighted Runoff Factor	0.66	unitless
	26	Initial Design Capture Volume	942	cubic-feet
Dispersion Area Adjustment & Rain Barrel Adjustment	27	Total Impervious Area Dispersed to Pervious Surface	0	sq-ft
	28	Total Pervious Dispersion Area	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area for DCV Reduction	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.66	unitless
	32	Design Capture Volume After Dispersion Techniques	942	cubic-feet
	33	Total Rain Barrel Volume Reduction	0	cubic-feet
Results	34	Final Adjusted Runoff Factor	0.66	unitless
	35	Final Effective Tributary Area	18,849	sq-ft
	36	Initial Design Capture Volume Retained by Dispersion Area and Rain Barrel(s)	0	cubic-feet
	37	Remaining Design Capture Volume Tributary to Tree Well(s)	942	cubic-feet

<u>No Warning Messages</u>

SSD-BMP Automated Worksheet I-3: Step 3. Tree Well Sizing (V1.0)				
Category	**#**	**Description**	***i***	**Units**
Standard Tree Well Inputs	1	Drainage Basin ID or Name	DMA-4B	unitless
	2	Design Capture Volume Tributary to BMP	942	cubic-feet
	3	Is Hydromodification Control Applicable?	Yes	yes/no
	4	Predominant NRCS Soil Type Within Tree Well(s) Location	D	unitless
	5	Select a Tree Species for the Tree Well(s) Consistent with SD-A Tree Palette Table Note: Numbers shown in list are Tree Species Mature Canopy Diameters	30' - Other	unitless
	6	Tree Well(s) Soil Depth (Installation Depth) Must be 30, 36, 42, or 48 Inches; Select from Standard Depths**	30	inches
	7	Number of Identical* Tree Wells Proposed for this DMA	7	trees
	8	Proposed Width of Tree Well(s) Soil Installation for One (1) Tree	25.0	feet
	9	Proposed Length of Tree Well(s) Soil Installation for One (1) Tree	25.0	feet
Tree Data	10	Botanical Name of Tree Species	Provide in PDP SWQMP	unitless
	11	Tree Species Mature Height per SD-A	Provide in PDP SWQMP	feet
	12	Tree Species Mature Canopy Diameter per SD-A	30	feet
	13	Minimum Soil Volume Required In Tree Well (2 Cubic Feet Per Square Foot of Mature Tree Canopy Projection Area)	1414	cubic-feet
	14	Credit Volume Per Tree	420	cubic-feet
Tree Well Sizing Calculations	15	DCV Multiplier To Meet Flow Control Requirements	2.90	unitless
	16	Required Retention Volume (RRV) To Meet Flow Control Requirements	2732	cubic-feet
	17	Number of Trees Required	7	trees
	18	Total Area of Tree Well Soil Required for Each Tree	565	sq-ft
	19	Approximate Required Width of Tree Well Soil Area for Each Tree	24	feet
	20	Approximate Required Length of Tree Well Soil Area for Each Tree	24	feet
	21	Number of Trees Proposed for this DMA	7	trees
	22	Total Area of Tree Well Soil Proposed for Each Tree	625	sq-ft
	23	Minimum Spacing Between Multiple Trees To Meet Soil Area Requirements (when applicable)***	30.0	feet
Results	24	Are Tree Well Soil Installation Requirements Met?	Yes	yes/no
	25	Is Remaining DCV Requirement Fully Satisfied by Tree Well(s)?	Yes	yes/no
	26	Is Hydromodification Control Requirement Satisfied by Tree Well(s)?	Yes	yes/no

Attention!

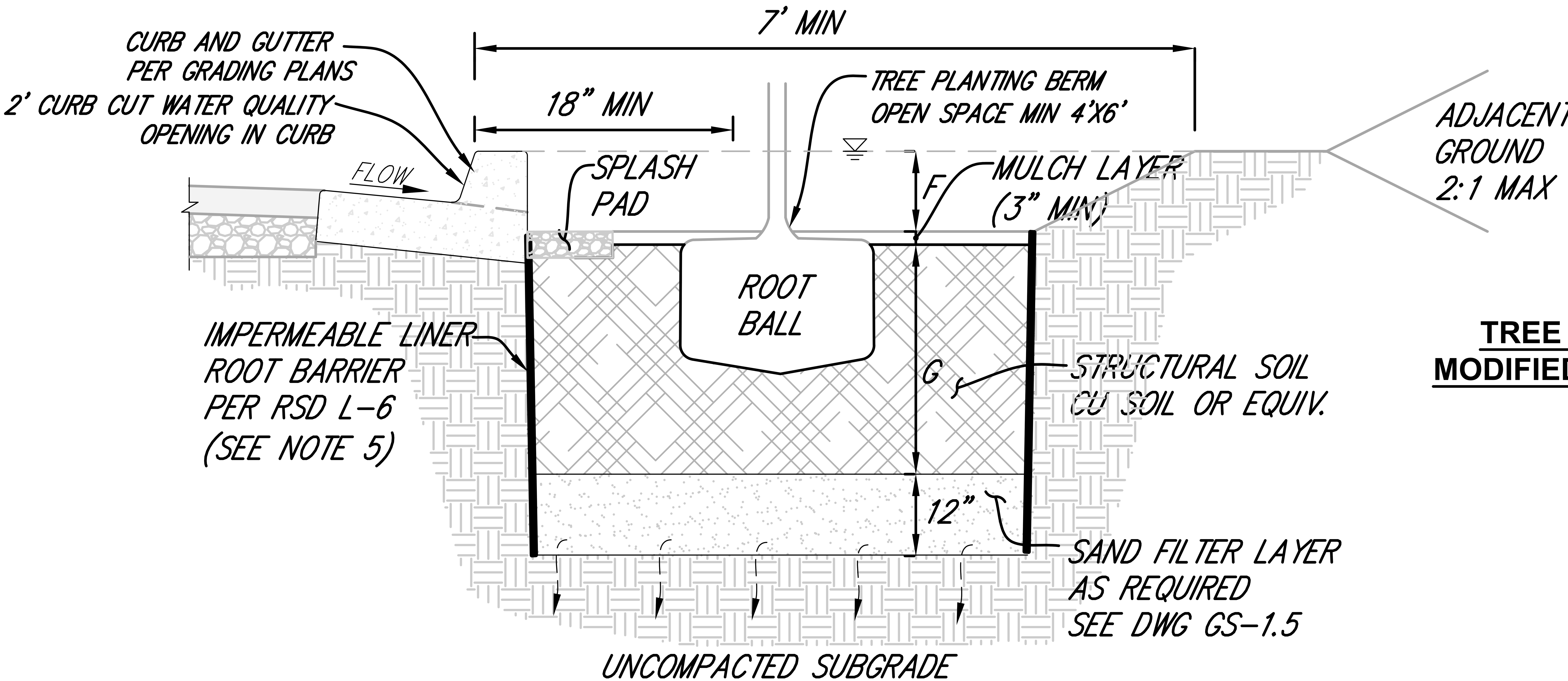
-[Line 12] Applicant to provide supporting documentation for tree species in PDP SWQMP.

Notes:

*If using more than one mature canopy diameter within the same DMA, only the smallest mature canopy diameter should be entered. Alternatively, if more than one ma

**If the actual proposed installation depth is not available in the table of standard depths, select the next lower depth.

***Tree Canopy or Agency Requirements May Also Influence the Minimum Spacing of Trees.



TREE WELL
MODIFIED GS-1.3b

7.0 General Requirements

- Submit this cover page and all required Sub-attachments for all structural BMPs proposed for the project.
- See the BMPDM sections and appendices listed under “BMPDM Design Resources” in the table below for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- PDPs subject to hydromodification management requirements must also implement structural BMPs for flow control for hydromodification management. Completion of SWQMP Attachment 8 is also required for these BMPs.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural BMPs documented this attachment and in Attachment 8 must be certified by a registered engineer in Sub-attachment 7.1.
- Structural BMP Verification. Structural BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)	**Requirement**	**BMPDM Design Resources**
☒ **7.1: Preparer’s Certification**	Required	• N/A
☒ **7.2: Structural BMP Strategy**	Required	• BMPDM Sections 5.1., 5.3, 5.4, and Chapter 6 • BMPDM Appendix E (pages E-78 through E-210)
☒ **7.3: Structural BMP Checklist(s)**	Required	
☒ **7.4: Stormwater Pollutant Control Worksheet Calculations**	Required	• BMPDM Appendix B
☐ **7.5: Identification and Narrative of Receiving Water and Pollutants of Concern**	Required if flow-thru BMPs are proposed	• N/A

7.1 Engineer of Work Certification for Structural BMPs

Project Name Questhaven 76 Lot Residential Subdivision
Permit Application Number PDS2020-TM-6343

CERTIFICATION

I hereby declare that I am the Engineer in Responsible Charge of design of structural 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 structural storm water BMPs for this project, of my responsibilities for their design.

☒ In addition to the structural pollutant control BMPs described in this attachment, this certification applies to the Structural Hydromodification Management BMPs described in Attachment 8 (check if applicable).

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

Robert D. Dentino
Print Name

Excel Engineering
Company

________________________ Engineer's Seal:
Date

7.2 Structural BMP Strategy

7.2.1 Narrative Strategy (Continue description on subsequent pages as necessary)

Describe the general strategy for structural BMP implementation at the project site. For pollutant control BMPs, your description must address the key points outlined in Section 5.1 of the BMP Design Manual, and the type of BMPs selected. For projects requiring hydromodification flow control BMPs, indicate whether pollutant control and flow control BMPs are integrated or separate.

The general strategy for structural BMP implementation on this project follows the steps outlined in the BMP manual (Manual) section 5.1 which refers to sections in appendix B of the Manual.

Step 1. Determine DCV per Appendix B.1

The first step in performing storm water pollutant control calculations is to calculate the Design Capture Volume (DCV). The DCV represents the volume of storm water runoff that must be retained and/or biofiltered in order to satisfy pollutant control requirements. The DCV is calculated through use of the automated worksheet (Worksheet B.1) which is part of the workbook provided by the County for this purpose:

(https://www.sandiegocounty.gov/content/dam/sdc/dpw/WATERSHED_PROTECTION_PROGRAM/watershedpdf/Dev_Sup/County_BMPDM_PC_Worksheet.xlsx) (County Workbook).

A. Determine rainfall depth per Appendix B.1.1.

The rainfall depth (D) used to calculate the DCV is determined through examination of the 85th percentile, 24-hour isopluvial map provided in Figure B.1-1 of the BMP Manual. The isopluvial map represents rainfall depths as blue line work provided at 0.02" intervals. Appropriate rainfall depths are determined by plotting the project location on the map, examining adjacent rainfall depths, and interpolating an appropriate depth to the nearest hundredth of an inch. The result is then entered into the appropriate field on Worksheet B.1.

B. Delineate tributary areas per Appendix B.1.2.

The entire project site is divided up into distinct tributary areas to each point of discharge from the site. All areas of the site that are intended to be developed with buildings or site improvements are delineated by their tributary area and available space to construct structural BMPs. BMPs must be sized to treat the DCV from the total area draining to the BMP, including any offsite or onsite areas that comingle with project runoff draining to the BMP. To minimize offsite flows treated by project BMPs, upgradient flows from offsite areas and self-treating cut and fill slopes are diverted around the developed portions of the project.

C. Determine runoff factors per Appendix B.1.3.

Runoff factors (C) represent the ratio of storm water runoff over rainfall that is anticipated for a particular surface type. Impervious surfaces typically have high runoff factors (0.90) as nearly all rainfall is converted into runoff. Pervious surfaces typically have low runoff factors (0.10) as much of the rainfall is retained in natural surface features. For each of the DMAs draining to structural BMPs, each DMA area is evaluated for the relative quantities of impervious surfaces (roofs, concrete, asphalt, etc.) and pervious surfaces (amended soils, landscaped areas, mulched areas). The respective areas are entered into Worksheet B.1 (County Workbook), and the worksheet calculates the respective weighted runoff factor. Dispersion Area Runoff Factor Adjustments are not considered for this project.

D. Determine site design volume reductions per Appendix B.1.4

Site design volume reductions (R) account for the effects of incorporating non-structural BMPs such as tree wells and rain barrels into the site design. Effective use of these site design elements can significantly reduce and/or completely eliminate the DCV requiring treatment through structural

BMP strategies. Tree wells designed per the SD-A fact sheet provide the volume reductions to the DCV of up to 420 cf/tree (30-foot tree canopy). Rain barrels provide less substantial effects. For the preliminary nature of this project, the use of volume reductions is not considered.

Step 2. Determine Retention Requirements Appendix B.2

The second step in performing storm water pollutant control calculations is to determine the retention requirements for each drainage area. Retention requirements are calculated through use of the automated Worksheet B.2 (County Workbook).

A. Determine if capture and use analysis is required per Appendix B.2.1

Projects that propose habitable structures over 9 stories tall are required to perform a capture and use analysis to identify whether the DCV from the project site can be utilized for onsite toilet flushing and/or irrigation within 36 hours of the storm. This project does not propose this type development, therefore Capture and Use is not required.

B. Evaluate infiltration restrictions per Appendix B.2.2

Infiltration Restrictions are listed in table B.2-1 of the Manual. Restriction elements are divided into Mandatory Considerations and Optional Considerations. Mandatory Considerations include elements that may pose a significant risk to human health and safety. These elements must always be evaluated and discretion regarding the setbacks is not permitted, unless supported by the recommendations of a geotechnical engineer. None of the mandatory considerations are applicable to this project. Optional Considerations include elements that are not necessarily associated with human health and safety, so analysis is not mandated. Even though not mandated, none of the optional considerations are applicable to this project.

C. Determine design infiltration rate per Appendix B.2.3

The design infiltration rate for each drainage area must be determined through either a basic or advanced analysis. The basic analysis allows for the use of a default design infiltration rate based on the predominant NRCS soil type present within the proposed BMP footprint. The basic analysis is not permitted for BMPs that lack an underdrain. The advanced analysis allows for a geotechnical engineer to assign a more specific design infiltration rate based on field testing. Table B.2-3 of the Manual identifies the design infiltration rates that can be used for each analysis. For this project all of the proposed BMPs are located in areas of type B soil and have no infiltration restrictions, therefore the basic design infiltration rate of 0.2 in/hr is used.

D. Determine retention requirements per Appendix B.2.4

Using the results from the previous discussion, the values are entered into Automated Worksheet B.2 (County Workbook). From this worksheet the required retention volume is read.

Step 3. Determine BMP Performance per Appendix B.3

The third step in performing stormwater pollutant control calculations is to design a structural BMP with the characteristics that provide stormwater treatment for the DCV and meet the minimum retention requirements for the drainage area.

A. Identify proposed BMP characteristics per Appendix B.3.1.

The performance of a BMP is a function of its retention and biofiltration processes, which are directly related to the proposed BMP geometry and design components. BMP geometries identify the area and depth over which retention and/or biofiltration processes occur. Critical BMP geometries include: BMP surface area, surface ponding depth, biofiltration soil media depth, gravel depth, underdrain depth, underdrain diameter and underdrain offset. BMP components dictate how retention and biofiltration processes occur over the BMP footprint. Critical BMP components include: vegetation vs no vegetation, standard biofiltration soil media vs non-standard biofiltration soil media, impermeable liner vs no impermeable liner, underdrain vs no underdrain, and design infiltration rates. By default, these BMPs must be sized to provide a surface area that is equal to at least 3% of the tributary effective impervious area. If a smaller BMP surface area is desired, the application must include additional calculations determining the required maintenance interval required to maintain BMP effectiveness. This project does not propose BMPs smaller than the 3% limit. The most common BMPs proposed for storm water compliance are infiltration BMPs, bioretention BMPs, and biofiltration BMPs. For this project the site layout, soil characteristics, and maintenance requirements were considered against the advantages and disadvantages of each of the common BMP options.

B. Calculate retention processes per Appendix B.3.2

BMP retention processes include infiltration and evapotranspiration occurring within the BMP.

Part 1) Is to determine the amount of infiltration in a 6 hour storm event.

Located on the on the county spreadsheet B.3 Line 18 is located the infiltration over a 6 hour time frame, some basins may not be infiltrating and those basins will have a "zero" listed in line 18.

Part 2) Of this section is in reference to the retention capacity of the bmp.

This item is characterized in the county's spreadsheet as well in terms of an efficiency of retention listed on line item 25.

C. Calculate biofiltration processes per Appendix B.3.3

Any portion of the DCV that has not been retained within site design or structural BMP elements must be biofiltered. BMP biofiltration processes include filtration, sedimentation, sorption, biochemical processes and/or vegetative uptake. This section presents how to calculate the biofiltration processes occurring within the proposed BMP.

Part 1) Determine the filtration rate (in/hr) of the proposed BMP.

This is the rate in which storm water biofilters through the BMP and exits through the underdrain. Filtration rates can be governed by characteristics of the biofiltration soil media or by flow restrictions experienced due to the design of the BMP underdrain/orifice. The soil infiltration rate can be seen in the County's spreadsheet on B.3 Line item 30.

Part 2) Determine the volume of biofiltration occurring within the BMP during a 6 hour storm event.

This volume is a function of the BMP filtration rate, BMP surface area, and the rainfall duration as shown below. The item can be found in the County's spreadsheet in B.3 from ((item 33)/12) * Line 8 and is built into the spreadsheet to check for efficiency.

Part 3) Determine the static biofiltration capacity of the BMP assuming it is entirely full.

This volume is a function of the BMP surface area and the effective biofiltration depth. This is located from Worksheet B.3 line 37 * Line 8

Part 4) Determine the drawdown time (hours) for surface ponding.

This is the ponding depth divided by the sum of the design infiltration rate and BMP filtration rate. Surface ponding depths of 24 hours or less are typically required; however, longer drawdown times up to 96 hours may be proposed if supported by a landscape architect/agronomist and no safety hazards are anticipated due to excessive

ponding. Surface ponding drawdown times over 96 hours are not permitted due to vector concerns. This item is located on worksheet B.3 item 11.

Part 5) Determine the efficacy of the biofiltration processes provided by the BMP.

This value represents the portion of the pollutant control standard that is satisfied through the biofiltration processes of the BMP. There are two options available for establishing the biofiltration performance standard. Applicants may select the option of their choice. Option 1 requires that the

BMP treat 1.5 times the portion of the DCV not reliably retained onsite (assuming a 6 hour routing period). Option 2 requires that the BMP treat 1.0 times the portion of the DCV not reliably retained onsite; and additionally check that the system has a total static (i.e., non-routed) storage volume, including pore spaces and pre-filter detention volume, equal to at least 0.75 times the portion of the DCV not reliably retained onsite. For option of 1.5 times the DCV see worksheet B.3 Line item 41
For option of 1.0 times the DCV with a static volume of 0.75 DCV see worksheet B.3 Line item 43.

Both items are calculated and the minimum value between the two is chosen to be used in the calculations.

D. Satisfaction of pollutant control requirements per Appendix B.3.4

The performance of a BMP with respect to the pollutant control performance standards is referred to as the BMP efficacy. Worksheet B.3 Line item 47 is the efficiency; if the efficiency is not at least 100% then changes to sizing parameter will need to be considered.

E. Satisfaction of minimum retention requirements per Appendix B.3.5

Minimum retention requirements can be satisfied by demonstrating that the all of the retention elements incorporated within a drainage area (rain barrels, tree wells, dispersion areas, and BMPs) retain a volume of water that is greater than or equal to what is required. Worksheet B.1 will provide areas that have been incorporated into any retention volumes for rain barrels and or tree wells (this project uses neither of these for this portion of the project). the remaining retention requirements are on Worksheet B.2 Retention Requirements. When incorporated into worksheet B.3 a box is Labeled as " "YES" or "NO" to determine if the requirements have been met. for this project all items are to be reflective of "YES" in the box.

7.2.2 Structural BMP Summary Table (Complete for all proposed structural BMPs)

- List and provide the information requested below for all pollutant control and hydromodification management BMPs proposed for the project.
- For each BMP listed, complete the Structural BMP Checklist on the next page. Copy the Checklist as many times as needed.

BMP ID #	DMA #	DMA Area (ft²)	Structural BMP Type: Harvest and Use	Infiltration	Unlined Biofiltration	Lined Biofiltration	Flow-thru treatment	Hydromodification Management [1]	Other	Permit # and Sheet #
BMP-A	BMP-A	449,103	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 3
BMP-B	BMP-B	484,822	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 2
BMP-C	BMP-C	75,359	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 2
BMP-D	BMP-D	17,424	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 2
BMP-E	BMP-E	18,731	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 2
BMP-F	BMP-F	106,286	☐	☐	☐	☒	☐	☒	☐	PDS2020-TM-6343 Sheet 2
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	
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			☐	☐	☐	☐	☐	☐	☐	
			☐	☐	☐	☐	☐	☐	☐	

Copy and Paste table here for additional BMPs

[1] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.3 Structural BMP Checklist (Complete once for each proposed structural BMP)

<table>
<tr><td>Structural BMP ID #</td><td>BMP-A</td><td>Permit # and Sheet #</td><td>PDS2020-TM-6343 Sheet 3</td></tr>
<tr><td colspan="4">BMP Type</td></tr>
<tr><td colspan="2">Infiltration
☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)
Unlined Biofiltration
☐ Biofiltration with partial retention (PR-1)
Lined Biofiltration
☒ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)</td><td colspan="2">Harvest and Use
☐ Cistern (HU-1)
Flow-thru Treatment (describe below)
☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance
Hydromodification Management[3]
☒ Detention pond or vault
☐ Other (describe below)</td></tr>
<tr><td colspan="4">BMP Purpose</td></tr>
<tr><td colspan="2">☐ Pollutant control only
☐ Hydromodification control only
☒ Combined pollutant control and hydromodification</td><td colspan="2">☐ Pre-treatment/forebay for another BMP
☐ Other (describe below)</td></tr>
<tr><td colspan="4">BMP Verification (See BMPDM Section 8.3)</td></tr>
<tr><td colspan="2">Provide name and contact information for the party responsible to sign BMP verification forms</td><td colspan="2">Robert D. Dentino, PE
(760) 745-8188</td></tr>
<tr><td colspan="4">BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)</td></tr>
<tr><td colspan="2">BMP Maintenance Category</td><td colspan="2">Cat. 1 ☐   Cat. 2 ☒   Cat. 3 ☐   Cat. 4 ☐</td></tr>
<tr><td colspan="2">Final owner of BMP</td><td colspan="2">☒ HOA   ☐ Property Owner   ☐ County
☐ Other (describe):</td></tr>
<tr><td colspan="2">Maintenance of BMP into perpetuity</td><td colspan="2">☒ HOA   ☐ Property Owner   ☐ County
☐ Other (describe):</td></tr>
<tr><td colspan="4">Discussion (As needed; Continue on subsequent pages as necessary)
The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.</td></tr>
</table>

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BMP-B	Permit # and Sheet #	PDS2020-TM-6343 Sheet 2
BMP Type			
Infiltration ☐ Infiltration basin (INF-1) ☐ Bioretention (INF-2) ☐ Permeable pavement (INF-3) **Unlined Biofiltration** ☐ Biofiltration with partial retention (PR-1) **Lined Biofiltration** ☒ Biofiltration (BF-1) ☐ Nutrient Sensitive Media Design (BF-2) ☐ Proprietary Biofiltration (BF-3)		**Harvest and Use** ☐ Cistern (HU-1) **Flow-thru Treatment** (describe below) ☐ With prior lawful approval to meet earlier PDP requirements ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2] ☐ With alternative compliance **Hydromodification Management**[3] ☒ Detention pond or vault ☐ **Other** (describe below)	
BMP Purpose			
☐ Pollutant control only ☐ Hydromodification control only ☒ Combined pollutant control and hydromodification		☐ Pre-treatment/forebay for another BMP ☐ Other (describe below)	
BMP Verification (See BMPDM Section 8.3)			
Provide name and contact information for the party responsible to sign BMP verification forms	Robert D. Dentino, PE (760) 745-8188		
BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)			
BMP Maintenance Category	Cat. 1 ☐ Cat. 2 ☒ Cat. 3 ☐ Cat. 4 ☐		
Final owner of BMP	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe):		
Maintenance of BMP into perpetuity	☒ HOA ☐ Property Owner ☐ County ☐ Other (describe):		
Discussion (As needed; Continue on subsequent pages as necessary)			
The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.			

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

<table>
<tr><td>Structural BMP ID #</td><td>BMP-C</td><td>Permit # and Sheet #</td><td colspan="2">PDS2020-TM-6343 Sheet 2</td></tr>
<tr><td colspan="5">BMP Type</td></tr>
<tr><td colspan="2">Infiltration
☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)
Unlined Biofiltration
☐ Biofiltration with partial retention (PR-1)
Lined Biofiltration
☒ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)</td><td colspan="3">Harvest and Use
☐ Cistern (HU-1)
Flow-thru Treatment (describe below)
☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance
Hydromodification Management[3]
☒ Detention pond or vault
☐ Other (describe below)</td></tr>
<tr><td colspan="5">BMP Purpose</td></tr>
<tr><td colspan="2">☐ Pollutant control only
☐ Hydromodification control only
☒ Combined pollutant control and hydromodification</td><td colspan="3">☐ Pre-treatment/forebay for another BMP
☐ Other (describe below)</td></tr>
<tr><td colspan="5">BMP Verification (See BMPDM Section 8.3)</td></tr>
<tr><td>Provide name and contact information for the party responsible to sign BMP verification forms</td><td colspan="4">Robert D. Dentino, PE
(760) 745-8188</td></tr>
<tr><td colspan="5">BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)</td></tr>
<tr><td>BMP Maintenance Category</td><td>Cat. 1
☐</td><td>Cat. 2
☒</td><td>Cat. 3
☐</td><td>Cat. 4
☐</td></tr>
<tr><td>Final owner of BMP</td><td colspan="4">☒ HOA ☐ Property Owner ☐ County
☐ Other (describe):</td></tr>
<tr><td>Maintenance of BMP into perpetuity</td><td colspan="4">☒ HOA ☐ Property Owner ☐ County
☐ Other (describe):</td></tr>
<tr><td colspan="5">Discussion (As needed; Continue on subsequent pages as necessary)
The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.</td></tr>
</table>

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

<table>
<tr><td>Structural BMP ID #</td><td>BMP-D</td><td>Permit # and Sheet #</td><td>PDS2020-TM-6343 Sheet 2</td></tr>
<tr><td colspan="4">BMP Type</td></tr>
<tr><td colspan="2">Infiltration
☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)
Unlined Biofiltration
☐ Biofiltration with partial retention (PR-1)
Lined Biofiltration
☒ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)</td><td colspan="2">Harvest and Use
☐ Cistern (HU-1)
Flow-thru Treatment (describe below)
☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance
Hydromodification Management[3]
☒ Detention pond or vault
☐ Other (describe below)</td></tr>
<tr><td colspan="4">BMP Purpose</td></tr>
<tr><td colspan="2">☐ Pollutant control only
☐ Hydromodification control only
☒ Combined pollutant control and hydromodification</td><td colspan="2">☐ Pre-treatment/forebay for another BMP
☐ Other (describe below)</td></tr>
<tr><td colspan="4">BMP Verification (See BMPDM Section 8.3)</td></tr>
<tr><td>Provide name and contact information for the party responsible to sign BMP verification forms</td><td colspan="3">Robert D. Dentino, PE
(760) 745-8188</td></tr>
<tr><td colspan="4">BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)</td></tr>
<tr><td>BMP Maintenance Category</td><td colspan="3">Cat. 1 ☐   Cat. 2 ☒   Cat. 3 ☐   Cat. 4 ☐</td></tr>
<tr><td>Final owner of BMP</td><td colspan="3">☒ HOA   ☐ Property Owner   ☐ County
☐ Other (describe):</td></tr>
<tr><td>Maintenance of BMP into perpetuity</td><td colspan="3">☒ HOA   ☐ Property Owner   ☐ County
☐ Other (describe):</td></tr>
<tr><td colspan="4">Discussion (As needed; Continue on subsequent pages as necessary)
The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.</td></tr>
</table>

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BMP-E	Permit # and Sheet #	PDS2020-TM-6343 Sheet 2

BMP Type

Infiltration
- ☐ Infiltration basin (INF-1)
- ☐ Bioretention (INF-2)
- ☐ Permeable pavement (INF-3)

Unlined Biofiltration
- ☐ Biofiltration with partial retention (PR-1)

Lined Biofiltration
- ☒ Biofiltration (BF-1)
- ☐ Nutrient Sensitive Media Design (BF-2)
- ☐ Proprietary Biofiltration (BF-3)

Harvest and Use
- ☐ Cistern (HU-1)

Flow-thru Treatment (describe below)
- ☐ With prior lawful approval to meet earlier PDP requirements
- ☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
- ☐ With alternative compliance

Hydromodification Management[3]
- ☒ Detention pond or vault

☐ **Other** (describe below)

BMP Purpose
- ☐ Pollutant control only
- ☐ Hydromodification control only
- ☒ Combined pollutant control and hydromodification
- ☐ Pre-treatment/forebay for another BMP
- ☐ Other (describe below)

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Robert D. Dentino, PE (760) 745-8188

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):
Maintenance of BMP into perpetuity	☒ HOA	☐ Property Owner	☐ County	☐ Other (describe):

Discussion (As needed; Continue on subsequent pages as necessary)

The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.

[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

Structural BMP ID #	BMP-F	**Permit # and Sheet #**	PDS2020-TM-6343 Sheet 2

BMP Type

Infiltration

☐ Infiltration basin (INF-1)
☐ Bioretention (INF-2)
☐ Permeable pavement (INF-3)

Unlined Biofiltration

☐ Biofiltration with partial retention (PR-1)

Lined Biofiltration

☒ Biofiltration (BF-1)
☐ Nutrient Sensitive Media Design (BF-2)
☐ Proprietary Biofiltration (BF-3)

Harvest and Use

☐ Cistern (HU-1)

Flow-thru Treatment (describe below)

☐ With prior lawful approval to meet earlier PDP requirements
☐ Pre-treatment/forebay for an onsite retention or biofiltration BMP[2]
☐ With alternative compliance

Hydromodification Management[3]

☒ Detention pond or vault

☐ **Other** (describe below)

BMP Purpose

☐ Pollutant control only
☐ Hydromodification control only
☒ Combined pollutant control and hydromodification
☐ Pre-treatment/forebay for another BMP
☐ Other (describe below)

BMP Verification (See BMPDM Section 8.3)

Provide name and contact information for the party responsible to sign BMP verification forms	Robert D. Dentino, PE (760) 745-8188

BMP Ownership and Maintenance (See BMPDM Section 7.3 and Attachment 11)

BMP Maintenance Category	Cat. 1 ☐	Cat. 2 ☒	Cat. 3 ☐	Cat. 4 ☐
Final owner of BMP	☒ HOA ☐ Other (describe):	☐ Property Owner	☐ County	
Maintenance of BMP into perpetuity	☒ HOA ☐ Other (describe):	☐ Property Owner	☐ County	

Discussion (As needed; Continue on subsequent pages as necessary)

The BMP is a biofiltration unit sized and designed to provide stormwater treatment, hydromodification mitigation, and flood control peak flow mitigation functions.

[2] Indicate which onsite retention or biofiltration BMP the pre-treatment/forebay serves.
[3] Hydromodification Management BMPs must be accompanied by BMPs that provide pollutant control.

7.4 Storm Water Pollutant Control Worksheet Calculations

- Use this page as a cover sheet for the submittal of any required worksheets below.
- Complete the checklist to identify which BMPDM Appendix B (Storm Water Pollutant Control Hydrologic Calculations and Sizing Methods) worksheets are included with this attachment.
- See BMPDM Appendix B for an explanation of the applicability of individual worksheets and detailed guidance on their completion.

Worksheet	Requirement
☒ Worksheet B.1 Calculation of Design Capture Volume (DCV)	Required
☒ Worksheet B.2 Retention Requirements	Required
☒ Worksheet B.3 BMP Performance	Required
☐ Worksheet B.4 Major Maintenance Intervals for Reduced-sized BMPs	If applicable
☐ Other worksheets	As required

Questhaven Impervious Area Calulations

		TOTAL DMA AREA	PAVEMENT	# LOTS	TOTAL LOT IMPERVIOUS AREA*	SUM:IMPERVIOUS	TOTAL PERVIOUS AREA	PERCENT IMPERVIOUS
		SQFT	SQFT	EA	SQFT	SQFT	SQFT	%
BMP-A	DMA-1	449,128	53,883	30	150,000	203,883	245,244	45.4%
BMP-B	DMA-3	484,970	53,221	33	165,000	218,221	266,748	45.0%
BMP-C	DMA-2	75,232	8,584	6	30,000	38,584	36,648	51.3%
BMP-D	DMA-4A	17,480	17,480	0	0	17,480	0	100.0%
BMP-E	DMA-11	18,784	5,328	0	0	5,328	13,456	28.4%
BMP-F	DMA-12	106,885	12,106	7	35,000	47,106	59,779	44.1%

***Assuming each lot will have one 5,000 sqft of additional impervious area**

Automated Worksheet B.1: Calculation of Design Capture Volume (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	Units
Standard Drainage Basin Inputs	1	Drainage Basin ID or Name	BMP-A	BMP-B	BMP-C	BMP-D	BMP-E	BMP-F	unitless
	2	85th Percentile 24-hr Storm Depth	0.60	0.60	0.60	0.60	0.60	0.60	inches
	3	Impervious Surfaces Not Directed to Dispersion Area (C=0.90)	203,883	219,221	38,584	17,480	5,328	47,106	sq-ft
	4	Semi-Pervious Surfaces Not Serving as Dispersion Area (C=0.30)							sq-ft
	5	Engineered Pervious Surfaces Not Serving as Dispersion Area (C=0.10)	245,244	266,748	36,648	0	13,456	59,779	sq-ft
	6	Natural Type A Soil Not Serving as Dispersion Area (C=0.10)							sq-ft
	7	Natural Type B Soil Not Serving as Dispersion Area (C=0.14)							sq-ft
	8	Natural Type C Soil Not Serving as Dispersion Area (C=0.23)							sq-ft
	9	Natural Type D Soil Not Serving as Dispersion Area (C=0.30)							sq-ft
Dispersion Area, Tree Well & Rain Barrel Inputs (Optional)	10	Does Tributary Incorporate Dispersion, Tree Wells, and/or Rain Barrels?	No	No	No	No	No	No	yes/no
	11	Impervious Surfaces **Directed to Dispersion Area** per SD-B (Ci=0.90)							sq-ft
	12	Semi-Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.30)							sq-ft
	13	Engineered Pervious Surfaces **Serving as Dispersion Area** per SD-B (Ci=0.10)							sq-ft
	14	Natural Type A Soil **Serving as Dispersion Area** per SD-B (Ci=0.10)							sq-ft
	15	Natural Type B Soil **Serving as Dispersion Area** per SD-B (Ci=0.14)							sq-ft
	16	Natural Type C Soil **Serving as Dispersion Area** per SD-B (Ci=0.23)							sq-ft
	17	Natural Type D Soil **Serving as Dispersion Area** per SD-B (Ci=0.30)							sq-ft
	18	Number of Tree Wells Proposed per SD-A							#
	19	Average Mature Tree Canopy Diameter							ft
	20	Number of Rain Barrels Proposed per SD-E							#
	21	Average Rain Barrel Size							gal
Initial Runoff Factor Calculation	22	Total Tributary Area	449,127	485,969	75,232	17,480	18,784	106,885	sq-ft
	23	Initial Runoff Factor for Standard Drainage Areas	0.46	0.46	0.51	0.90	0.33	0.45	unitless
	24	Initial Runoff Factor for Dispersed & Dispersion Areas	0.00	0.00	0.00	0.00	0.00	0.00	unitless
	25	Initial Weighted Runoff Factor	0.46	0.46	0.51	0.90	0.33	0.45	unitless
	26	Initial Design Capture Volume	10,330	11,177	1,918	787	310	2,405	cubic-feet
Dispersion Area Adjustments	27	Total Impervious Area Dispersed to Pervious Surface	0	0	0	0	0	0	sq-ft
	28	Total Pervious Dispersion Area	0	0	0	0	0	0	sq-ft
	29	Ratio of Dispersed Impervious Area to Pervious Dispersion Area	n/a	n/a	n/a	n/a	n/a	n/a	ratio
	30	Adjustment Factor for Dispersed & Dispersion Areas	1.00	1.00	1.00	1.00	1.00	1.00	ratio
	31	Runoff Factor After Dispersion Techniques	0.46	0.46	0.51	0.90	0.33	0.45	unitless
	32	Design Capture Volume After Dispersion Techniques	10,330	11,177	1,918	787	310	2,405	cubic-feet
Tree & Barrel Adjustments	33	Total Tree Well Volume Reduction	0	0	0	0	0	0	cubic-feet
	34	Total Rain Barrel Volume Reduction	0	0	0	0	0	0	cubic-feet
Results	35	Final Adjusted Runoff Factor	0.46	0.46	0.51	0.90	0.33	0.45	unitless
	36	Final Effective Tributary Area	206,598	223,546	38,368	15,732	6,199	48,098	sq-ft
	37	Initial Design Capture Volume Retained by Site Design Elements	0	0	0	0	0	0	cubic-feet
	38	Final Design Capture Volume Tributary to BMP	10,330	11,177	1,918	787	310	2,405	cubic-feet

No Warning Messages

Automated Worksheet B.2: Retention Requirements (V2.0)

Category	#	Description	*i*	*ii*	*iii*	*iv*	*v*	*vi*	*vii*	*viii*	*ix*	*x*	Units
Basic Analysis	1	Drainage Basin ID or Name	BMP-A	BMP-B	BMP-C	BMP-D	BMP-E	BMP-F	-	-	-	-	unitless
	2	85th Percentile Rainfall Depth	0.60	0.60	0.60	0.60	0.60	0.60	-	-	-	-	inches
	3	Predominant NRCS Soil Type Within BMP Location	D	D	D	D	D	D					unitless
	4	Is proposed BMP location Restricted or Unrestricted for Infiltration Activities?	Restricted	Restricted	Restricted	Restricted	Restricted	Restricted					unitless
	5	Nature of Restriction	Soil Type	Soil Type	Soil Type	Soil Type	Soil Type	Soil Type					unitless
	6	Do Minimum Retention Requirements Apply to this Project?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	yes/no
	7	Are Habitable Structures Greater than 9 Stories Proposed?	No	No	No	No	No	No					yes/no
Advanced Analysis	8	Has Geotechnical Engineer Performed an Infiltration Analysis?	No	No	No	No	No	No					yes/no
	9	Design Infiltration Rate Recommended by Geotechnical Engineer	~~0.020~~	~~0.020~~	~~0.020~~	~~0.020~~	~~0.020~~	~~0.020~~					in/hr
Result	10	Design Infiltration Rate Used To Determine Retention Requirements	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	11	Percent of Average Annual Runoff that Must be Retained within DMA	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	-	-	-	-	percentage
	12	Fraction of DCV Requiring Retention	0.02	0.02	0.02	0.02	0.02	0.02	-	-	-	-	ratio
	13	Required Retention Volume	207	224	38	16	6	48	-	-	-	-	cubic-feet

No Warning Messages

Automated Worksheet B.3: BMP Performance (V2.0)

Category	#	Description	i	ii	iii	iv	v	vi	vii	viii	ix	x	Units
BMP Inputs	1	Drainage Basin ID or Name	BMP-A	BMP-B	BMP-C	BMP-D	BMP-E	BMP-F	-	-	-	-	sq-ft
	2	Design Infiltration Rate Recommended	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	in/hr
	3	Design Capture Volume Tributary to BMP	10,330	11,177	1,918	787	310	2,405	-	-	-	-	cubic-feet
	4	Is BMP Vegetated or Unvegetated?	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated	Vegetated					unitless
	5	Is BMP Impermeably Lined or Unlined?	Lined	Lined	Lined	Lined	Lined	Lined					unitless
	6	Does BMP Have an Underdrain?	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain	Underdrain					unitless
	7	Does BMP Utilize Standard or Specialized Media?	Standard	Standard	Standard	Standard	Standard	Standard					unitless
	8	Provided Surface Area	17,236	10,862	1,486	597	2,189	4,691					sq-ft
	9	Provided Surface Ponding Depth	6	6	6	6	6	6					inches
	10	Provided Soil Media Thickness	21	21	21	21	21	21					inches
	11	Provided Gravel Thickness (Total Thickness)	18	15	15	18	15	18					inches
	12	Underdrain Offset	3	3	3	3	3	3					inches
	13	Diameter of Underdrain or Hydromod Orifice (Select Smallest)	1.50	1.50	0.75	0.75	1.00	1.00					inches
	14	Specialized Soil Media Filtration Rate											in/hr
	15	Specialized Soil Media Pore Space for Retention											unitless
	16	Specialized Soil Media Pore Space for Biofiltration											unitless
	17	Specialized Gravel Media Pore Space											unitless
Retention Calculations	18	Volume Infiltrated Over 6 Hour Storm	0	0	0	0	0	0	0	0	0	0	cubic-feet
	19	Ponding Pore Space Available for Retention	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	unitless
	20	Soil Media Pore Space Available for Retention	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	unitless
	21	Gravel Pore Space Available for Retention (Above Underdrain)	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.40	0.40	0.40	unitless
	22	Gravel Pore Space Available for Retention (Below Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	23	Effective Retention Depth	2.25	2.25	2.25	2.25	2.25	2.25	0.00	0.00	0.00	0.00	inches
	24	Fraction of DCV Retained (Independent of Drawdown Time)	0.31	0.18	0.15	0.14	1.32	0.37	0.00	0.00	0.00	0.00	ratio
	25	Calculated Retention Storage Drawdown Time	120	120	120	120	120	120	0	0	0	0	hours
	26	Efficacy of Retention Processes	0.32	0.20	0.17	0.16	0.87	0.37	0.00	0.00	0.00	0.00	ratio
	27	Volume Retained by BMP (Considering Drawdown Time)	3,255	2,247	328	127	271	881	0	0	0	0	cubic-feet
	28	Design Capture Volume Remaining for Biofiltration	7,075	8,930	1,590	660	39	1,524	0	0	0	0	cubic-feet
Biofiltration Calculations	29	Max Hydromod Flow Rate through Underdrain	0.1096	0.1055	0.0265	0.0275	0.0470	0.0488	0.0000	0.0000	0.0000	0.0000	cfs
	30	Max Soil Filtration Rate Allowed by Underdrain Orifice	0.27	0.42	0.77	1.99	0.93	0.45	0.00	0.00	0.00	0.00	in/hr
	31	Soil Media Filtration Rate per Specifications	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	in/hr
	32	Soil Media Filtration Rate to be used for Sizing	0.27	0.42	0.77	1.99	0.93	0.45	0.00	0.00	0.00	0.00	in/hr
	33	Depth Biofiltered Over 6 Hour Storm	1.65	2.52	4.62	11.95	5.57	2.70	0.00	0.00	0.00	0.00	inches
	34	Ponding Pore Space Available for Biofiltration	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	unitless
	35	Soil Media Pore Space Available for Biofiltration	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	unitless
	36	Gravel Pore Space Available for Biofiltration (Above Underdrain)	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	unitless
	37	Effective Depth of Biofiltration Storage	16.20	15.00	15.00	16.20	15.00	16.20	0.00	0.00	0.00	0.00	inches
	38	Drawdown Time for Surface Ponding	22	14	8	3	6	13	0	0	0	0	hours
	39	Drawdown Time for Effective Biofiltration Depth	59	36	19	8	16	36	0	0	0	0	hours
	40	Total Depth Biofiltered	17.85	17.52	19.62	28.15	20.57	18.90	0.00	0.00	0.00	0.00	inches
	41	Option 1 - Biofilter 1.50 DCV: Target Volume	10,613	13,395	2,385	991	59	2,286	0	0	0	0	cubic-feet
	42	Option 1 - Provided Biofiltration Volume	10,613	13,395	2,385	991	59	2,286	0	0	0	0	cubic-feet
	43	Option 2 - Store 0.75 DCV: Target Volume	5,306	6,698	1,193	495	29	1,143	0	0	0	0	cubic-feet
	44	Option 2 - Provided Storage Volume	5,306	6,698	1,193	495	29	1,143	0	0	0	0	cubic-feet
	45	Portion of Biofiltration Performance Standard Satisfied	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
Result	46	Do Site Design Elements and BMPs Satisfy Annual Retention Requirements?	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-	yes/no
	47	Overall Portion of Performance Standard Satisfied (BMP Efficacy Factor)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	ratio
	48	**Deficit of Effectively Treated Stormwater**	**0**	**0**	**0**	**0**	**0**	**0**	**n/a**	**n/a**	**n/a**	**n/a**	cubic-feet

No Warning Messages

8.0 General Requirements

- Completion of this attachment is required for all PDPs subject to hydromodification management requirements (see PDP SWQMP Form Table 5). Do not submit this attachment if exempt from Hydromodification Management requirements. Document the PDP exemption in Attachment 9.
- Submit this cover page and all required Sub-attachments for all structural hydromodification management BMPs proposed for the project.
- Constructed features must fully satisfy the requirements described in applicable BMPDM sections and appendices, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: DMAs, features, and BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.
- Structural BMP Certification. All structural hydromodification management BMPs documented this attachment must be certified by a registered engineer in Attachment 7, Sub-attachment 7.1.
- Structural BMP Verification. BMP installation must be verified by the County at the completion of construction. Applicants must complete an Installation Verification Form (Attachment 10).

Sub-attachments (check all that are completed)
☒ **8.1: Flow Control Facility Design** (required)[1] Submit using ☒ the Sub-attachment 8.1 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.1.
☒ **8.2: Hydromodification Management Points of Compliance** (required) Complete the table provided in Sub-attachment 8.2.
8.3: Geomorphic Assessment of Receiving Channels 1. Has a geomorphic assessment been performed for the receiving channel(s)? ☒ No, the low flow threshold is 0.1Q2 (default low flow threshold)
☐ Yes (provide the information below): Low flow threshold: ☐ 0.1Q2 ☐ 0.3Q2 ☐ 0.5Q2
Title: Date: Preparer:
Submit using ☐ the Sub-attachment 8.3 cover sheet provided, or ☐ as a separate stand-alone document labeled Sub-attachment 8.3.
8.4: Vector Control Plan (required if BMPs will not drain in less than 96 hours) ☐ Included with this attachment ☒ Not required

[1] Including Structural BMP Drawdown Calculations and Overflow Design Summary. See BMPDM Chapter 6 and Appendix G for additional design guidance.

8.1 Flow Control Facility Design

Insert Flow Control Facility Design behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.1.

Table of Contents

INTRODUCTION

This report provides Hydromodification and Water Quality design based on LID (Low Impact Development) principles for a proposed 64 lot development located on San Elijo Road in San Marcos, CA.

The Hydromodification and Water Quality calculations were performed utilizing continuous simulation analysis to size the storm water treatment and control facilities. Storm Water Management Model (SWMM) version 5.0 distributed by USEPA is the basis of all calculations within this report. SWMM generates peak flow recurrence frequencies and flow duration series statistics based on an assigned rain gauge for pre-development, unmitigated post-development flows and post-development mitigated flows to determine compliance with the State Water Resources Control Board Order No.R9-2015-001 and Hydromodification Management Plan (HMP) requirements.

There are four points of compliance (POC) for each of the projects in the analysis.

The Hydromodification system proposed for this project consists of 6 biofiltration basins with four points of compliance located around the project. This system detains storm water on the surface of the basins as well as in the underdrain reservoir. Bio-filtration is a process by which storm water is filtered through plant roots and a biologically active soil mix. For POC 3 and POC 4, water will be released from the basins into the existing storm drain system that currently collects the sites storm flows. POC 1 and POC 2 both discharge into existing natural channels. The resulting mitigated outflows are shown to be equal to or less than all continuously simulated storms based on the historical data collected from the Oceanside rain gage.

Low Flow Threshold

A downstream channel assessment has not been completed for this project and therefore the low flow threshold utilized for the system analysis is 10% of 2-year storm event (0.1Q2). This will be used as the low flow threshold to meet peak flow frequency and flow duration controls.

SECTION I. MODEL SETUP

Pre-development Model Setup

The SWMM model for this project's pre-development site is analyzed using historical rain gauge data. The Oceanside gauge is utilized for this project. That data provides continuous precipitation input to a sub-catchment with its outfall based on the contributing basins imperviousness.

The imperviousness parameter in SWMM is the amount of effective or directly connected impervious area. The effective impervious area is the impervious area that drains directly to the Stormwater conveyance system. The pre-development condition is a vacant land with poor cover of grass and some shrubs with no trees. For the purpose of this study, the site is assumed to have 0% of impervious surface in the existing condition.

The project site is composed entirely of undeveloped natural terrain.

Approximately 34 acres of the discharge from the southern portion of the site starts near the southern limits of the drainage basin and flows mainly in a northeasterly direction. As the northeasterly follows meet the eastern limits of the property, the discharge from the site enters an unnamed tributary of the Escondido Creek flowing in a southerly direction along the eastern property line. The point where the discharge leaves the site is identified as POC-1.

The remaining 45 acres of the southern tributary area flows in a northerly direction where it meets a natural channel flowing in a north westerly direction to a point where it leaves the site along the western boundary. This point is identified as POC-2. From point POC-2 the flows continue along a natural channel until they meet San Elijo road and continue to San Marcos Creek.

Approximately 3 acres of the site along the north eastern portion of the site into an existing brow ditch that carries the water in an easterly direction along the property line and discharge directly to the public storm drain system along San Elijo Road. This point of discharge is identified as POC-3.

The remaining approximately 1 acre of the north western frontage of the site along San Elijo Road flows into two brow ditches that flow westerly and enter the public storm drain system along San Elijo Road tributary to San Marcos Creek. This point is identified as POC-4. This point is not analyzed since it is made of only self-mitigating areas with no impervious areas.

For SWMM model illustration see figure 3, or Pre-development map of this SWMM report.

Post-Development Model Setup

Figure 3 illustrates each contributing basin discharging its overland flow directly into the biofiltration system. Each biofiltration layer section has a similar configuration as seen as in the detail drawing below. There is no actual elevation entered in the program. The bottom elevation of the biofiltration surface storage is assumed at 0 ft.

The site is graded such that the distribution of discharge from the site to the respective POCs will remain balanced as much as possible. The area of the project to the southwest will remain open space and will be directed to flow separately from the flow from the developed portions of the site until discharging to the respective POC. The developed portions of the site will all be directed to a stormwater treatment facility.

Multiple treatment facilities will be located onsite. The parts of the site that serve as access to the building lots, and the lots themselves will be directed to combination of biofiltration and flow detention facilities.

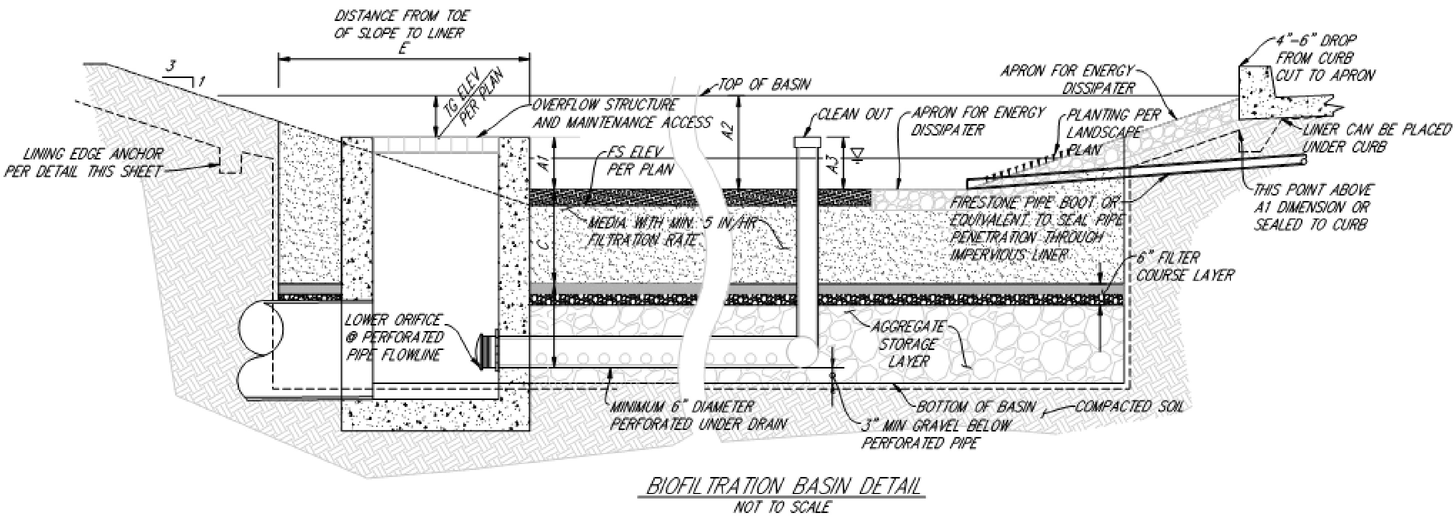


Figure-1. Typical
Bio-filtration Section

PRE DEVELOPMENT

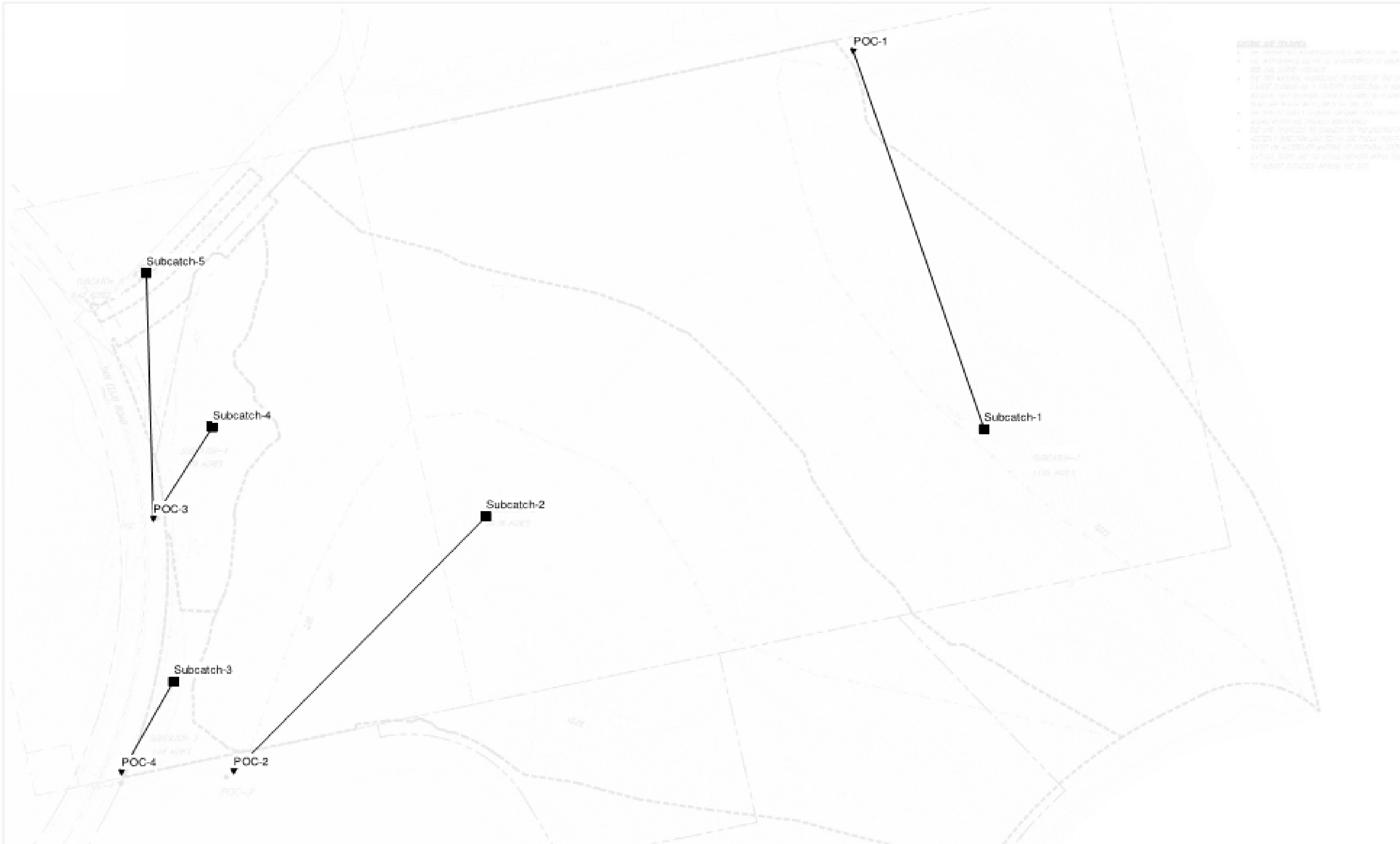


Fig.2 – SWMM Pre-Development Modl

POST DEVELOPMENT

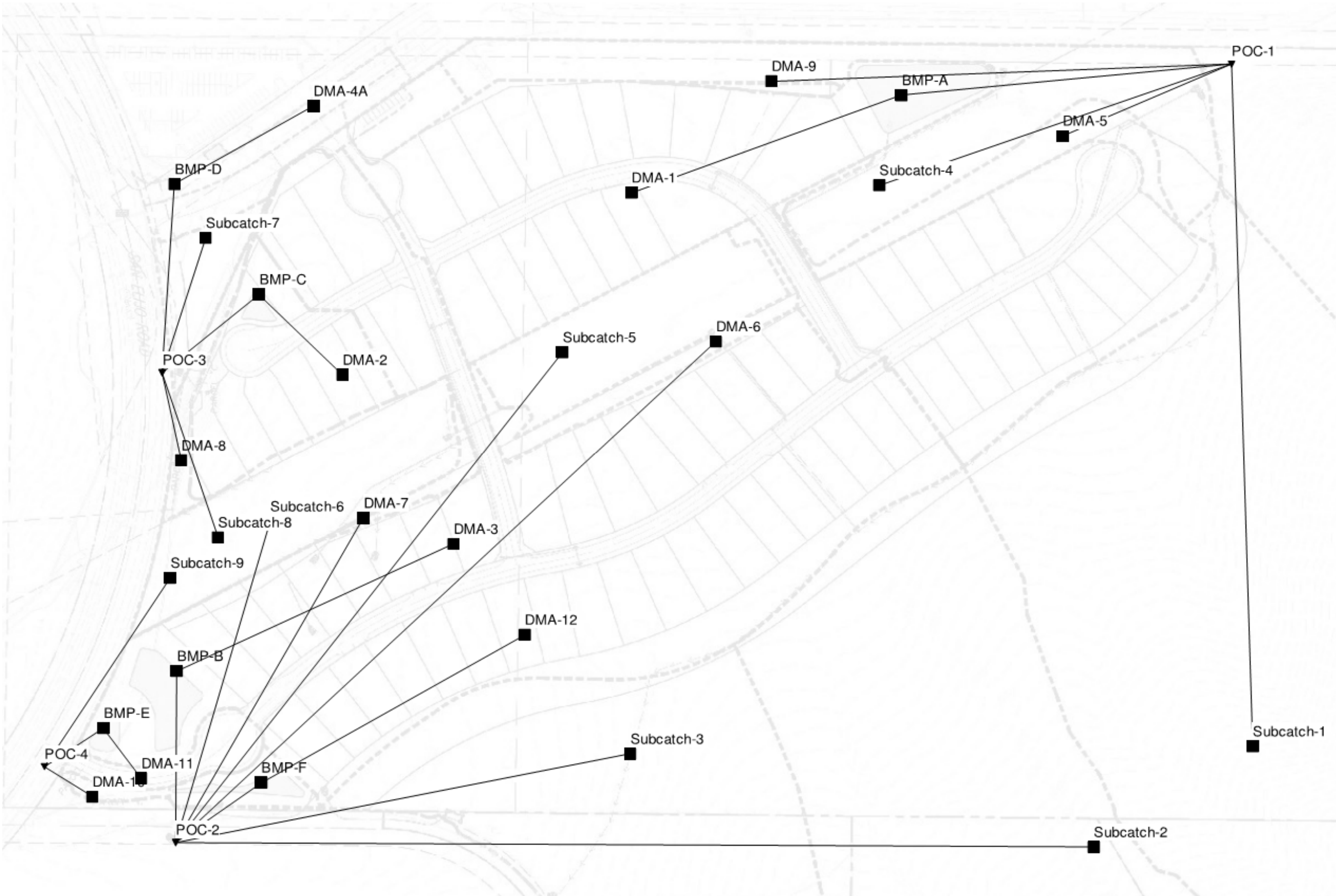


Fig.3 – SWMM Post-Development Model

Post-Development Drainage Management Areas (DMAs)

The DMAs provide an important framework for feasibility screening, BMP prioritization and storm water management system configuration. DMAs are defined based on drainage patterns of the site and the BMPs to which they drain. The Bio-Basin Summary Table above, references a gravel depth of 12" which does not include the 3" minimum of gravel below the perforated pipe (see Figure-1 Typical Biofiltration Basin). Implying that the total gravel depth for this project is 15" (12" + 3" minimum). This 15" value is used in the SWMM model calculations the as the total storage depth.

In the SWMM model and table below note that the total areas of each DMA are equal to the combination of the DMA area and its respective BMP area. For example, in this project the total area of DMA-1 = (DMA-1 Area) + (BMP-A Area) OR 10.71ac = (10.31ac) + (0.40ac)

DMA Table for Post-Development

[SUBCATCHMENTS]					
Name	Outlet	Area (ac)	%Imperv	Width	%Slope
DMA-1	BMP-A	10.31	46	450	3.3
DMA-2	BMP-C	1.73	51	300	1.38
DMA-3	BMP-B	11.13	45	527	0.5
DMA-4A	BMP-D	0.40	100	297	1.82
DMA-5	POC-1	0.81	0	55	50
DMA-6	POC-2	0.46	0	34	50
DMA-7	POC-2	0.16	0	36	50
DMA-8	POC-3	0.31	0	50	50
DMA-9	POC-1	0.09	0	15	18.5
DMA-10	POC-4	0.20	0	40	50
DMA-11	BMP-E	0.43	29	250	15
DMA-12	BMP-F	2.44	42	340	0.5
SUBCATCH-1	POC-1	21.11	0	642	27.2
SUBCATCH-2	POC-2	13.25	0	780	22.62
SUBCATCH-3	POC-2	6.95	0	623	21.2
SUBCATCH-4	POC-1	3.91	0	258	4
SUBCATCH-5	POC-2	1.77	0	235	6
SUBCATCH-6	POC-2	1.38	0	220	6
SUBCATCH-7	POC-3	0.59	0	315	4
SUBCATCH-8	POC-2	0.60	0	149	4.5
SUBCATCH-9	POC-2	0.11	0	181	30
BMP-A	POC-1	0.40	0	82	0
BMP-B	POC-2	0.25	0	30	0
BMP-C	POC-3	0.04	0	31	0
BMP-D	POC-3	0.01	0	10	0

BMP-E	POC-4	0.05	0	35	0
BMP-F	POC-2	0.11	0	15	0
	Total	79.01			

DMA Table for Pre-Development

DMA ID	DMA TYPE	TOTAL (ACRE)	%IMP
SUBCATCH-1	Drains to POC 1	33.95	0
SUBCATCH-2	Drains to POC 2	39.76	0
SUBCATCH-3	Drains to POC 4	1.06	0
SUBCATCH-4	Drains to POC 3	3.85	0
SUBCATCH-5	Drains to POC 3	0.415	0
	Total	79.04	

Bio-Basin Summary Table

BMP ID	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	C (INCH) MEDIA	D (INCH) GRAVEL	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER LOWER (INCH)	IMP LINER?
BMP - A	17,236	6	12	6	21	18	48x48	1.8	YES
BMP - B	10,862	6	12	6	21	15	48X48	1.5	YES
BMP - C	1,486	6	12	6	21	15	48x48	0.5	YES
BMP - D	597	6	12	6	21	18	48x48	0.5	YES
BMP - E	2,189	6	12	6	21	15	48X48	1.0	YES
BMP - F	4,691	6	12	6	21	18	48X48	1.0	YES

SECTION II. SYSTEM REPRESENTATION

SWMM is a distributed model, which means that a study area can be subdivided into any number of irregular sub-catchments to best capture the effect that spatial variability in topography, drainage pathways, land cover, and soil characteristics have on runoff generation. For modeling of Hydromodification calculations, there are four main system representations: Rain gage, Sub-catchment (contributing basin or LID area), Nodes and Links.

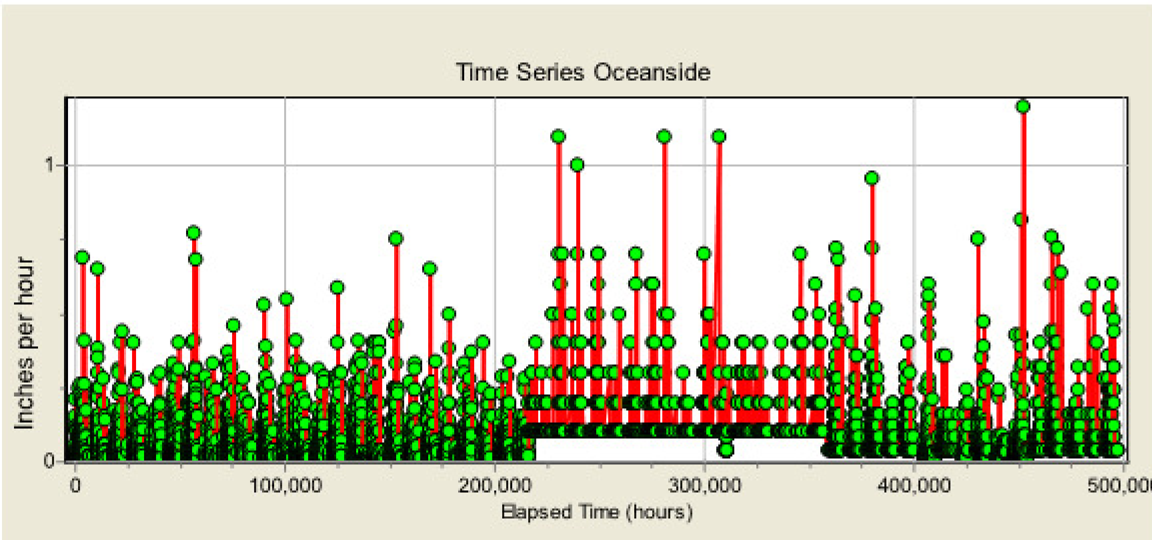


Fig. 2.1 – Time series rain data, which corresponds to runoff estimates for each of the 508,080 time steps (each date and hour) of the 58-year simulation period. (Inches/hour vs. elapsed time) (*Note: Time series has a gap that occurs around 225,000; this gap is a part of the acquired data set and is a period of time when the decimal was changed from 2 decimals to 1)

Rain Gauge

The properties of a rain gauge describe the source and format of the precipitation data that are applied to the study area. In this project, the rainfall data consist of a long-term rainfall record stored in a user-defined Time Series labeled as "Oceanside" rain gauge station. The Oceanside rain station was chosen due to its data quality and its location to the project site.

The rain gauge supplies precipitation data for one or more sub-catchment areas in a study region taken from the Project Clean Water website (www.projectcleanwater.org). This data file contains rainfall intensity, hourly-recorded time interval, and the dates of recorded precipitation each hour. The Oceanside rain data has approximately 58 years of hourly precipitation data from 8/28/1951 to 5/23/2008 and generates 58 years of hourly runoff estimates, which corresponds to runoff estimates for each of the 508,080 time steps (each date and hour) of the 58 year simulation period. See figure 2.1 for hourly precipitation intensity graph for 58 years in inches.

Sub-catchment (contributing basin or LID area)
A basin is modeled using a sub-catchment object, which contains some of the following properties:

The rate of stormwater runoff and volume depends directly on the precipitation magnitude and its spatial and temporal distribution over the catchment. Each sub-catchment in SWMM is linked to a rain gauge object that describes the format and source of the rainfall input for the sub-catchment.

Area

This area is bounded by the sub-catchment boundary. Its value is determined directly from maps or field surveys of the site or by using SWMM's Auto-length tool when the sub-catchment is drawn to scale on SWMM's study area map. This Project is divided into several sub-catchments based on its outfall.

Width

Width can be defined as the sub-catchment's area divided by the length of the longest overland flow path that water can travel. When there are several such paths, one would use an average of their lengths to compute a width. If overland flow is visualized as running down –slope off an idealized, rectangular catchment, then the width of the sub-catchment is the physical width of overland flow.

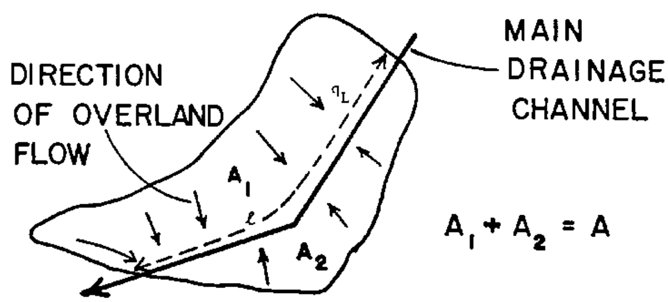


Figure-2-2 Irregular subcatchment shape for width calculations (DiGiano et al., 1977, p.165).

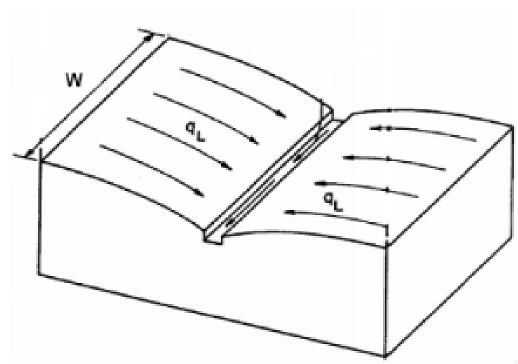


Figure-2-3 Idealized representation of a subcatchment.

Source: STORM WATER MANAGEMENT MODEL REFERENCE MANUAL VOLUME 1- JANUARY 2016

The method of calculations used following Figure 2-2 involves an estimation by Guo and Urbonas (2007). As stated in the Storm Water Management Model Reference Manual Vol. 1

A more fundamental approach to estimating both subcatchment width and slope has recently been developed by Guo and Urbonas (2007). The idea is to use "shape factors" to convert a natural watershed as pictured in Figure 2-2 into the idealized overland flow plane of Figure 2-3. A shape factor is an index that reflects how overland flows are collected in a watershed. The shape factor X for the actual watershed is defined as A/L^2 where A is the watershed area and L is the length of the watershed's main drainage channel (not necessarily the length of overland flow). The shape factor Y for the idealized watershed is W/L. Requiring that the areas of the actual and idealized watersheds be the same and that the potential energy in terms of the vertical fall along the drainage channel be preserved, Guo and Urbonas (2007) derive the following expression for the shape factor Y of the idealized watershed:

$$Y = 2X(1.5 - Z)(2K - X)/(2K - 1) \qquad (3\text{-}12)$$

where K is an upper limit on the watershed shape factor. Guo and Urbonas (2007) recommend that K be between 4 and 6 and note that a value of 4 is used by Denver's Urban Drainage and Flood Control District.

Once Y is determined, the equivalent width W for the idealized watershed is computed as YL.

Applying this approach:

$X = (A \bullet 43{,}560\ ft^2/acre) / (L^2)$

$Z = A_m/A$

Z = skew factor, $0.5 \leq Z \leq 1$,
A_m = larger of the two areas on each side of the channel A = total area.

$W = L \bullet Y$

This width value is considerably lower than those derived from direct estimates of either the longest flow path length or the drainage channel length. As a result, it would most likely produce a longer time to peak for the runoff hydrograph.

Slope

This is the slope of the land surface over which runoff flows and is the same for both the pervious and impervious surfaces. It is the slope of what one considers being the overland flow path or its area-weighted average if there are several paths in the sub-catchment.

Imperviousness

This is the percentage of sub-catchment area covered by impervious surfaces such as sidewalks and roadways or any surfaces that rainfall cannot infiltrate.

Roughness Coefficient

The roughness coefficient reflects the amount of resistance that overland flow encounters as it runs off the sub-catchment surface. The value used for this project's predevelopment is a 0.038 for Mowed Poor Grass. This was based on the figures in 2-4 and 2-4a and assuming to be the most accurate to the predevelopment site before mass grading and the "pre-project" and conditions were created. This value was also used for undisturbed areas of the post development condition. The developed areas were given a value of 0.055 for suburban residential land use to best represent the development's final intended use. The roughness coefficient for both impervious values is 0.012 for smooth asphalt pavement.

Table 3-5 Estimates of Manning's roughness coefficient for overland flow

Source	Ground Cover	n	Range
Crawford and Linsley (1966)[a]	Smooth asphalt	0.01	
	Asphalt of concrete paving	0.014	
	Packed clay	0.03	
	Light turf	0.20	
	Dense turf	0.35	
	Dense shrubbery and forest litter	0.4	
Engman (1986)[b]	Concrete or asphalt	0.011	0.010-0.013
	Bare sand	0.010	0.01-0.016
	Graveled surface	0.02	0.012-0.03
	Bare clay-loam (eroded)	0.02	0.012-0.033
	Range (natural)	0.13	0.01-0.32
	Bluegrass sod	0.45	0.39-0.63
	Short grass prairie	0.15	0.10-0.20
	Bermuda grass	0.41	0.30-0.48
Yen (2001)[c]	Smooth asphalt pavement	0.012	0.010-0.015
	Smooth impervious surface	0.013	0.011-0.015
	Tar and sand pavement	0.014	0.012-0.016
	Concrete pavement	0.017	0.014-0.020
	Rough impervious surface	0.019	0.015-0.023
	Smooth bare packed soil	0.021	0.017-0.025
	Moderate bare packed soil	0.030	0.025-0.035
	Rough bare packed soil	0.038	0.032-0.045
	Gravel soil	0.032	0.025-0.045
	Mowed poor grass	0.038	0.030-0.045
	Average grass, closely clipped sod	0.050	0.040-0.060
	Pasture	0.055	0.040-0.070
	Timberland	0.090	0.060-0.120
	Dense grass	0.090	0.060-0.120
	Shrubs and bushes	0.120	0.080-0.180
	Business land use	0.022	0.014-0.035
	Semi-business land use	0.035	0.022-0.050
	Industrial land use	0.035	0.020-0.050
	Dense residential land use	0.040	0.025-0.060
	Suburban residential land use	0.055	0.030-0.080
	Parks and lawns	0.075	0.040-0.120

[a]Obtained by calibration of Stanford Watershed Model.
[b]Computed by Engman (1986) by kinematic wave and storage analysis of measured rainfall-runoff data.
[c]Computed on basis of kinematic wave analysis.

Source: *Storm Water Management Model Reference Manual Volume I – Hydrology (Revised) ~ January 2016*

Infiltration Model

The pre-development condition is primarily empty land with moderate vegetation cover. Infiltration of rainfall from the pervious area of a sub-catchment into the unsaturated upper soil zone can be described using three different infiltration models: Horton, Green-Ampt, and Curve Number. There is no general agreement on which method of these three is the best.

The Green-Ampt method was chosen to calculate the infiltration of the pervious areas based on the availability of data for this project. It is invoked when editing the infiltration property of a sub-catchment.

The Hydrologic Soil Class identified for this project had a D rating. This determination was from Web Soil Survey and is provided as Attachment C of this projects SWMM report.

The default values shown in Table 1 for use in San Diego were used in this project based on the soil class within each DMA.

Table 1 – Soil Infiltration Parameter

SWMM Parameter Name	Unit	Range	Use in San Diego
Infiltration	Method	HORTON GREEN_AMPT CURVE_NUMBER	GREEN_AMPT
Suction Head (Green-Ampt)	Inches	1.93 – 12.60 presented in Table A.2 of SWMM Manual	Hydrologic Soil Group A: 1.5 Hydrologic Soil Group B: 3.0 Hydrologic Soil Group C: 6.0 Hydrologic Soil Group D: 9.0
Conductivity (Green-Ampt)	Inches per hour	0.01 – 4.74 presented in Table A.2 of SWMM Manual by soil texture class 0.00 – Ç0.45 presented in Table A.3 of SWMM Manual by hydrologic soil group	Hydrologic Soil Group A: 0.3 Hydrologic Soil Group B: 0.2 Hydrologic Soil Group C: 0.1 Hydrologic Soil Group D: 0.025 Note: reduce conductivity by 25% in the post-project condition when native soils will be compacted. For fill soils in post-project condition, see Section G.1.4.3.
Initial Deficit (Green-Ampt)		The difference between soil porosity and initial moisture content. Based on the values provided in Table A.2 of SWMM Manual, the range for completely dry soil would be 0.097 to 0.375	Hydrologic Soil Group A: 0.30 Hydrologic Soil Group B: 0.31 Hydrologic Soil Group C: 0.32 Hydrologic Soil Group D: 0.33 Note: in long-term continuous simulation, this value is not important as the soil will reach equilibrium after a few storm events regardless of the initial moisture content specified.
Groundwater	yes/no	yes/no	NO
LID Controls			Project Specific
Snow Pack Land Uses Initial Buildup Curb Length			Not applicable to hydromodification management studies

Source: Model BMP Design Manual San Diego Region Appendices, February 26, 2016

LID controls

Utilizing LID controls within a SWMM project is a two-step process that:

- Creates a set of scale-independent LID controls that can be deployed throughout the study area,
- Assign any desired mix and sizing of these controls to designated sub-catchments.

The LID control type that was selected was a biofiltration cell that contains vegetation grown in an engineered soil mixture placed above a gravel drainage bed. Biofiltration provides storage, infiltration (depending on the soil type) and evaporation of both direct rainfall and runoff captured from surrounding areas. For this project, we do not allow infiltration to the existing/filled soil.

SECTION III. CONTINUED SIMULATION OPTIONS

Simulation Dates

These dates determine the starting and ending dates/times of a simulation and are chosen based on the rain data availability.

Start analysis on 08/28/1951
Start Reporting on 08/28/1951
End Analysis on 05/23/2008

Time Steps

The Time Steps establish the length of the time steps used for runoff computation, routing computation and results reporting. Time steps are specified in days and hours: minutes: seconds except for flow routing which is entered as decimal seconds.

Climatology

-Evaporation Data

The available evaporation data for San Diego County that is similar to the Lot 5 project conditions is taken Table G.1-1: Monthly Average Reference Evapotranspiration by ETo Zone for use in SWMM Models for Hydromodification Management Studies in San Diego County CIMIS Zone 4 (in/day).

January	February	March	April	May	June
0.060	0.080	0.110	0.150	0.170	0.190
July	August	September	October	November	December
0.190	0.180	0.150	0.110	0.080	0.060

SECTION IV. BIOFILTRATION AS LID CONTROL

LID controls are represented by a combination of vertical layers whose properties are defined on a per-unit-area basis. This allows an LID of the same design but differing coverage area to easily be placed within different sub-catchments of a study area. During a simulation, SWMM performs a moisture balance that keeps track of how much water moves between and is stored within each LID layer. If the biofiltration basin is full and water is leaving the upper weir, the flow is divided in two flows: the lower flow discharging from the bottom orifice directly draining to the point of compliance and the upper flow is routed at the top of the biofiltration basin and after routing, discharged to the point of compliance. In this project, we used 100% of the area of this specific sub-catchment for biofiltration.

1. Surface

Storage Depth
When confining walls or berms are present, this is the maximum depth to which water can pond above the surface of the unit before overflow occurs (in inches). In this project, storage depth is set at 6" which is representative of the height of water that can pond above a 3" mulch layer before over flowing into the box riser.

Vegetation Volume Fraction
It is the fraction of the volume within the storage depth that is filled with vegetation. This is the volume occupied by stems and leaves, not their surface area coverage. This value is 0 for our project as is standard in the BMP Manual Appendix G.

Surface Roughness
Manning's n value for overland flow over a vegetative surface.

Surface Slope
Slope of porous pavement surface or vegetative swale (percent).

2. Soil

Thickness
The thickness of the soil layer in inches. We used a typical value of 21 inches soil thickness for a biofiltration. This includes the 3" of mulch layer.

The volume of pore space relative to total volume of soil (as a fraction). We designed it with a soil mix porosity of 0.40 maximum for a good percolation rate (Countywide Model SUSMP Table B1 – Soil Porosity Appendix A: Assumed Water Movement Hydraulics for Modeling BMPs).

Field Capacity
Volume of pore water relative to total volume after the soil has been allowed to drain fully (as a fraction). We used 0.2 for this soil. Below this level, vertical drainage of water through the soil layer does not occur. (See Table 1 – Soil Infiltration Parameter).

Wilting Point
Volume of pore water relative to total volume for a well-dried soil where only bound water remains (as a fraction). The moisture content of the soil cannot fall below this limit.
We assumed the minimum moisture content within this biofiltration soil is 0.1.

Conductivity
Hydraulic conductivity for the fully saturated soil is 5 inches/hour. This is a design minimum value for percolation rate.

Conductivity Slope
Slope of the curve of log (conductivity) versus soil moisture content (dimensionless). Typical values range from 5 for sands to 15 for silty clay. We designed this soil to have a very good percolation rate therefore the conductivity slope is 5.

Suction Head
The average value of soil capillary suction along the wetting front (inches). This is the same parameter as used in the Green-Ampt infiltration model. Table 1 was utilized to determine the capillary of the soil mix top layer of a biofiltration system. The suction head will be 1.5 inches.

3. Storage Layer
The Storage Layer page of the LID Control Editor describes the properties of the crushed stone or gravel layer used in biofiltration cells as a bottom storage/drainage layer. The following data fields are displayed:

Height
This is the thickness of a gravel layer (inches).

Void Ratio
The volume of void space relative to the volume of solids in the layer. Typical values range from 0.5 to 0.75 for gravel beds. Note that porosity = void ratio / (1 + void ratio). We designed this void ratio to have a value of 0.67.

Seepage Rate
The rate at which water infiltrates into the native soil below the layer (in inches/hour). This would typically be the Saturated Hydraulic Conductivity of the surrounding sub-catchment if Green-Ampt infiltration is used. If a liner beneath the gravel layer is proposed, the seepage rate is assumed to be 0 in/hr. If there is no liner proposed, such as BMP-C, the infiltration rate is equal to the suggested value already discussed per soil type in Table 1.

Clogging Factor
Total volume of treated runoff it takes to completely clog the bottom of the layer divided by the void volume of the layer. For south east biofiltration, a value of 0 was used to ignore clogging since the system does NOT consider infiltration to the native soils. Clogging progressively reduces the Infiltration Rate in direct proportion to the cumulative volume of runoff treated and may only be of concern for

infiltration trenches with permeable bottoms and no under drains. We assumed zero for the clogging factor since the infiltration rate is not considered.

4. Underdrain Layer

LID storage layers can contain an optional underdrain system that collects stored water from the bottom of the layer and conveys it to a conventional storm drain. The Underdrain page of the LID Control Editor describes the properties of this system. It contains the following data entry fields:

Drain Coefficient and Drain Exponent
Coefficient C and exponent n that determines the rate of flow through the underdrain as a function of height of stored water above the drain height. The following equation is used to compute this flow rate (per unit area of the LID unit):

$q = C(h-Hd)^n$

where q is the outflow (in/hr), h is the height of stored water (inches), and Hd is the drain height. A typical value for n would be 0.5 (making the drain act like an orifice).

Drain Offset Height
Height of any underdrain piping above the bottom of a storage layer (inches). In this project, this value was set to 3" as the underdrain piping is at the bottom of the 24" of the live gravel storage layer but above the 3" of dead gravel storage.

Table 3 – Summary of LID Drain/flow coefficient

IMP NAME	EFFECTIVE AREA (SQFT)	ORIFICE (IN)	LID Storage Height (IN)	SOIL (IN)	GRAVEL (IN)	UNDERDRAIN OFFSET (IN)	C
BMP-A	17,236	1.5	6	21	18	3	0.04275
BMP-B	13,068	1.5	6	21	15	3	0.06784
BMP-C	1,355	0.5	6	21	15	3	0.12393
BMP-D	597	0.5	6	21	18	3	0.30858
BMP-E	2,189	1	6	21	15	3	0.14960
BMP-F	4,691	1	6	21	18	3	0.06981

Note:
$q = C(h-Hd)^n$
C= $C_o A_o \frac{\sqrt{2g}}{A} \times 12^{0.5} \times 3600$

SECTION V. RUNNING THE SIMULATION

In general, the Run time will depend on the complexity of the watershed being modeled, the routing method used, and the size of the routing time step used. The larger the time steps, the faster the simulation, but the less detailed the results.

Model Results

SWMM's Status Report summarizes overall results for the 58-yr simulation. The runoff continuity error is -0.12% and the flow routing continuity error is 0.00%. When a run completes successfully, the mass continuity errors for runoff, flow routing, and pollutant routing will be displayed in the Run Status window. These errors represent the percent difference between initial storage + total inflow and final storage + total outflow for the entire drainage system. If they exceed some reasonable level, such as 10 percent, then the validity of the analysis results must be questioned. The most common reasons for an excessive continuity error are computational time steps that are too long or conduits that are too short.

In addition to the system continuity error, the Status Report produced by a run will list those nodes of the drainage network that have the largest flow continuity errors. If the error for a node is excessive, then one should first consider if the node in question is of importance to the purpose of the simulation. If it is, then further study is warranted to determine how the error might be reduced.

The SWMM program ranks the partial duration series, the exceedance frequency and the return period. They are computed using the Weibull formula for plotting position. See the flow duration curve and peak flow frequency on the following pages.

SECTION VI. RESULT ANALYSIS

<u>Development of the Flow Duration Statistics</u>

The flow duration statistics are also developed directly from the SWMM binary output file. It should be noted right from the start that the "durations" that we are talking about in this section have nothing to do with the "storm durations" presented in the peak flow statistics section. Other than using the same sequence of letters for the word, the two concepts have nothing to do with each other and the reader is cautioned not to confuse the two. The goal of the flow duration statistics is to determine, for the flow rates that fall within the hydromorphologicaly significant range, the length of time that each of those flow rates occur. Since the amount of sediment transported by a river or stream is proportional to the velocity of the water flowing and the length of time that velocity of flow acts on the sediment, knowing the velocity and length of time for each flow rate is very useful.

Methodology

The methodology for determining the flow duration curves comes from a document developed by the U.S. Geological Survey (USGS). The first stop on the journey to find this document was a link to the USGS water site (http://www.usgs.gov/water/). This link is found in Appendix E (SDHMP Continuous Simulation Modeling Primer), found in the County Hydromodification Management Plan[1]. On this web site a search for "Flow Duration Curves" leads to USGS Publication 1542-A, Flow-duration curves, by James K. Searcy 1959 (http://pubs.er.usgs.gov/publication/wsp1542A). In this publication the development of the flow duration curves is discussed in detail.

In Pub 1542-A, beginning on page 7 an example problem is used to illustrate the compilation of data used to create the flow duration plots. A completed form 9-217-c form shows the monthly tabulation of flow rates for Bowie Creek near Hattiesburg, Miss. For each flow range the number of readings is tabulated and then the total number of each flow rate is totaled for the year. It should be noted that while this example is for a stream with a minimum flow rate of 100cfs, for the purposes of run-off studies in Southern California the minimum flow rate of zero (0) cfs is the common low flow value. Once each of the year's data has been compiled the summary numbers from each year are transferred to form 9-217-d. On this form the total number of each flow rate is again totaled and the percentage of time exceeded calculated (as will be explained later under the discussion of our calculations). Once the data has been compiled a graph of Discharge Rate vs. Percent Time Exceeded is developed. As will be explained in the next section, the use of these curves leads to the amount of time each particular flow can be expected to occur (based on historical data).

[1] FINAL HYDROMODIFICATION MANAGEMENT PLAN, Prepared for County of San Diego, California, March 2011, by Brown and Caldwell Engineering of San Diego.
(http://www.projectcleanwater.org/images/stories/Docs/LDS/HMP/0311_SD_HMP_wAppendices.pdf)

How to Read the Graphs[2]

Figure 6-1 shows a flow duration curve for a hypothetical development. The three curves show what percentage of the time a range of flow rates are exceeded for three different conditions: pre-project, post-project and post-project with storm water mitigation. Under pre-project conditions the minimum geomorphically significant flow rate is 0.10cfs (assumed) and as read from the graph, flows would equal or exceed this value about 0.14% of the time (or about 12 hours per year) (0.0014 x 365days x 24 hour/day). For post-project conditions, this flow rate would occur more often – about 0.38% of the time (or about 33 hours per year) (0.0038 x 365days x 24 hour/day). This increase in the duration of the geomorphically significant flow after development illustrates why duration control is closely linked to protecting creeks from accelerated erosion.

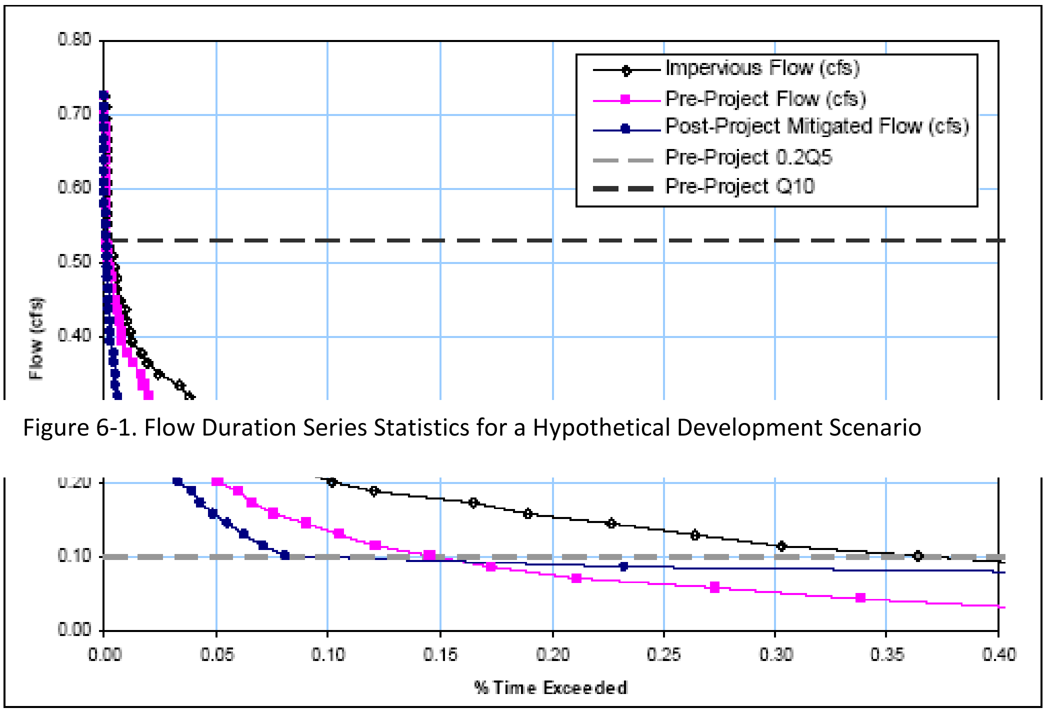


Figure 6-1. Flow Duration Series Statistics for a Hypothetical Development Scenario

Figure 1. Flow Duration Series Statistics for a Hypothetical Development Scenario

Development of Flow Duration Curves

The first step in developing the flow duration curves is to count the number of occurrences of each flow rate. This is done by first rounding every non-zero flow value to an appropriate number of decimal places (say two places). This in effect groups each flow into closely related values or "bins" as they are referred to in publication 9-217d. Then the entire runoff record is queried for each value and the number of each value counted. The next step is to enter the results of the query into a grid patterned after form 9-217d. The data is entered in ascending order starting with the lowest flow first. The grid is composed of four columns. They are (from left to right) Discharge Rate, Number of **Periods (count),** Total Periods Exceeding (the total number of periods equal to or exceeding this value), and Percent Time Exceeded. Starting at the top row (row 1), the flow rate (which is often times zero) is entered with the

[2] The graph and the explanation were taken directly from Appendix E of the Hydromodification Plan

corresponding number of times that value was found. The next column is the total number of values greater than or equal to that flow rate. For the first flow rate point, by definition all flow rate values are greater than or equal to this value, therefore the total number of runoff records of the rainfall record is entered here. The final column which is the percent of time exceeded is calculated by dividing the total periods exceeded by the total number of periods in the study. For the first row this number should be 100%

For the next row (row 2), the flow rate, and the flow rate count are entered. The total number of periods exceeding for row 2 is calculated by subtracting Number of Periods of row 1 from the Total Periods Exceeding of line 1. This result is entered in the Total Periods Exceeding on row 2. As was the case for line 1, the final column is calculated by dividing the total periods exceeded by the total number of periods in the study. For the second row this number should be something less than 100% and continually decrease as we move down the chart. If all the calculations are correct, then everything should zero out on the last line of the calculations.

The final step in developing the flow duration curves is to make a plot of the Discharge Rate vs. the Percent Time Exceeded. For the purposes of this report, the first value corresponding to the zero flow rate is not plotted allowing the graph to be focused on the actual flow rate values.

The Flow Duration Analysis
The Peak Flow Statistics analysis is composed of the following series of files:

1. The Flow Duration Plot
2. Comparison of the Un-Mitigated Flow Duration Curve to the Pre-Development Curve (Pass/Fail)
3. Comparison of the Mitigated Flow Duration Curve to the Pre-Development Curve (Pass/Fail)
4. The calculations for the Pre-Development flow duration curve development (USGS9217d)
5. The calculations for the Post-Development flow duration curve development (USGS9217d)
6. The calculations for the Mitigated flow duration curve development (USGS9217d)

The Flow Duration Plot

The Flow Duration Curves Plot is the plotting of all three (pre, un-mitigated and mitigated) sets of Discharge Rate vs. the Percent Time Exceeded data point pair lists. In addition to these curves horizontal lines are plotted corresponding to the Q_{10} and Q_{lf} (low flow threshold) values. Within the geomorphically significant range ($Q_{10} – Q_{lf}$) one can see a visual representation of the relative positions of the flow duration curves. The flow duration curves are compared in an East/West (horizontal) direction to compare post development Discharge Rates to pre-development Discharge Rates. The pre-development curve is plotted in blue and the mitigated curve is plotted in green. As long as the post development curve lies to the left of the pre-development curve (mostly[3]), the project meets the peak flow hydromodification requirements.

[3] See hydromodification limits for exceedance of pre-development values

Pass/Fail comparison of the curves

The next two sets of data are the point by point comparison of the post-development curve(s) and the pre-development curve. The Pass/Fail table is helpful in determining compliance since the plotted lines can be difficult to see at the scales suitable for use in a report. Each point on the post- development curve has a corresponding "Y" value (Flow Rate), and "X" value (% Time Exceeded). For each point on the post development curve, the "Y" value is used to interpolate the corresponding Percent Time Exceeded (X) value from the pre-development curve. Then the Post-development Percent Time Exceeded value is compared to the pre-development Percent Time Exceeded value. Based on the relative values of each point, pass/fail criteria are determined point by point.

For each set of data, the upper right hand header value shows the name of the file being displayed (ex. flowDurationPassFailMitigated.TXT). The first line of the file shows the name of the SWMM output file (*.out). The next line shows the time stamp of the SWMM file that is being analyzed. The time stamps of all of the report files should be within a minute or two of each other, otherwise there may have been tampering with the files. Each report run creates and prints all of the files and reports at one time so all the time stamps should be very close.

The first column is the zero based number of the point. The next two columns show the post development "X" and "Y" values. The next column shows the value interpolated between the two bounding points on the pre-development curve. The next three columns show the true or false values of the comparison of the two "X" values. The last column shows the resultant pass or fail status of the point. There are three ways a point can pass. They are:

1. Q_{post} being outside of the geomorphically significant range Q_{lf} to Q_{10}
2. Q_{post} being less than Q_{pre}
3. Q_{post} being less than 110% of the value of Q_{pre} if the point is between Q_{lf} and Q_{10}

There are two ways that a point can fail. They are:

1. Q_{post} being greater than 110% of Q_{pre} if the point is between Q_{lf} and Q_{10}
2. If more than 10% of the points are between 100% and 110% of Q_{pre} for the points between Q_{lf} and Q_{10}

A quick scan down the last column will quickly tell if there are any points that fail.

At the bottom of each set of data are the date stamp of the report to the left, and to the right is the page number/number of pages for the specific set of data (not the pages of the report!). Each new set of data has its own page numbering. Between the file name in the header row and the page numbering in the footer row, the engineer can readily scan the document for the data of interest.

Plan Check Suggestions

As was described under the peak flow section, is the responsibility of the reviewing agency to confirm that the data sets presented are valid results from consistent calculations, and that any and all results can be duplicated by manual methods and achieve the same results. In light of these goals, the plan checker is invited to consider the following tasks as part of the plan check process.

Compare the Data Stamps for Each of the Statistics Files Used In This Analysis.

As was described in the Peak Flows section, all report files should have time stamps that are nearly identical. If the time values are more than a few minutes apart then the potential for inconsistent results files should be investigated.

Verify the Flow Rate Counts

For each of the pre, and mitigated flow duration tables, a few randomly selected flow value counts should be checked against the values taken directly from the SWMM file. This can be done by opening the corresponding SWMM file, selecting the outfall node, selecting Report>Table>By Object, Setting the time format to Date/Time, selecting the appropriate node value, and clicking the OK button to generate a table of the date/time/Total Inflow values. Next step is to click in the left most header row of the SWMM table which will select the entire table. Now from the main menu select Edit>Copy To>Clipboard. Now open a new blank sheet in MS Excel (or suitable spread sheet program) select cell A1 and paste the results from the clipboard into the spread sheet. Now sort the values based on the Total Inflow column. This will group all the flow values together enabling the number of occurrences of each value to be counted. At this point the a few (or all) of the counts on the various USGS9217d.txt files can be verified.

Manually Verify That the Percent Exceeded Values (form USGS9217d) are Correctly Calculated

The discharge rates and counts are confirmed as was described above. The top row should be the smallest runoff value (0.00cfs usually). Total Periods Exceeding of the first line should be the total number of rainfall records in the study. The percentage of Time Exceeding should be the total periods Exceeding divided by the total number of rainfall records in the study (100% for the first line). For each successive discharge rate, the total periods exceeding for the current line should be the total periods exceeding from the line above minus the number of periods from the line above. The number of periods and the number of periods exceeding should zero out at the last line.

Compare Plotted Curves to Table Data

Randomly check a few of the plotted points against the values verified above.

Verify by Observation that the plotted values of Q_{10} and Q_{lf} are reasonable.

Verify that the correct values for each of these return periods are plotted correctly on the graph.

Development of the Peak Flow Statistics

The peak flow statistics are developed directly from the binary output file produced by the SWMM program. The site is modeled three ways, Pre-Development, Post-Development-Unmitigated, and Post-Development-Mitigated. For each of these files a specific time period differentiating distinct storms is chosen. The SWMM results are extracted and each flow value is queried. The majority of the values for Southern California sites are zero flow. As each successive record is read, as soon as a non-zero value is read the time and flow value of that record are recorded as the beginning of an event. The first record is automatically recorded as the “tentative” peak value. As each successive non-zero value is read and the successive flow value is compared to the peak value and the greater value is retained as the peak value of the storm. As soon as a successive number of zero values equal to the predetermined storm separation value, then the time value of the last non-zero value is recorded as the end of the storm, the duration of the storm is the difference between the end time and the start time, and the peak value is recorded as the highest flow value between the start and end times.

Once the entire SWMM output file is read all of the distinct storm events will have been recorded in a special list. The storms will be in the order of their occurrence. To develop the peak flow statistics table the first step is to sort the storms in descending order of the peak flow value. Once the list is sorted then the relative rank of each storm is assigned with the highest ranking storm being the storm with the highest peak flow. There are several methods that can be used to determine which storm should be ranked above another equally valued storm. For the purposes of these studies an Ordinal ranking is used so that each storm has a unique rank number. Where two or more storms have equal flow values, the earlier storm is assigned the higher rank. This is done consistently throughout the storm record. Since we are only looking at peak flow statistics, it is assumed that the relative ranking of individual (but equal) storms is irrelevant to the calculations.

The exceedance frequency and return period are both computed using the Weibull formula for plotting position. Therefore, for a specific event the exceedance frequency F and the return period in years T are calculated using the following equations[4]:

$F=m/(n_R+1)$ and $T=n+1/m$

where m is the event's rank, n_R is the total number of events and n is the number of years under analysis.

Once the Peak flow statistics table is complete, a plot of Return Frequency vs. peak flow is created. All three conditions (pre, post and mitigated) are plotted on the same plot.

The Peak Flow Statistics Analysis

The Peak Flow Statistics analysis is composed of the following series of files:

1. The Peak Flow Frequency Plot
2. The Comparison of the Un-Mitigated Peak Flow Curve to the Pre-Development Curve (Pass/Fail)
3. The Comparison of the Mitigated Conditions Curve to the Pre-Development Curve (Pass/Fail)
4. The Peak Flow Statistics Calculation for the Pre-Development Curve.
5. The Peak Flow Statistics Calculation for the Un-Mitigated Curve.
6. The Peak Flow Statistics Calculation for the Mitigated Curve.

The Peak Flow Frequency Plot

The Peak Flow Frequency Curves are the plotting of all three (Pre, Un-Mitigated and Mitigated) sets of return Period vs peak flow data point pair lists. In addition to these curves horizontal lines are plotted corresponding to the Q_{10}, Q_5, Q_2 and Q_{lf} (low flow threshold) values. Within the geomorphically significant range (Q_{10} – Q_{lf}) one can see a visual representation of the relative positions of the peak flow curves. The peak flow curves are compared in a North/South (vertical) direction to compare post development peak flows to pre-development flows. The Pre-Development curve is plotted in blue, the unmitigated curve is plotted in red, and the mitigated curve is plotted in green. As long as the post

[4] Pg 169-170 STORM WATER MANAGEMENT MODEL APPLICATIONS MANUAL, EPA/600/R-09/000 July 2009

development curve lies below the pre-development curve (mostly[5]), the project meets the peak flow hydromodification requirements.

Pass/Fail comparison of the curves

The next two sets of data are the point by point comparison of the post-development curve(s) and the pre-development curve. The Pass/Fail table is helpful in determining compliance since the plotted lines can be difficult to see at the scales suitable for use in a report. Each point on the post- development curve has a corresponding "X" value (Recurrence Interval), and "Y" value (Peak Flow). For each point on the post development curve, the "X" value is used to interpolate the corresponding peak flow value from the pre-development curve. Then the Post-development peak flow value is compared to the pre-development peak flow value. Based on the relative values of each point, pass/fail criteria are determined point by point.

For each set of data, the upper right hand header value shows the name of the file being displayed (ex. peakFlowPassFailMitigated.TXT). The first line of the file also shows this value. The next line shows the time stamp of the file that is being analyzed. The time stamps of all of the report files should be within a minute or two of each other, otherwise there may have been tampering with the files. Each report run creates and prints all of the files and reports at one time so all the time stamps should be very close. It should be noted that the SWMM.out files will not have related time stamps since each file is developed independently.

The first column is the zero based number of the point. The next two columns show the post development "X" and "Y" values. The next column shows the value interpolated between the two bounding points on the pre-development curve. The next three columns show the true or false values of the comparison of the two "Y" values. The last column shows the resultant pass or fail status of the point. There are three ways a point can pass. They are:

1. Point is outside of the geomorphically significant range Q_{10} – Q_{lf}
2. Q_{post} being less than Q_{pre}
3. Q_{post} being less than 110% of the value of Q_{pre} if the point is between Q_5 and Q_{10}[6]

There are four ways that a point can fail. They are:

1. Q_{post} being greater than Q_{pre} if the point is between Q_{lf} and Q_5
2. Q_{post} being greater than 110% of Q_{pre} if the point is between Q_{lf} and Q_{10}
3. If more than 10% of the points are between 100% and 110% of Q_{pre} for the points between Q_5 and Q_{10}
4. If the frequency interval for points > 100% of Q_{pre} is greater than 1 year for the points between Q_5 and Q_{10}

A quick scan down the last column will quickly tell if there are any points that fail.

At the bottom of each set of data are the date stamp of the report to the left, and to the right is the page number/number of pages for the specific set of data (not the pages of the report!). Each new set

[5] See hydromodification limits for exceedance of pre-development values
[6] See section on how a point can fail point number 3 hereon

of data has its own page numbering. Between the file name in the header row and the page numbering in the footer row, the engineer can readily scan the document for the data of interest.

The Peak Flow Statistics Calculations

There are three sets of data for the Peak Flow Statistics calculations (Pre-Development, Un-Mitigated, and Mitigated). As was the case for the pass/fail data, the upper right hand corner of each sheet has the file name. The first row of the data is the SWMM file name. The second row is the SWMM file time stamp of the file being analyzed. The 4th, 5th, and 6th rows are the calculated values for Q_{10}, Q_5, and Q_2. These values are derived by linear interpolation between the nearest bounding points in the listing. While the relationship between the points in the peak flow analysis is not technically a linear relationship, the error introduced in using linear interpolation between such relatively close data points is assumed to be irrelevant. Finally, the footer row shows the report time and the page/number of pages of the data set.

As was previously discussed, each storm listed was determined by reading the flow values directly from the binary output file from the SWMM program. The storms were then sorted in descending order of peak flow values. Then each storm was assigned a unique rank, then the Frequency and Return Period were calculated using Weibull formulas. Every discharge value for the entire rainfall record is listed in each of these lists. It should be noted that the derivation of these peak flow statistics values use full precision (i.e. no rounding off) of the SWMM output values. Since the precision of the calculations may not be the same as the SWMM program uses, and also the assignment of rank to values of equal peak flow value may differ slightly from the way SWMM calculates the tables, minor variances in the data values and/or the order of storms can be expected.

Finally, as was previously stated, the values of the Return Period were plotted vs. the peak flow values to develop the peak flow frequency curves.

Plan Check Suggestions

As is the responsibility of the reviewing agency, any and all methods should be considered to verify that the SWMM analysis adequately models the site as far as hydrologic discharge is concerned, and that the data sets presented are valid results from consistent calculations, and that any and all results can be duplicated by manual methods and achieve the same results. In light of these goals, the plan checker is invited to consider the following tasks as part of the plan check process.

Compare the Data Stamps for Each of the Statistics Files Used In This Analysis.

For each set of calculations and report files, the first step of the process is to list out all the files in the report folder and delete those files. The very first step leaves the reports folder completely empty. Then as each successive step is performed, the results file is placed in the reports folder. Once all of the results files are complete, then the report file is compiled using the data directly from the files placed in the results folder. This means that the time stamps on each of the report files in the report should be within a minute or two depending on the speed of the computer. If the time values are more than a few minutes apart then the potential for inconsistent results files should be investigated.

Verify A Few Random Storm Statistics

For each of the Pre, Un-mitigate and Mitigated peak flow statics tables, a few randomly selected storms should be checked against the values taken directly from the SWMM file. This can be done by opening the corresponding SWMM file, selecting the outfall node, selecting Report>Table>By Object, Setting the time format to Date/Time, selecting the appropriate node value, and clicking the OK button to generate a table of the date/time/Total Inflow values. Now scroll down the list to the start date and time of the randomly selected storm. Verify that the start date, end date, and the highest flow value between the start and end date correspond to the values shown in the statistics table. Do this for a few storm to verify that the data corresponds to the SWMM output file. Verify by hand a few of the frequency and return period values.

Compare Plotted Curves to Table Data

Randomly check a few of the plotted points against the values found in the Peak Flow Frequency Tables.

Verify by Observation that the values of Q_{10}, Q_5, Q_2 and Q_{lf} are reasonable.

For each value shown on the reports, verify that the value shown for say Q10 is in between the next higher return period and the next lower period. Also verify that the correct values for each of these return periods are plotted correctly on the peak flow frequency graph.

Manually Verify That the Pass Fail Table Is Correctly Calculated

Select at random several points on each of the pass/fail tables to verify that the values for post X/Y and interpolated Y look reasonable. Also check that the various test results are shown accurately in the chart and also the final pass/fail result looks accurate.

Drawdown Time of Bio-filtration Surface Ponding

The drawdown time for hydromodification flow control facilities was calculated by assuming a starting water surface elevation coincident with the peak operating level in the bio-filtration facility such as the elevation at the weir or the emergency spillway overflow.

The instruction from the county of San Diego Department of Environmental Health (DEH) limits the drawdown time hydromodification flow control facilities to 96 hours. This restriction was implemented as mitigation to potential vector breeding issues and the subsequent risk to human health.

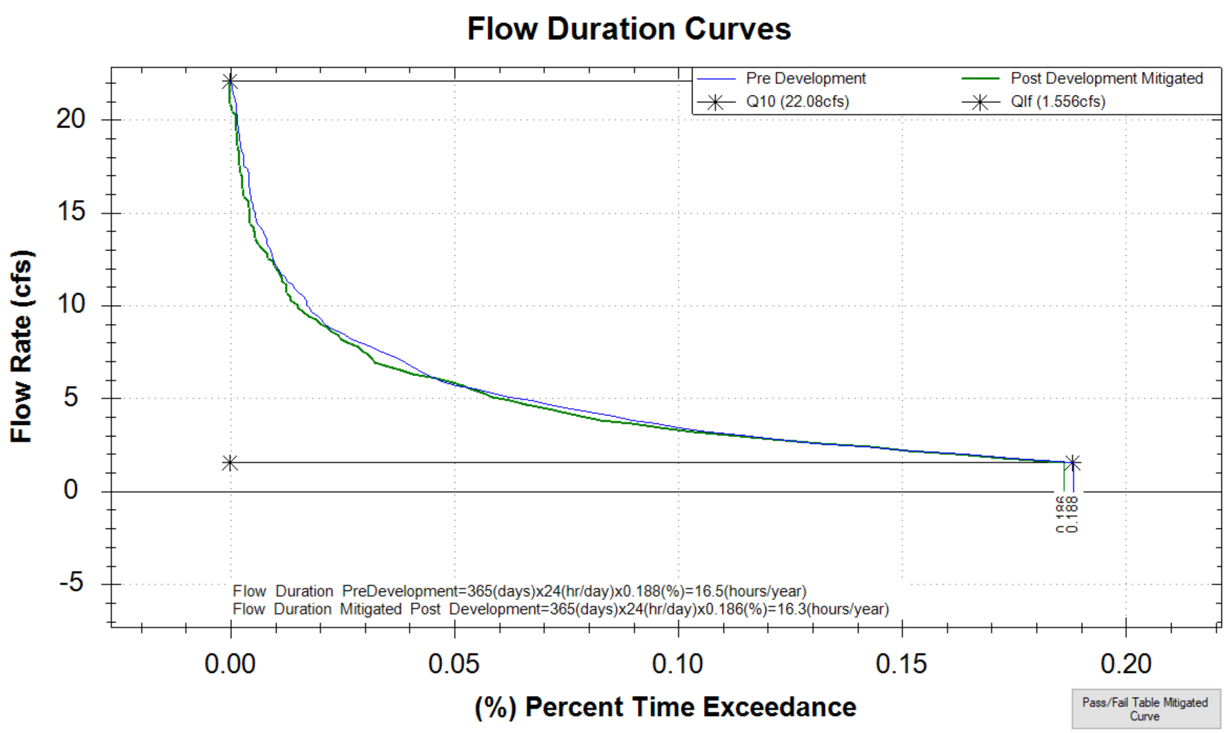
VII. SUMMARY AND CONCLUSION

Hydromodification calculations were performed utilizing continuous simulation to size storm water control facilities. SWMM (Storm Water Management Model) version 5.0 distributed by USEPA was used to generate computed peak flow recurrence and flow duration series statistics.

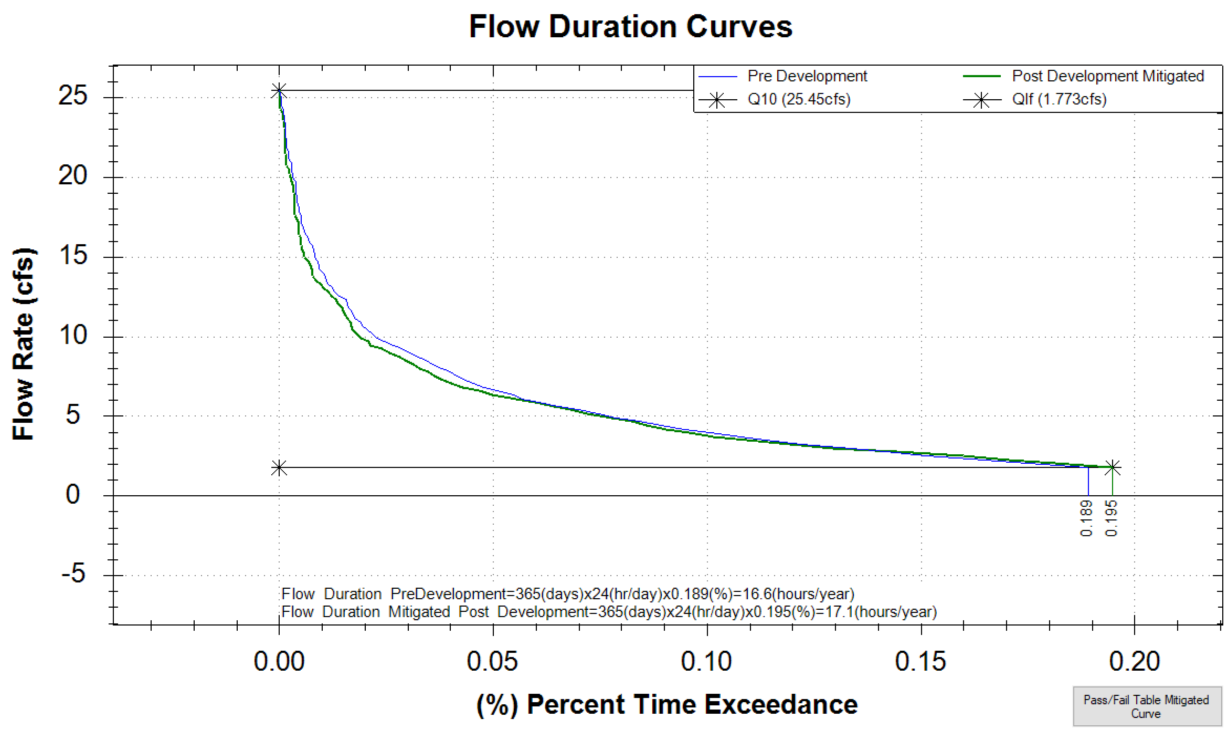
There are several tributary areas planned as industrial use treated by 4 biofiltration basins (labeled as BMP-# (Best Management Practices) with a total tributary area of approximately 5.9 acres. The areas were grouped based on its outfall and were analyzed for pre-development and post-development conditions; all basins drain to one point of compliance (POC).

The analyzed SWMM runs attached show that the proposed biofiltration facilities provided with variety of orifice flow control at the base of the gravel storage configured as shown in Figure 6-1 is in compliance with the HMP and BMP Manual.

POC 1
With the proposed square footage of LID areas and orifices acting as the low flow restrictor configured as shown in Figure 1 the duration of the flow is 16.3 hours (0.173×365days×24 hour/day =16.3 hours). This flow duration is higher lower than the existing and meets the requirements.

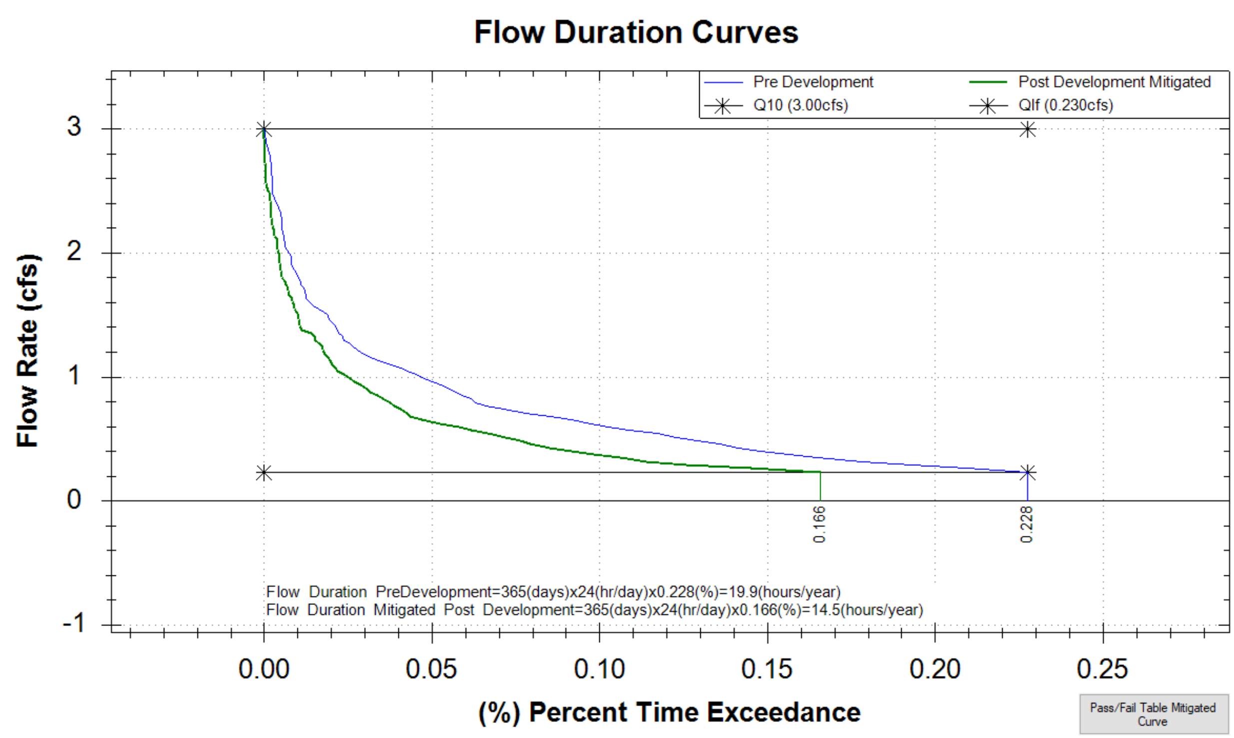


POC 2
With the proposed square footage of LID areas and orifices acting as the low flow restrictor configured as shown in Figure 1 the duration of the flow is 17.1 hours (0.195×365days×24 hour/day =17.1 hours). This flow duration is higher lower than the existing and meets the requirements.



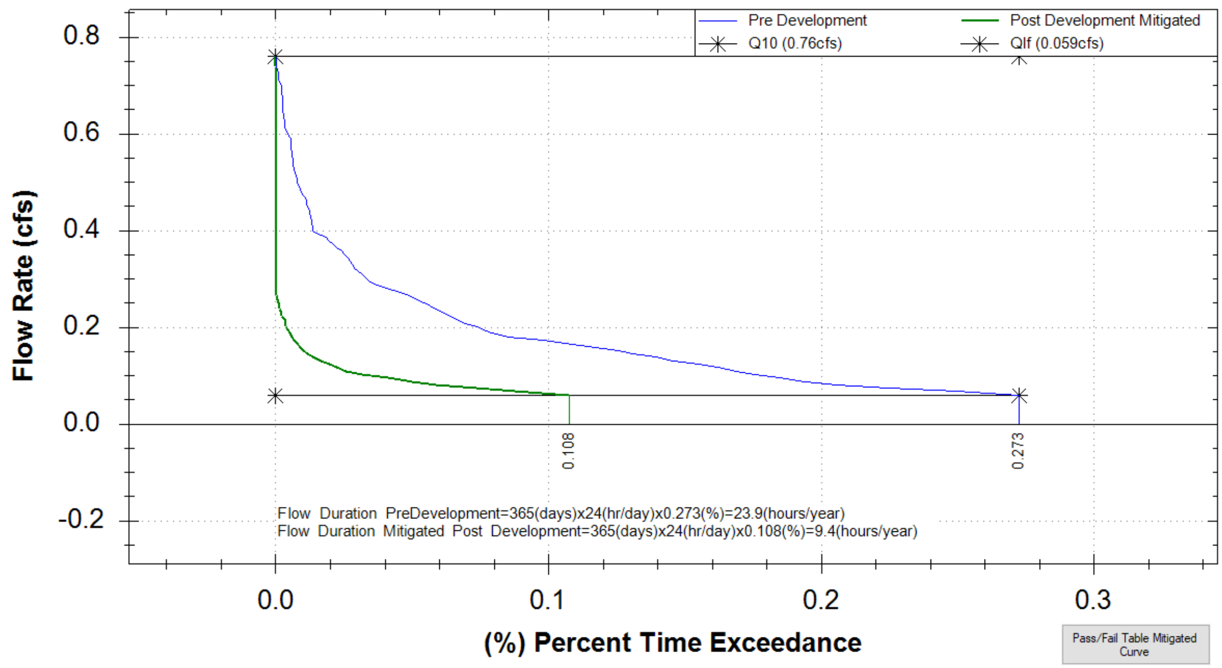
POC 3

With the proposed square footage of LID areas and orifices acting as the low flow restrictor configured as shown in Figure 1 the duration of the flow is 14.5 hours (0.166×365days×24 hour/day =14.5 hours). This flow duration is higher lower than the existing and meets the requirements.



POC 4

With the proposed square footage of LID areas and orifices acting as the low flow restrictor configured as shown in Figure 1 the duration of the flow is 9.4 hours (0.108×365days×24 hour/day =9.8 hours). This flow duration is higher lower than the existing and meets the requirements.



Therefore, this study has demonstrated that the proposed optimized biofiltration basins are sufficient to meet the current HMP and BMP criteria.

EXISTING SITE FEATURES:

- THE UNDERLYING HYDROLOGIC SOILS GROUP FOR THE ENTIRE SITE IS SOIL TYPE D.
- THE APPROXIMATE DEPTH TO GROUNDWATER IS GREATER THAN 25 FEET BASED ON THE EPA WEB SOIL SURVEY RESULTS
- THE TWO NATURAL HYDROLOGIC FEATURES OF THE SITE ARE A NATURAL DRY DRAINAGE COURSE FLOWING ON A SOUTHERLY DIRECTION ALONG THE EASTERN PROPERTY LINE, AND A NATURAL DRY DRAINAGE COURSE FLOWING IN A NORTHWESTERLY DIRECTION LEAVING THE SITE NEAR THE NORTH WEST LIMITS OF THE SITE.
- THE SITE IS GENTLY SLOPING NATURAL UNDEVELOPED AREA WITH NO APPRECIABLE IMPERVIOUS AREAS WITHIN THE PROJECT BOUNDARIES.
- THE SITE PROPOSES TO CONNECT TO THE EXISTING PUBLIC STORMDRAIN SYSTEM FLOWING IN A WESTERLY DIRECTION LOCATED IN THE PUBLIC RIGHT-OF-WAY FOR SAN ELIJO ROAD.
- BASED ON WATERSHED MAPPING OF POTENTIAL CRITICAL COARSE SEDIMENT YIELD AREAS (CCSYA), THERE ARE NO CCSYA LOCATED WITHIN THE PROJECT BOUNDARY OR TRIBUTARY TO THE RUNOFF BYPASSED AROUND THE SITE.

LEGEND

DMA-BOUNDARY

SCALE 1:100

0 100 200

EXCEL ENGINEERING
LAND PLANNING • ENGINEERING • SURVEYING
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PH (760)745-8118 FX (760)745-1890

QUESTHAVEN
PRE-DEVELOPMENT
HYDROMODIFICATION EXHIBIT

V:\19\19038\Engineering\TM\Storm\Working Files\SWQMP\DMA and HMP Exhibits\19038-HMPPRE.dwg 3/18/2021 12:54 PM ORIGINAL PLOT SIZE: ----

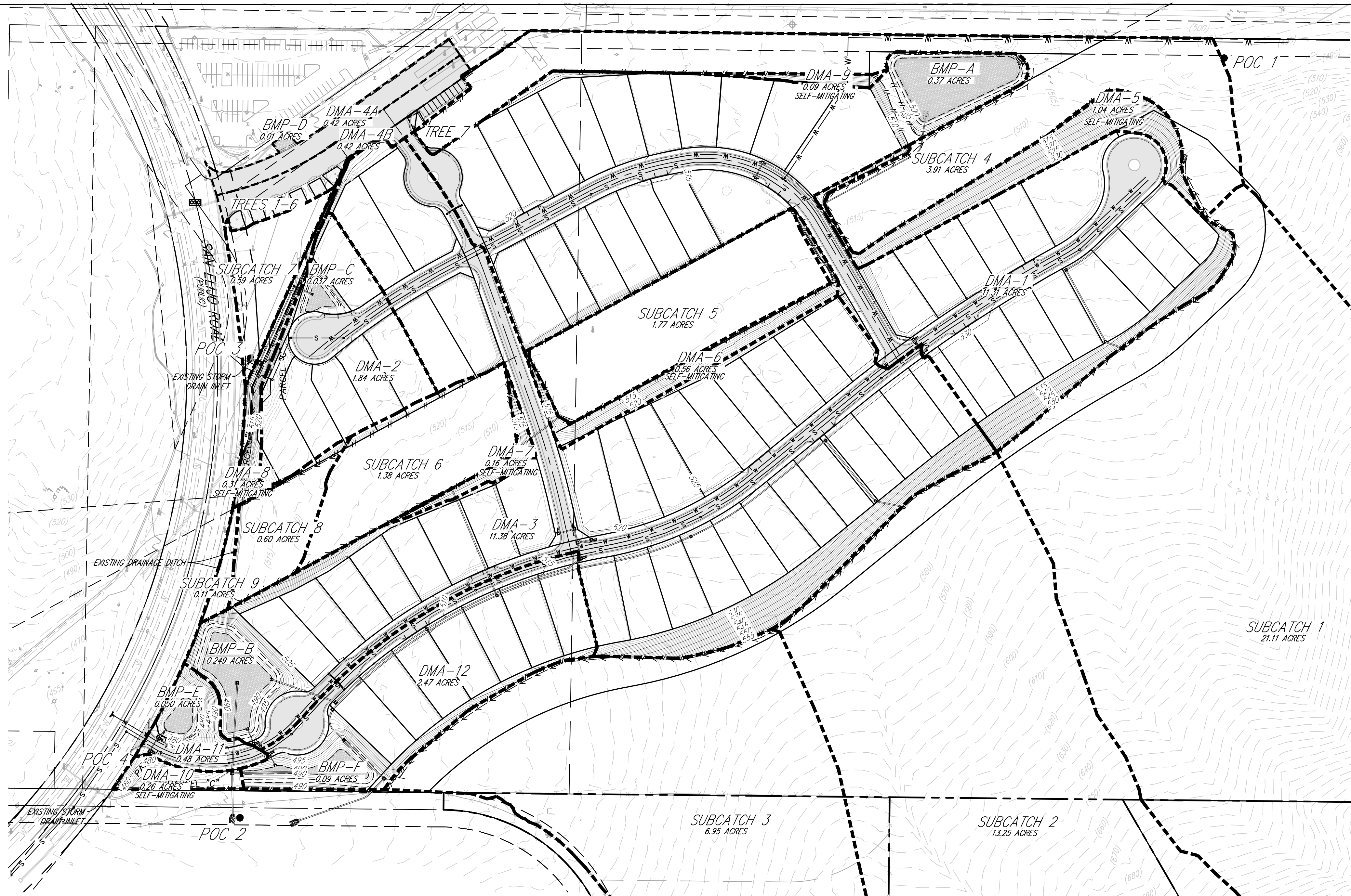
HMP PRE


08/28/1951 01:00:00
POC-1
Subcatch-5
Subcatch-4
Subcatch-1
POC-3
Subcatch-2
Subcatch-3
POC-4
POC-2

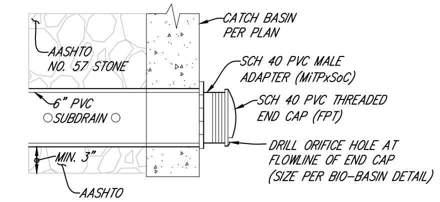
```
[TITLE]
;;Project Title/Notes
  HMP PRE

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           00:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             24:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.06   0.08   0.11   0.15   0.17   0.19   0.19   0.18   0.15   0.11   0.08
0.06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      FILE       "R:\_Storm\HydMOD\Rain gauge
Data\Oceanside\Oceanside ALERT Station.dat" Oceanside  IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen
SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
----------------
Subcatch-1       Oceanside        POC-1            33.9471  0        678      18.5
0
Subcatch-2       Oceanside        POC-2            39.75656657 0        680      19
0
Subcatch-4       Oceanside        POC-3            3.850467585 0        235      18.5
0
```

```
Subcatch-5       Oceanside        POC-3            0.415    0        35       5.6
0
Subcatch-3       Oceanside        POC-4            1.055582163 0        67       20
0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
Subcatch-1       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-2       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-4       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-5       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-3       0.012      0.038      0.05       0.10       0          OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
Subcatch-1       9.0        0.025      0.3
Subcatch-2       9.0        0.025      0.30
Subcatch-4       9.0        0.01875    0.3
Subcatch-5       9.0        0.01875    0.3
Subcatch-3       9.0        0.025      0.33

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-1            0.0        FREE                        NO
POC-3            0.0        FREE                        NO
POC-2            0.0        FREE                        NO
POC-4            0.0        FREE                        NO

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 12500.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-1            5822.723           9118.511
POC-3            -690.500           4603.330
POC-2            53.869             2164.545
POC-4            -984.329           2154.750

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
Subcatch-1       7037.218           5475.024
Subcatch-2       2404.505           4622.919
Subcatch-4       -142.018           5484.819
Subcatch-5       -759.060           6973.555
Subcatch-3       -504.407           3036.239

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
```

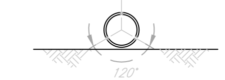
```
;;-------------- ----------------- -----------------


[BACKDROP]
FILE       "V:\19\19038\Engineering\TM\Storm\Working Files\SWQMP\DMA and HMP
Exhibits\Plots\swmmbackgroundtestPRE.jpg"
DIMENSIONS -2500.000 0.000 12500.000 10000.000
```



	STRUCTURAL BMP SUMMARY TABLE													
DMA ID	BMP ID:	TYPE OF BMP	EFFECTIVE AREA (SQFT)	A1 (INCH) RISER	A2 (INCH) TOP OF BASIN	A3 (INCH) CLEAN OUT	B (INCH) UPPER ORIFICE	C (INCH) MEDIA	D (INCH) GRAVEL	E (FEET)	BOX RISER / OVERFLOW STRUCTURE SIZE (INCHES)	ORIFICES DIAMETER UPPER (INCH)	ORIFICES DIAMETER LOWER (INCH)	IMPERMEABLE LINER?
DMA-1	BMP-A	BIOFILTRATION	17,236	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.5	YES
DMA-2	BMP-C	BIOFILTRATION	10,862	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.5	YES
DMA-3	BMP-B	BIOFILTRATION	1,486	6	12.0	6.0	–	21.0	15	1.5	36X36	–	0.75	YES
DMA-4A	BMP-D	BIOFILTRATION	597	6	12.0	6.0	–	21.0	18	1.5	36X36	–	0.75	YES
DMA-11	BMP-E	BIOFILTRATION	2,189	6	12.0	6.0	–	21.0	15	1.5	36X36	–	1.0	YES
DMA-12	BMP-F	BIOFILTRATION	4,691	6	12.0	6.0	–	21.0	18	1.5	36X36	–	1.0	YES



ORIFICE DETAIL
NOT TO SCALE

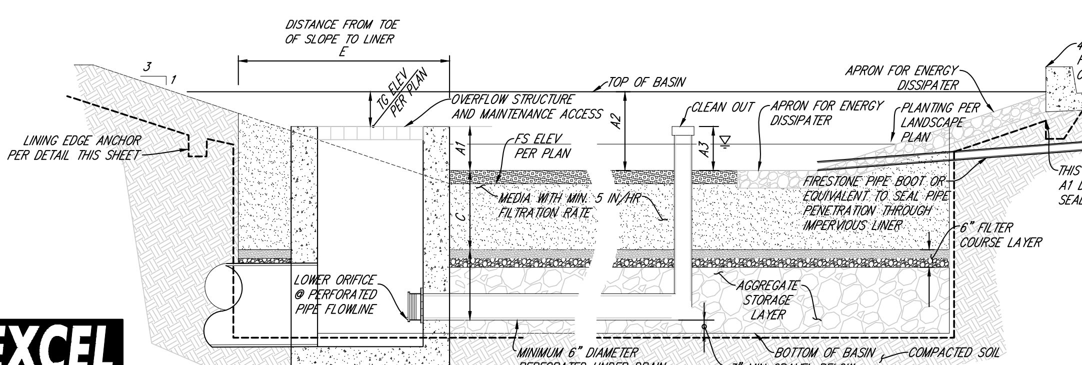


6" PVC PIPE PERFORATION LAYOUT DETAIL
NOT TO SCALE

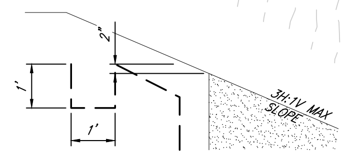
LEGEND

DMA-BOUNDARY

PROPOSED IMPERVIOUS ROADWAY



BIOFILTRATION BASIN DETAIL
NOT TO SCALE



IMPERMEABLE LINER EDGE ANCHOR DETAIL
NOT TO SCALE

SCALE 1:100
0 100 200 300 400

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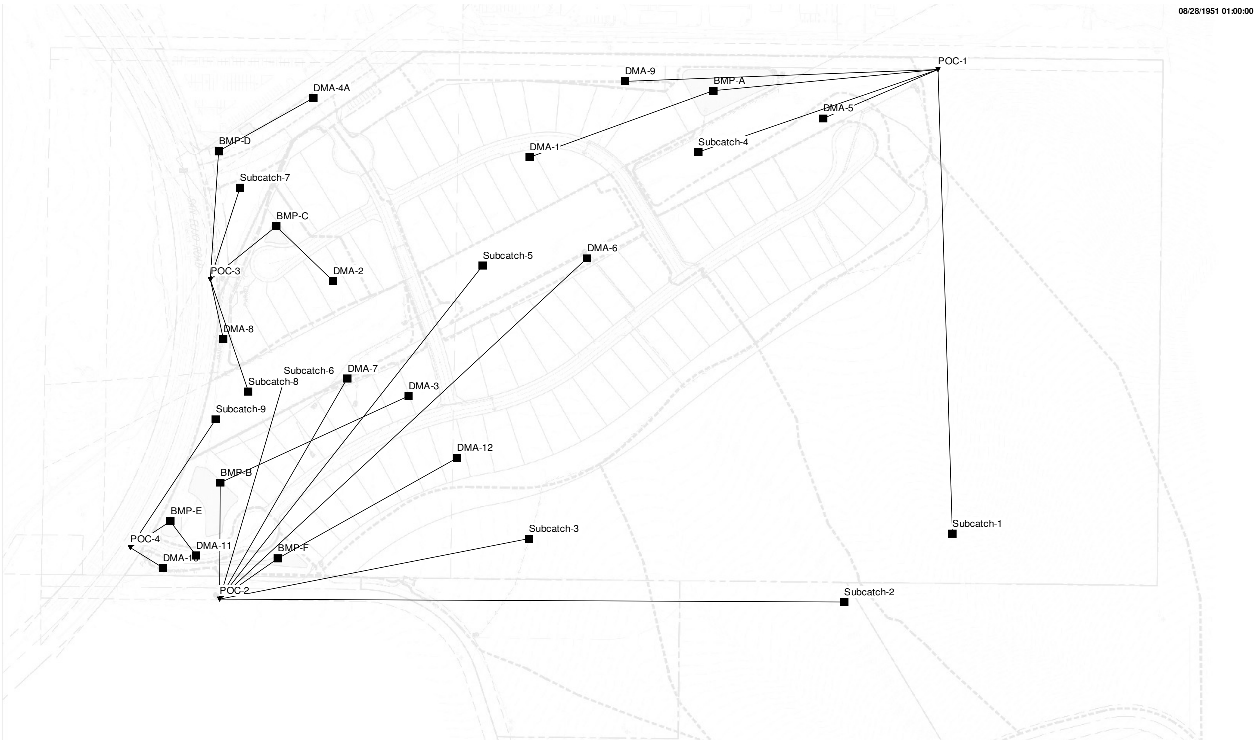
QUESTHAVEN POST-DEVELOPMENT HYDROMODIFICATION EXHIBIT

V: \19\19038\Engineering\TM\Storm\Working Files\SWQMP\DMA and HMP Exhibits\19038-HMPPOST.dwg 3/19/2021 2:16 PM ORIGINAL PLOT SIZE: PDF 24X36

HMP POST


08/28/1951 01:00:00
POC-1
DMA-9
BMP-A
DMA-4A
DMA-5
BMP-D
DMA-1
Subcatch-4
Subcatch-7
BMP-C
Subcatch-5
DMA-6
POC-3
DMA-2
DMA-8
Subcatch-6
DMA-7
Subcatch-8
DMA-3
Subcatch-9
DMA-12
BMP-B
BMP-E
Subcatch-3
Subcatch-1
POC-4
DMA-11
BMP-F
POC-2
Subcatch-2

```
[TITLE]
;;Project Title/Notes
HMP         POST

[OPTIONS]
;;Option             Value
FLOW_UNITS           CFS
INFILTRATION         GREEN_AMPT
FLOW_ROUTING         KINWAVE
LINK_OFFSETS         DEPTH
MIN_SLOPE            0
ALLOW_PONDING        YES
SKIP_STEADY_STATE    NO

START_DATE           08/28/1951
START_TIME           00:00:00
REPORT_START_DATE    08/28/1951
REPORT_START_TIME    00:00:00
END_DATE             05/23/2008
END_TIME             23:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          01:00:00
WET_STEP             00:15:00
DRY_STEP             24:00:00
ROUTING_STEP         0:01:00
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           0
HEAD_TOLERANCE       0
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              1

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
MONTHLY          0.06   0.08   0.11   0.15   0.17   0.19   0.19   0.18   0.15   0.11   0.08
0.06
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- ------ ------ ----------
Oceanside        INTENSITY 1:00     1.0      FILE       "R:\_Storm\HydMOD\Rain gauge
Data\Oceanside\Oceanside ALERT Station.dat" Oceanside  IN

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen
SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
----------------
BMP-A            Oceanside        POC-1            0.395697429 0        82       0
0
BMP-B            Oceanside        POC-2            0.2493590932 0        30       0
0
BMP-C            Oceanside        POC-3            0.0369651561 0        31       0
0
```

```
BMP-D            Oceanside        POC-3            0.013705234 0       10       0
0
BMP-E            Oceanside        POC-4            0.0502556129 0       35       0
0
BMP-F            Oceanside        POC-2            0.107696979 0       15       0
0
DMA-1            Oceanside        BMP-A            10.31055511 46      450      3.3
0
DMA-10           Oceanside        POC-4            0.1991376722 0       40       50
0
DMA-11           Oceanside        BMP-E            0.4312266745 28.4     250      15
0
DMA-12           Oceanside        BMP-F            2.437184991 42      340      0.5
0
DMA-2            Oceanside        BMP-C            1.727093792 51      300      1.38
0
DMA-3            Oceanside        BMP-B            11.13337261 45      527      0.5
0
DMA-4A           Oceanside        BMP-D            0.40127615 100     297      1.82
0
DMA-5            Oceanside        POC-1            0.80777545 0       55       50
0
DMA-6            Oceanside        POC-2            0.464878563 0       34       50
0
DMA-7            Oceanside        POC-2            0.160097335 0       36       50
0
DMA-8            Oceanside        POC-3            0.3077537282 0       50       50
0
DMA-9            Oceanside        POC-1            0.092362009 0       15       18.5
0
Subcatch-1       Oceanside        POC-1            21.11284323 0       642      27.2
0
Subcatch-2       Oceanside        POC-2            13.25343272 0       780      22.62
0
Subcatch-3       Oceanside        POC-2            6.948286015 0       623      21.2
0
Subcatch-4       Oceanside        POC-1            3.910482351 0       258      4
0
Subcatch-5       Oceanside        POC-2            1.773571492 0       235      6
0
Subcatch-6       Oceanside        POC-2            1.382463829 0       220      6
0
Subcatch-7       Oceanside        POC-3            0.592021694 0       315      4
0
Subcatch-8       Oceanside        POC-3            0.601340824 0       149      4.5
0
Subcatch-9       Oceanside        POC-4            0.111646134 0       181      30
0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
BMP-A            0.012      0.055      0.05       0.10       0          OUTLET
BMP-B            0.012      0.055      0.05       0.10       0          OUTLET
BMP-C            0.012      0.055      0.05       0.10       0          OUTLET
BMP-D            0.012      0.055      0.05       0.10       0          OUTLET
BMP-E            0.012      0.055      0.05       0.1        0          OUTLET
BMP-F            0.012      0.055      0.05       0.10       0          OUTLET
DMA-1            0.012      0.055      0.05       0.10       0          OUTLET
DMA-10           0.012      0.055      0.05       0.1        0          OUTLET
DMA-11           0.012      0.055      0.05       0.1        0          OUTLET
DMA-12           0.012      0.055      0.05       0.10       0          OUTLET
DMA-2            0.012      0.055      0.05       0.10       0          OUTLET
DMA-3            0.012      0.055      0.05       0.10       0          OUTLET
DMA-4A           0.012      0.055      0.05       0.10       0          OUTLET
DMA-5            0.012      0.055      0.05       0.10       0          OUTLET
```

```
DMA-6            0.012      0.055      0.05       0.10       0          OUTLET
DMA-7            0.012      0.038      0.05       0.10       0          OUTLET
DMA-8            0.012      0.055      0.05       0.1        0          OUTLET
DMA-9            0.012      0.055      0.05       0.10       0          OUTLET
Subcatch-1       0.012      0.055      0.05       0.10       0          OUTLET
Subcatch-2       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-3       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-4       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-5       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-6       0.012      0.038      0.05       0.10       0          OUTLET
Subcatch-7       0.012      0.055      0.05       0.10       0          OUTLET
Subcatch-8       0.012      0.055      0.05       0.10       0          OUTLET
Subcatch-9       0.012      0.055      0.05       0.10       0          OUTLET

[INFILTRATION]
;;Subcatchment   Suction    Ksat       IMD
;;-------------- ---------- ---------- ----------
BMP-A            9.0        0.025      0.3
BMP-B            9.0        0.025      0.3
BMP-C            9.0        0.025      0.3
BMP-D            9.0        0.025      0.3
BMP-E            9.0        0.025      0.3
BMP-F            9.0        0.025      0.3
DMA-1            9.0        0.01875    0.3
DMA-10           9          0.01875    0.3
DMA-11           9          0.01875    0.3
DMA-12           9.0        0.01875    0.3
DMA-2            9.0        0.01875    0.3
DMA-3            9.0        0.01875    0.3
DMA-4A           9.0        0.025      0.3
DMA-5            9.0        0.025      0.3
DMA-6            9.0        0.025      0.3
DMA-7            9.0        0.01875    0.3
DMA-8            9          0.025      0.3
DMA-9            9.0        0.025      0.3
Subcatch-1       9.0        0.025      0.3
Subcatch-2       9.0        0.025      0.3
Subcatch-3       9.0        0.025      0.3
Subcatch-4       9.0        0.025      0.3
Subcatch-5       9.0        0.025      0.3
Subcatch-6       9.0        0.025      0.3
Subcatch-7       9.0        0.025      0.3
Subcatch-8       9.0        0.025      0.3
Subcatch-9       9.0        0.025      0.3

[LID_CONTROLS]
;;Name           Type/Layer Parameters
;;-------------- ---------- ----------
BMP-A            BC
BMP-A            SURFACE    6          0.0        0.0        0.0        5
BMP-A            SOIL       21         0.4        0.2        0.1        5.0        5.0
1.5
BMP-A            STORAGE    18         0.67       0.025      0.0
BMP-A            DRAIN      0.0624194055300589 0.5        3          6          0
0

BMP-B            BC
BMP-B            SURFACE    6          0.0        0.0        0.0        5
BMP-B            SOIL       21         0.4        0.2        0.1        5.0        5.0
1.5
BMP-B            STORAGE    15         0.67       0.025      0.0
BMP-B            DRAIN      0.0678397467742332 0.5        3          6          0
0

BMP-C            BC
BMP-C            SURFACE    6          0.0        0.0        0.0        5
```

```
BMP-C            SOIL       21         0.4        0.2        0.1        5.0        5.0
1.5
BMP-C            STORAGE    15         0.67       0.025      0.0
BMP-C            DRAIN      0.114408265532459 0.5        3          6          0
0

BMP-D            BC
BMP-D            SURFACE    6          0.0        0          0          5
BMP-D            SOIL       18         0.4        0.2        0.1        5          5
1.5
BMP-D            STORAGE    21         0.67       0.025      0
BMP-D            DRAIN      0.308576531256894 0.5        3          6          0
0

BMP-E            BC
BMP-E            SURFACE    6          0.0        0          0          5
BMP-E            SOIL       21         0.4        0.2        0.1        5          5
1.5
BMP-E            STORAGE    15         0.67       0.025      0
BMP-E            DRAIN      0.149603978981293 0.5        3          6          0
0

BMP-F            BC
BMP-F            SURFACE    6          0.0        0.1        1.0        5
BMP-F            SOIL       21         0.4        0.2        0.1        5          5
1.5
BMP-F            STORAGE    18         0.67       0.25       0
BMP-F            DRAIN      0.0698109169581259 0.5        3          6          0
0

[LID_USAGE]
;;Subcatchment   LID Process      Number  Area       Width      InitSat    FromImp
ToPerv     RptFile                  DrainTo          FromPerv
;;-------------- ---------------- ------- ---------- ---------- ---------- ----------
---------- ------------------------ ---------------- ----------
BMP-A            BMP-A            1       17236.58   0          0          0
0          "V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\BMP-3 LID
report.txt" *               0
BMP-B            BMP-B            1       10862.08   0          0          0
0          "V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\BMP-2 LID
report.txt" POC-2           0
BMP-C            BMP-C            1       1610.20    0          0          0
0          "V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\BMP-4 LID
report.txt" *               0
BMP-D            BMP-D            1       597.00     0          0          0
0          *                        *                0
BMP-E            BMP-E            1       2189.13    0          0          0
0          *                        *                0
BMP-F            BMP-F            1       4691.28    0          0          0
0          *                        *                0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
POC-2            0          FREE                        NO
POC-1            0          FREE                        NO
POC-3            0          FREE                        NO
POC-4            0          FREE                        NO

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
BMP-3-SSC        Storage    0          17236.58
BMP-3-SSC                   1.25       19385.74
;
BMP-2-SSC        Storage    0          10925.28
```

```
BMP-2-SSC                       0.25        11288.41
BMP-2-SSC                       0.75        12023.17
BMP-2-SSC                       1           12394.81
BMP-2-SSC                       1.25        12783.22
BMP-2-SSC                       1.5         13171.20
BMP-2-SSC                       1.75        13561.10
BMP-2-SSC                       2           13952.90
BMP-2-SSC                       2.25        14343.73
BMP-2-SSC                       2.5         14744.67
BMP-2-SSC                       2.75        15156.62
BMP-2-SSC                       3           15579.59
BMP-2-SSC                       3.25        16001.39
BMP-2-SSC                       3.5         16432.10
BMP-2-SSC                       3.75        16879.65
BMP-2-SSC                       4           17344.03
BMP-2-SSC                       4.25        17792.07
BMP-2-SSC                       4.5         18254.78
BMP-2-SSC                       4.75        18732.17
BMP-2-SSC                       5           18780
;
BMP-1-SSC        Storage        0           3852
BMP-1-SSC                       0.25        4015.15
BMP-1-SSC                       0.5         4180.07
BMP-1-SSC                       0.75        4347.51
BMP-1-SSC                       1           4517.49
;
Sto-Box-3        Storage        0           36
Sto-Box-3                       1           36
Sto-Box-3                       2           36
Sto-Box-3                       3.25        36
;
BMP-C-STO        Storage        0           1355.00
BMP-C-STO                       .5          1578.6185
;
BMP-D-STO        Storage        0           597
BMP-D-STO                       0.5         756.77

[REPORT]
;;Reporting Options
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]

[MAP]
DIMENSIONS -2500.000 0.000 12500.000 10000.000
Units      None

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
POC-2            132.223            3271.303
POC-1            7448.580           8873.653
POC-3            44.074             6650.343
POC-4            -778.648           3819.785

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[Polygons]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
BMP-A            5166.503           8648.384
BMP-B            142.018            4505.387
```

```
BMP-C             710.088           7218.413
BMP-D             122.429           8011.753
BMP-E             -367.287          4094.025
BMP-F             728.275           3698.806
DMA-1             3295.788          7943.193
DMA-10            -445.642          3604.310
DMA-11            -102.840          3731.636
DMA-12            2555.923          4762.308
DMA-2             1287.953          6640.548
DMA-3             2059.622          5416.164
DMA-4A            1092.067          8570.029
DMA-5             6283.056          8354.554
DMA-6             3873.653          6875.612
DMA-7             1434.868          5602.351
DMA-8             171.401           6023.506
DMA-9             4265.426          8746.327
Subcatch-1        7595.495          3966.699
Subcatch-2        6498.531          3241.920
Subcatch-3        3285.994          3907.933
Subcatch-4        5009.794          8001.959
Subcatch-5        2815.867          6797.258
Subcatch-6        788.443           5582.762
Subcatch-7        337.904           7619.980
Subcatch-8        426.053           5465.230
Subcatch-9        93.046            5171.401

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------


[BACKDROP]
FILE       "V:\19\19038\Engineering\TM\Storm\Working Files\SWQMP\DMA and HMP
Exhibits\Plots\swmmbackgroundtest.jpg"
DIMENSIONS -2500.000 0.000 12500.000 10000.000
```

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC-1

ANALYSIS DETAILS

Stream Susceptibility to Channel Erosion: High
Low Flow Threshold = (0.1)Q2 = (0.1)15.560 = Qlf = 1.5560 (cfs)
Flow Control Upper Limit = Q10 = 22.080 (cfs)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM file time stamp: 3/19/2021 1:46:15 PM
Selected Node to Analyze: POC-1

POST-DEVELOPMENT MITIGATED SWMM FILE

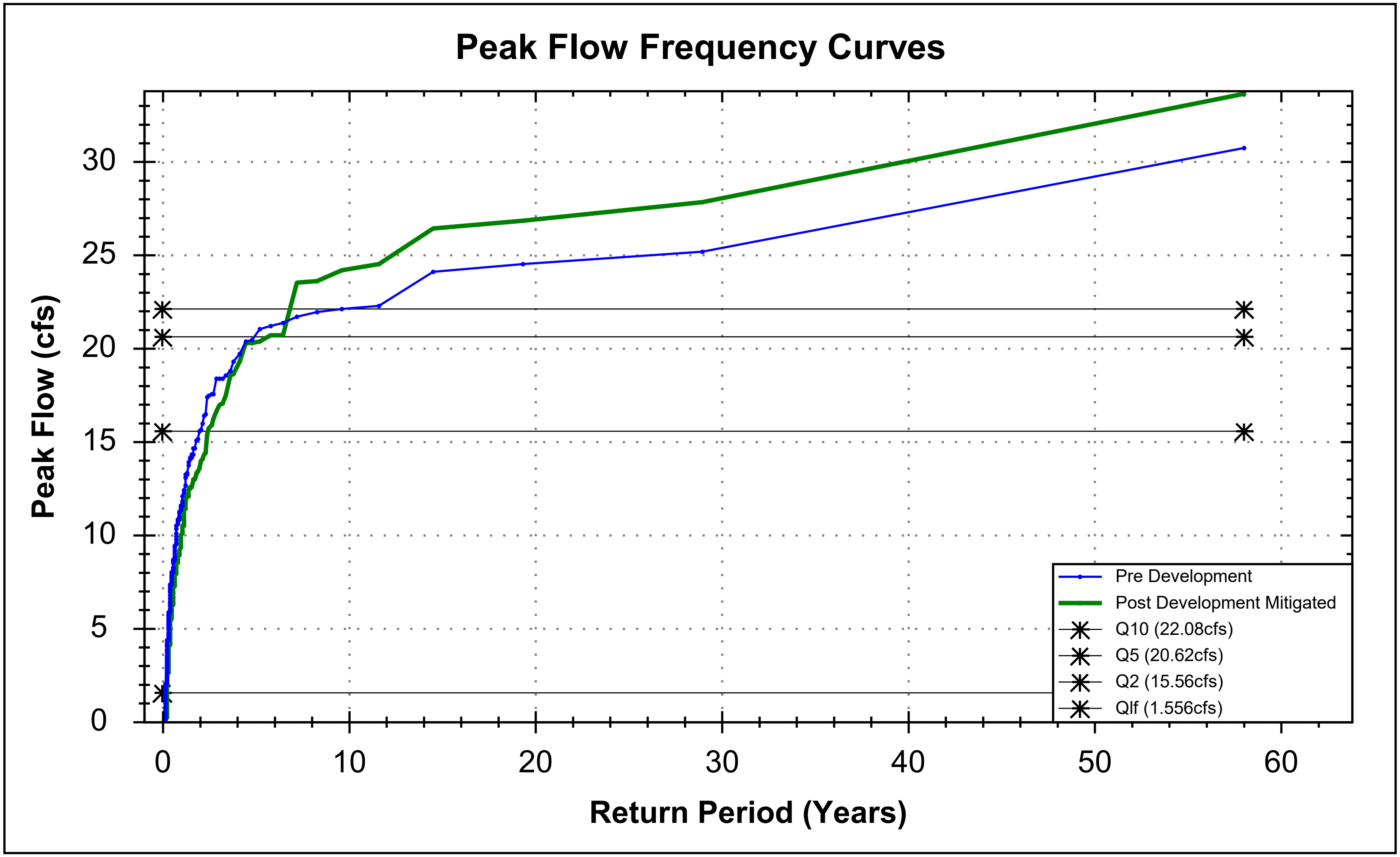
SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM file time stamp: 8/3/2021 1:19:24 PM
Selected Node to Analyze: POC-1

MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:
 Peak Flow Conditions PASS
 Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 373 points. Of the points, 8 point(s) are above the flow control upper limit (Q10 = 22.08 (cfs)), 152 point(s) are below the low flow threshold value (Qlf = 1.556 (cfs)). Of the points within the flow control range (Qlf to Q10), 213 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater discharge value. Within the flow control range, comparing the post-development flow duration curve to the pre-development flow duration curve, 100 post-development curve point(s) have a lower flow duration than pre-development conditions. These points all pass. There are no points that failed, therefore the flow duration requirements have been met.


Peak Flow Frequency Curves
Peak Flow (cfs)
Return Period (Years)
0
5
10
15
20
25
30
0
10
20
30
40
50
60
Pre Development
Post Development Mitigated
Q10 (22.08cfs)
Q5 (20.62cfs)
Q2 (15.56cfs)
Qlf (1.556cfs)

Compare Post-Development Curve to Pre-Development Curve							
Flow Control Upper Limit: 22.08 (cfs)							
Flow Control Lower Limit: 1.556 (cfs)							
post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out							
post-development time stamp: 8/3/2021 1:19:24 PM							
Compared to:							
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out							
pre-development time stamp: 3/19/2021 1:46:15 PM							
Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	58.00	33.57	30.72	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
1	29.00	27.81	25.13	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
2	19.33	26.84	24.45	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
3	14.50	26.41	24.04	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
4	11.60	24.49	22.24	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
5	9.67	24.14	22.05	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
6	8.29	23.61	21.92	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
7	7.25	23.45	21.64	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (22.08 (cfs))
8	6.44	20.71	21.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	5.80	20.68	21.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	5.27	20.33	20.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	4.83	20.23	20.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	4.46	20.22	20.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	4.14	19.28	19.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.87	18.56	19.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	3.63	18.52	18.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	3.41	17.46	18.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	3.22	16.99	18.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	3.05	16.97	18.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.90	16.59	18.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.76	16.21	17.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.64	15.84	17.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	2.52	15.69	17.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	2.42	15.37	17.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	2.32	14.34	16.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	2.23	14.33	16.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	2.15	14.03	15.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	2.07	13.99	15.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	2.00	13.53	15.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.93	13.36	15.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.87	13.28	15.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.81	13.18	15.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
32	1.76	13.00	14.63	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.71	12.96	14.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
34	1.66	12.88	14.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.61	12.57	14.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.57	12.54	14.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.53	12.54	14.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.49	12.44	14.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.45	12.44	13.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.42	12.38	13.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.38	12.08	13.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.35	12.06	13.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.32	12.04	13.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.29	11.81	13.18	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	1.26	11.67	13.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	1.23	11.39	12.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	1.21	11.33	12.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	1.18	10.76	12.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	1.16	10.62	12.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	1.14	10.47	12.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	1.12	10.45	12.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	1.09	10.16	11.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	1.07	10.09	11.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
54	1.06	10.07	11.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
55	1.04	9.94	11.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
56	1.02	9.82	11.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
57	1.00	9.62	11.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
58	0.98	9.51	11.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
59	0.97	9.34	11.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
60	0.95	9.12	11.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
61	0.94	9.08	11.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
62	0.92	9.04	10.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
63	0.91	9.03	10.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
64	0.89	8.99	10.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
65	0.88	8.91	10.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
66	0.87	8.80	10.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
67	0.85	8.72	10.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
68	0.84	8.62	10.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
69	0.83	8.55	10.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
70	0.82	8.53	10.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
71	0.81	8.52	10.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
72	0.80	8.51	10.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
73	0.78	8.43	10.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
74	0.77	8.24	10.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
75	0.76	8.23	10.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
76	0.75	8.07	9.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
77	0.74	8.06	9.69	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
78	0.73	8.05	9.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
79	0.73	7.95	9.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
80	0.72	7.93	9.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
81	0.71	7.87	9.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
82	0.70	7.87	9.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
83	0.69	7.86	9.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
84	0.68	7.85	9.18	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
85	0.67	7.84	9.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
86	0.67	7.84	9.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
87	0.66	7.61	8.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
88	0.65	7.47	8.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
89	0.64	7.33	8.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
90	0.64	7.27	8.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
91	0.63	7.24	8.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
92	0.62	7.20	8.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
93	0.62	7.16	8.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
94	0.61	6.92	8.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
95	0.60	6.91	8.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
96	0.60	6.86	8.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
97	0.59	6.84	8.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
98	0.59	6.81	8.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
99	0.58	6.66	8.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
100	0.57	6.64	8.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
101	0.57	6.61	8.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
102	0.56	6.45	8.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
103	0.56	6.44	7.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
104	0.55	6.29	7.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
105	0.55	6.26	7.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
106	0.54	6.24	7.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
107	0.54	6.18	7.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
108	0.53	6.17	7.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
109	0.53	6.17	7.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
110	0.52	6.12	7.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
111	0.52	6.12	7.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
112	0.51	6.12	7.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
113	0.51	6.11	7.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
114	0.50	6.07	7.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
115	0.50	5.98	7.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
116	0.50	5.97	7.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
117	0.49	5.91	7.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
118	0.49	5.83	7.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
119	0.48	5.78	7.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
120	0.48	5.76	7.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
121	0.48	5.68	7.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
122	0.47	5.61	7.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
123	0.47	5.54	7.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
124	0.46	5.49	7.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
125	0.46	5.36	7.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
126	0.46	5.33	7.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
127	0.45	5.31	7.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
128	0.45	5.19	7.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
129	0.45	5.10	7.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
130	0.44	5.06	7.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
131	0.44	5.06	7.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
132	0.44	5.05	7.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
133	0.43	4.98	6.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
134	0.43	4.94	6.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
135	0.43	4.86	6.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
136	0.42	4.84	6.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
137	0.42	4.75	6.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
138	0.42	4.74	6.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
139	0.41	4.71	6.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
140	0.41	4.64	6.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
141	0.41	4.60	6.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
142	0.41	4.54	6.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
143	0.40	4.52	6.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
144	0.40	4.50	6.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
145	0.40	4.46	6.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
146	0.40	4.42	6.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
147	0.39	4.29	6.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
148	0.39	4.24	6.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
149	0.39	4.21	5.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
150	0.38	4.20	5.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
151	0.38	4.06	5.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
152	0.38	4.05	5.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
153	0.38	4.04	5.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
154	0.37	3.98	5.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
155	0.37	3.96	5.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
156	0.37	3.95	5.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
157	0.37	3.81	5.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
158	0.37	3.77	5.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
159	0.36	3.72	5.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
160	0.36	3.67	5.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
161	0.36	3.67	5.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
162	0.36	3.66	5.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
163	0.35	3.65	5.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
164	0.35	3.65	5.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
165	0.35	3.62	5.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
166	0.35	3.58	5.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
167	0.35	3.56	5.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
168	0.34	3.54	5.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
169	0.34	3.53	5.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
170	0.34	3.47	5.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
171	0.34	3.36	5.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
172	0.34	3.28	5.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
173	0.33	3.27	5.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
174	0.33	3.19	5.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
175	0.33	3.15	4.92	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
176	0.33	3.08	4.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
177	0.33	3.06	4.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
178	0.32	3.00	4.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
179	0.32	2.97	4.65	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
180	0.32	2.95	4.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
181	0.32	2.89	4.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
182	0.32	2.87	4.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
183	0.32	2.86	4.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
184	0.31	2.83	4.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
185	0.31	2.82	4.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
186	0.31	2.81	4.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
187	0.31	2.72	4.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
188	0.31	2.68	4.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
189	0.31	2.65	4.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
190	0.30	2.65	4.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
191	0.30	2.61	4.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
192	0.30	2.59	4.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
193	0.30	2.58	4.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
194	0.30	2.57	4.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
195	0.30	2.48	4.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
196	0.29	2.47	4.18	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
197	0.29	2.44	4.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
198	0.29	2.40	4.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
199	0.29	2.39	4.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
200	0.29	2.38	4.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
201	0.29	2.36	3.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
202	0.29	2.29	3.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
203	0.28	2.15	3.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
204	0.28	2.13	3.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
205	0.28	2.13	3.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
206	0.28	2.09	3.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
207	0.28	2.08	3.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
208	0.28	2.07	3.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
209	0.28	2.07	3.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
210	0.28	2.03	3.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
211	0.27	2.02	3.65	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
212	0.27	1.91	3.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
213	0.27	1.89	3.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
214	0.27	1.89	3.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
215	0.27	1.87	3.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
216	0.27	1.87	3.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
217	0.27	1.83	3.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
218	0.27	1.83	3.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
219	0.26	1.77	3.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
220	0.26	1.69	3.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
221	0.26	1.52	3.24	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
222	0.26	1.51	3.24	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
223	0.26	1.51	3.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
224	0.26	1.51	3.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
225	0.26	1.45	3.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
226	0.26	1.43	3.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
227	0.25	1.38	3.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
228	0.25	1.37	3.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
229	0.25	1.36	3.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
230	0.25	1.34	2.97	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
231	0.25	1.34	2.94	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
232	0.25	1.27	2.91	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
233	0.25	1.26	2.87	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
234	0.25	1.10	2.85	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
235	0.25	1.07	2.84	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
236	0.25	0.96	2.81	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
237	0.24	0.95	2.80	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
238	0.24	0.92	2.79	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
239	0.24	0.92	2.78	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
240	0.24	0.86	2.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
241	0.24	0.85	2.75	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
242	0.24	0.79	2.74	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
243	0.24	0.70	2.73	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
244	0.24	0.69	2.65	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
245	0.24	0.67	2.60	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
246	0.24	0.67	2.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
247	0.23	0.67	2.50	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
248	0.23	0.65	2.40	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
249	0.23	0.65	2.34	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
250	0.23	0.64	2.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
251	0.23	0.61	2.32	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
252	0.23	0.60	2.30	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
253	0.23	0.53	2.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
254	0.23	0.48	2.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
255	0.23	0.46	2.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
256	0.23	0.41	2.21	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
257	0.23	0.38	2.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
258	0.22	0.38	2.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
259	0.22	0.38	2.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
260	0.22	0.35	2.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
261	0.22	0.32	2.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
262	0.22	0.30	2.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
263	0.22	0.24	2.12	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
264	0.22	0.23	2.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
265	0.22	0.23	2.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
266	0.22	0.20	2.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
267	0.22	0.17	2.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
268	0.21	0.15	1.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
269	0.21	0.15	1.91	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
270	0.21	0.14	1.83	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
271	0.21	0.13	1.83	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
272	0.21	0.13	1.80	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
273	0.21	0.13	1.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
274	0.21	0.12	1.70	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
275	0.21	0.11	1.67	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
276	0.21	0.11	1.65	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
277	0.21	0.11	1.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
278	0.21	0.10	1.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
279	0.21	0.10	1.57	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
280	0.20	0.10	1.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
281	0.20	0.09	1.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
282	0.20	0.09	1.53	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
283	0.20	0.09	1.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
284	0.20	0.09	1.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
285	0.20	0.09	1.40	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
286	0.20	0.09	1.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
287	0.20	0.09	1.26	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
288	0.20	0.09	1.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
289	0.20	0.09	1.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
290	0.20	0.08	1.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
291	0.19	0.08	1.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
292	0.19	0.08	1.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
293	0.19	0.08	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
294	0.19	0.08	1.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
295	0.19	0.08	1.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
296	0.19	0.08	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
297	0.19	0.08	0.95	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
298	0.19	0.07	0.94	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
299	0.19	0.07	0.93	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
300	0.19	0.07	0.80	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
301	0.18	0.07	0.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
302	0.18	0.07	0.67	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
303	0.18	0.07	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
304	0.18	0.07	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
305	0.18	0.07	0.59	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
306	0.18	0.07	0.54	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
307	0.18	0.07	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
308	0.18	0.07	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
309	0.18	0.07	0.45	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
310	0.18	0.07	0.43	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
311	0.17	0.07	0.36	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
312	0.17	0.07	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
313	0.17	0.06	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
314	0.17	0.06	0.30	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
315	0.17	0.06	0.28	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
316	0.17	0.06	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
317	0.17	0.06	0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
318	0.17	0.06	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
319	0.17	0.06	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
320	0.17	0.06	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
321	0.17	0.06	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
322	0.16	0.06	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
323	0.16	0.06	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
324	0.16	0.06	0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
325	0.16	0.06	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
326	0.16	0.05	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
327	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
328	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
329	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
330	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
331	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
332	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
333	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
334	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
335	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
336	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
337	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
338	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
339	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
340	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
341	0.15	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
342	0.15	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
343	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
344	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
345	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
346	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
347	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
348	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
349	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
350	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
351	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
352	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
353	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
354	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
355	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
356	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
357	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
358	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
359	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
360	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
361	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
362	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
363	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
364	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
365	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
366	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
367	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
368	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
369	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
370	0.12	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
371	0.12	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))
372	0.12	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.556 (cfs))

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM.out time stamp: 3/19/2021 1:46:15 PM

Q10: 22.080 (cfs)
Q5: 20.620 (cfs)
Q2: 15.560 (cfs)

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/04 16:00:00	1995/01/04 22:00:00	7	30.72	0.27%	58
2	2003/02/25 15:00:00	2003/02/25 22:00:00	8	25.13	0.54%	29
3	1958/02/03 04:00:00	1958/02/04 14:00:00	35	24.45	0.82%	19.33
4	1969/02/23 23:00:00	1969/02/25 21:00:00	47	24.04	1.09%	14.5
5	2004/10/27 02:00:00	2004/10/27 09:00:00	8	22.24	1.36%	11.6
6	2005/02/18 05:00:00	2005/02/19 01:00:00	21	22.05	1.63%	9.67
7	1980/02/20 18:00:00	1980/02/21 07:00:00	14	21.92	1.90%	8.29
8	1952/01/16 07:00:00	1952/01/16 16:00:00	10	21.64	2.17%	7.25
9	1993/01/12 20:00:00	1993/01/14 06:00:00	35	21.34	2.45%	6.44
10	1978/02/28 18:00:00	1978/03/01 09:00:00	16	21.19	2.72%	5.8
11	2000/10/29 22:00:00	2000/10/30 00:00:00	3	20.97	2.99%	5.27
12	1958/04/01 12:00:00	1958/04/01 21:00:00	10	20.4	3.26%	4.83
13	1978/01/04 16:00:00	1978/01/04 18:00:00	3	20.33	3.53%	4.46
14	1979/01/15 13:00:00	1979/01/15 16:00:00	4	19.7	3.80%	4.14
15	1982/03/17 03:00:00	1982/03/18 04:00:00	26	19.26	4.08%	3.87
16	1978/02/07 17:00:00	1978/02/10 06:00:00	62	18.78	4.35%	3.63
17	1980/03/02 20:00:00	1980/03/03 11:00:00	16	18.51	4.62%	3.41
18	1991/12/29 15:00:00	1991/12/30 04:00:00	14	18.33	4.89%	3.22
19	1965/11/22 04:00:00	1965/11/23 05:00:00	26	18.31	5.16%	3.05
20	1998/02/03 15:00:00	1998/02/03 23:00:00	9	18.31	5.43%	2.9
21	1983/02/27 16:00:00	1983/02/27 20:00:00	5	17.5	5.71%	2.76
22	1998/02/22 15:00:00	1998/02/24 01:00:00	35	17.49	5.98%	2.64
23	1970/12/19 02:00:00	1970/12/19 22:00:00	21	17.47	6.25%	2.52
24	1983/01/29 00:00:00	1983/01/29 04:00:00	5	17.36	6.52%	2.42
25	1998/02/16 17:00:00	1998/02/18 00:00:00	32	16.43	6.79%	2.32
26	2008/01/27 00:00:00	2008/01/27 22:00:00	23	16.36	7.07%	2.23
27	1980/02/16 18:00:00	1980/02/19 16:00:00	71	15.98	7.34%	2.15
28	1978/01/16 18:00:00	1978/01/17 03:00:00	10	15.59	7.61%	2.07
29	1961/12/01 19:00:00	1961/12/02 15:00:00	21	15.56	7.88%	2
30	2004/10/20 09:00:00	2004/10/20 15:00:00	7	15.14	8.15%	1.93
31	1980/01/28 20:00:00	1980/01/30 00:00:00	29	15.07	8.42%	1.87
32	1952/11/15 13:00:00	1952/11/15 14:00:00	2	15.05	8.70%	1.81
33	1986/03/15 21:00:00	1986/03/16 19:00:00	23	14.63	8.97%	1.76
34	1985/11/11 09:00:00	1985/11/11 13:00:00	5	14.6	9.24%	1.71
35	1998/02/14 15:00:00	1998/02/14 23:00:00	9	14.31	9.51%	1.66
36	1994/02/03 23:00:00	1994/02/04 11:00:00	13	14.25	9.78%	1.61
37	1986/02/14 23:00:00	1986/02/15 06:00:00	8	14.16	10.05%	1.57
38	1993/02/18 12:00:00	1993/02/18 13:00:00	2	14.16	10.33%	1.53
39	2008/01/05 05:00:00	2008/01/07 01:00:00	45	14.03	10.60%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1993/01/15 12:00:00	1993/01/18 16:00:00	77	13.86	10.87%	1.45
41	2008/02/22 02:00:00	2008/02/22 09:00:00	8	13.7	11.14%	1.42
42	1972/01/16 21:00:00	1972/01/17 00:00:00	4	13.67	11.41%	1.38
43	1960/04/27 08:00:00	1960/04/27 11:00:00	4	13.27	11.68%	1.35
44	1963/03/17 00:00:00	1963/03/17 03:00:00	4	13.2	11.96%	1.32
45	1995/03/11 02:00:00	1995/03/12 00:00:00	23	13.18	12.23%	1.29
46	1992/02/12 17:00:00	1992/02/13 08:00:00	16	13.03	12.50%	1.26
47	1977/08/17 02:00:00	1977/08/17 04:00:00	3	12.59	12.77%	1.23
48	1981/03/19 20:00:00	1981/03/19 22:00:00	3	12.36	13.04%	1.21
49	2003/02/11 17:00:00	2003/02/12 21:00:00	29	12.35	13.32%	1.18
50	1993/02/08 01:00:00	1993/02/08 11:00:00	11	12.24	13.59%	1.16
51	2005/01/11 00:00:00	2005/01/11 09:00:00	10	12.19	13.86%	1.14
52	1983/03/01 13:00:00	1983/03/04 09:00:00	69	12.04	14.13%	1.12
53	1991/02/27 18:00:00	1991/03/01 11:00:00	42	11.82	14.40%	1.09
54	2005/02/21 03:00:00	2005/02/23 07:00:00	53	11.74	14.67%	1.07
55	1992/02/15 12:00:00	1992/02/15 17:00:00	6	11.58	14.95%	1.06
56	1978/01/14 16:00:00	1978/01/15 06:00:00	15	11.53	15.22%	1.04
57	1980/01/10 23:00:00	1980/01/12 13:00:00	39	11.44	15.49%	1.02
58	1988/12/24 21:00:00	1988/12/25 00:00:00	4	11.38	15.76%	1
59	2003/03/15 15:00:00	2003/03/16 19:00:00	29	11.38	16.03%	0.98
60	1982/12/22 23:00:00	1982/12/23 00:00:00	2	11.31	16.30%	0.97
61	1979/01/05 23:00:00	1979/01/06 07:00:00	9	11.22	16.58%	0.95
62	1997/01/12 16:00:00	1997/01/13 08:00:00	17	11.1	16.85%	0.94
63	1983/01/27 07:00:00	1983/01/27 14:00:00	8	10.98	17.12%	0.92
64	1963/09/18 18:00:00	1963/09/18 22:00:00	5	10.96	17.39%	0.91
65	1983/12/24 18:00:00	1983/12/25 11:00:00	18	10.87	17.66%	0.89
66	1971/12/24 07:00:00	1971/12/24 23:00:00	17	10.79	17.93%	0.88
67	1960/01/12 02:00:00	1960/01/12 09:00:00	8	10.78	18.21%	0.87
68	2004/12/31 14:00:00	2004/12/31 16:00:00	3	10.76	18.48%	0.85
69	2005/01/09 04:00:00	2005/01/09 23:00:00	20	10.75	18.75%	0.84
70	1962/01/20 13:00:00	1962/01/20 20:00:00	8	10.66	19.02%	0.83
71	1968/03/08 05:00:00	1968/03/08 12:00:00	8	10.66	19.29%	0.82
72	1969/02/06 08:00:00	1969/02/06 17:00:00	10	10.58	19.57%	0.81
73	1958/02/19 12:00:00	1958/02/19 15:00:00	4	10.46	19.84%	0.8
74	1991/03/25 06:00:00	1991/03/27 06:00:00	49	10.3	20.11%	0.78
75	1983/11/24 22:00:00	1983/11/25 02:00:00	5	10.28	20.38%	0.77
76	1983/10/01 01:00:00	1983/10/01 03:00:00	3	10.02	20.65%	0.76
77	1988/11/25 08:00:00	1988/11/25 11:00:00	4	9.91	20.92%	0.75
78	2001/01/26 16:00:00	2001/01/27 00:00:00	9	9.69	21.20%	0.74
79	1959/02/11 09:00:00	1959/02/12 04:00:00	20	9.54	21.47%	0.73
80	1994/03/24 22:00:00	1994/03/25 02:00:00	5	9.52	21.74%	0.73
81	2001/02/13 17:00:00	2001/02/14 20:00:00	28	9.45	22.01%	0.72
82	2005/04/28 08:00:00	2005/04/28 09:00:00	2	9.43	22.28%	0.71
83	1967/12/18 17:00:00	1967/12/19 12:00:00	20	9.34	22.55%	0.7
84	2002/11/08 17:00:00	2002/11/08 19:00:00	3	9.29	22.83%	0.69
85	2004/02/26 04:00:00	2004/02/26 10:00:00	7	9.18	23.10%	0.68
86	1977/12/29 06:00:00	1977/12/30 03:00:00	22	9.16	23.37%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1960/02/01 22:00:00	1960/02/02 02:00:00	5	9	23.64%	0.67
88	2005/01/03 07:00:00	2005/01/03 11:00:00	5	8.98	23.91%	0.66
89	1965/12/10 06:00:00	1965/12/10 10:00:00	5	8.95	24.18%	0.65
90	1957/01/13 04:00:00	1957/01/13 09:00:00	6	8.8	24.46%	0.64
91	1975/04/08 16:00:00	1975/04/09 00:00:00	9	8.73	24.73%	0.64
92	2007/11/30 08:00:00	2007/11/30 21:00:00	14	8.64	25.00%	0.63
93	1986/11/18 03:00:00	1986/11/18 07:00:00	5	8.61	25.27%	0.62
94	1990/02/17 16:00:00	1990/02/17 19:00:00	4	8.56	25.54%	0.62
95	1980/01/09 04:00:00	1980/01/09 18:00:00	15	8.55	25.82%	0.61
96	1954/01/19 16:00:00	1954/01/19 22:00:00	7	8.53	26.09%	0.6
97	2007/01/30 23:00:00	2007/01/31 00:00:00	2	8.52	26.36%	0.6
98	1966/12/05 02:00:00	1966/12/05 13:00:00	12	8.45	26.63%	0.59
99	1995/03/05 07:00:00	1995/03/05 23:00:00	17	8.45	26.90%	0.59
100	1963/11/20 03:00:00	1963/11/21 07:00:00	29	8.24	27.17%	0.58
101	1956/04/12 20:00:00	1956/04/13 18:00:00	23	8.17	27.45%	0.57
102	1985/11/29 06:00:00	1985/11/29 14:00:00	9	8.03	27.72%	0.57
103	1952/03/15 20:00:00	1952/03/16 06:00:00	11	8	27.99%	0.56
104	1964/11/17 16:00:00	1964/11/17 19:00:00	4	7.98	28.26%	0.56
105	1958/03/15 19:00:00	1958/03/16 12:00:00	18	7.97	28.53%	0.55
106	2004/12/28 09:00:00	2004/12/29 10:00:00	26	7.97	28.80%	0.55
107	1952/12/02 01:00:00	1952/12/02 02:00:00	2	7.95	29.08%	0.54
108	1987/12/16 17:00:00	1987/12/17 10:00:00	18	7.9	29.35%	0.54
109	1967/04/11 07:00:00	1967/04/11 11:00:00	5	7.88	29.62%	0.53
110	1983/04/20 03:00:00	1983/04/20 06:00:00	4	7.81	29.89%	0.53
111	1978/09/05 18:00:00	1978/09/05 19:00:00	2	7.8	30.16%	0.52
112	1988/01/17 11:00:00	1988/01/17 12:00:00	2	7.79	30.43%	0.52
113	1967/11/30 16:00:00	1967/11/30 17:00:00	2	7.78	30.71%	0.51
114	1965/11/16 10:00:00	1965/11/16 19:00:00	10	7.75	30.98%	0.51
115	1996/11/21 16:00:00	1996/11/22 03:00:00	12	7.71	31.25%	0.5
116	2003/04/14 15:00:00	2003/04/14 23:00:00	9	7.71	31.52%	0.5
117	1993/02/19 19:00:00	1993/02/19 21:00:00	3	7.68	31.79%	0.5
118	1995/01/10 14:00:00	1995/01/12 15:00:00	50	7.66	32.07%	0.49
119	1980/02/14 00:00:00	1980/02/15 02:00:00	27	7.54	32.34%	0.49
120	1958/03/20 22:00:00	1958/03/22 07:00:00	34	7.53	32.61%	0.48
121	1966/02/07 22:00:00	1966/02/08 00:00:00	3	7.51	32.88%	0.48
122	1988/12/21 03:00:00	1988/12/21 07:00:00	5	7.44	33.15%	0.48
123	2002/12/20 16:00:00	2002/12/20 21:00:00	6	7.41	33.42%	0.47
124	1992/03/20 23:00:00	1992/03/21 00:00:00	2	7.38	33.70%	0.47
125	1999/01/26 22:00:00	1999/01/27 00:00:00	3	7.34	33.97%	0.46
126	1988/04/20 08:00:00	1988/04/21 07:00:00	24	7.33	34.24%	0.46
127	1997/01/15 15:00:00	1997/01/15 19:00:00	5	7.33	34.51%	0.46
128	2001/02/25 17:00:00	2001/02/27 18:00:00	50	7.33	34.78%	0.45
129	1957/01/28 03:00:00	1957/01/29 10:00:00	32	7.3	35.05%	0.45
130	1969/01/24 07:00:00	1969/01/26 21:00:00	63	7.28	35.33%	0.45
131	1960/01/14 17:00:00	1960/01/14 22:00:00	6	7.2	35.60%	0.44
132	2001/01/11 05:00:00	2001/01/12 11:00:00	31	7.1	35.87%	0.44
133	2005/01/07 14:00:00	2005/01/07 21:00:00	8	7.05	36.14%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1968/12/25 19:00:00	1968/12/25 20:00:00	2	6.96	36.41%	0.43
135	1977/01/03 04:00:00	1977/01/03 05:00:00	2	6.95	36.68%	0.43
136	1998/01/29 17:00:00	1998/01/29 21:00:00	5	6.88	36.96%	0.43
137	1955/01/18 15:00:00	1955/01/18 19:00:00	5	6.87	37.23%	0.42
138	2004/02/22 07:00:00	2004/02/23 07:00:00	25	6.72	37.50%	0.42
139	1956/01/26 19:00:00	1956/01/27 08:00:00	14	6.6	37.77%	0.42
140	1965/04/08 14:00:00	1965/04/09 23:00:00	34	6.55	38.04%	0.41
141	1983/03/24 03:00:00	1983/03/24 06:00:00	4	6.39	38.32%	0.41
142	1959/12/24 12:00:00	1959/12/24 14:00:00	3	6.38	38.59%	0.41
143	1992/12/07 13:00:00	1992/12/07 16:00:00	4	6.35	38.86%	0.41
144	1952/11/30 01:00:00	1952/11/30 05:00:00	5	6.33	39.13%	0.4
145	1958/04/06 17:00:00	1958/04/07 16:00:00	24	6.29	39.40%	0.4
146	1972/11/16 11:00:00	1972/11/17 08:00:00	22	6.27	39.67%	0.4
147	1987/10/12 10:00:00	1987/10/12 15:00:00	6	6.23	39.95%	0.4
148	1957/05/11 01:00:00	1957/05/11 03:00:00	3	6.21	40.22%	0.39
149	1993/01/06 03:00:00	1993/01/08 01:00:00	47	6.15	40.49%	0.39
150	1995/01/25 08:00:00	1995/01/26 10:00:00	27	5.96	40.76%	0.39
151	1998/02/07 17:00:00	1998/02/08 21:00:00	29	5.93	41.03%	0.38
152	1952/01/17 21:00:00	1952/01/18 09:00:00	13	5.82	41.30%	0.38
153	1973/11/22 23:00:00	1973/11/23 01:00:00	3	5.8	41.58%	0.38
154	1967/01/22 17:00:00	1967/01/23 00:00:00	8	5.79	41.85%	0.38
155	1958/04/03 10:00:00	1958/04/03 13:00:00	4	5.71	42.12%	0.37
156	1978/02/12 17:00:00	1978/02/14 00:00:00	32	5.68	42.39%	0.37
157	1973/02/13 00:00:00	1973/02/13 04:00:00	5	5.61	42.66%	0.37
158	1992/01/07 19:00:00	1992/01/07 23:00:00	5	5.6	42.93%	0.37
159	1976/09/10 05:00:00	1976/09/10 11:00:00	7	5.48	43.21%	0.37
160	1979/11/07 18:00:00	1979/11/07 19:00:00	2	5.47	43.48%	0.36
161	1954/02/13 19:00:00	1954/02/13 23:00:00	5	5.45	43.75%	0.36
162	1972/11/14 14:00:00	1972/11/14 16:00:00	3	5.38	44.02%	0.36
163	1981/11/28 03:00:00	1981/11/28 21:00:00	19	5.38	44.29%	0.36
164	1982/12/07 23:00:00	1982/12/08 01:00:00	3	5.3	44.57%	0.35
165	1970/02/28 16:00:00	1970/03/02 04:00:00	37	5.24	44.84%	0.35
166	1977/01/05 19:00:00	1977/01/07 07:00:00	37	5.23	45.11%	0.35
167	1967/03/13 20:00:00	1967/03/13 22:00:00	3	5.17	45.38%	0.35
168	2006/10/14 01:00:00	2006/10/14 01:00:00	1	5.17	45.65%	0.35
169	2001/12/09 17:00:00	2001/12/09 20:00:00	4	5.14	45.92%	0.34
170	1978/01/09 16:00:00	1978/01/11 00:00:00	33	5.12	46.20%	0.34
171	1967/11/19 08:00:00	1967/11/19 18:00:00	11	5.09	46.47%	0.34
172	1980/03/05 23:00:00	1980/03/06 13:00:00	15	5.08	46.74%	0.34
173	1991/03/19 00:00:00	1991/03/19 04:00:00	5	5.07	47.01%	0.34
174	1992/01/05 09:00:00	1992/01/06 04:00:00	20	5.07	47.28%	0.33
175	2006/03/11 07:00:00	2006/03/11 08:00:00	2	5	47.55%	0.33
176	1981/03/01 11:00:00	1981/03/02 13:00:00	27	4.92	47.83%	0.33
177	1991/03/20 07:00:00	1991/03/21 10:00:00	28	4.91	48.10%	0.33
178	2000/03/05 17:00:00	2000/03/05 21:00:00	5	4.89	48.37%	0.33
179	1952/03/07 14:00:00	1952/03/08 10:00:00	21	4.76	48.64%	0.32
180	1965/12/29 19:00:00	1965/12/29 21:00:00	3	4.65	48.91%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1965/04/03 05:00:00	1965/04/03 08:00:00	4	4.61	49.18%	0.32
182	1973/03/11 12:00:00	1973/03/12 09:00:00	22	4.57	49.46%	0.32
183	1985/11/25 01:00:00	1985/11/25 05:00:00	5	4.54	49.73%	0.32
184	1960/02/29 08:00:00	1960/03/01 06:00:00	23	4.49	50.00%	0.32
185	1951/12/29 23:00:00	1951/12/30 13:00:00	15	4.48	50.27%	0.31
186	1997/01/25 22:00:00	1997/01/26 07:00:00	10	4.47	50.54%	0.31
187	1984/12/27 02:00:00	1984/12/27 21:00:00	20	4.42	50.82%	0.31
188	1990/01/17 00:00:00	1990/01/17 03:00:00	4	4.4	51.09%	0.31
189	1967/11/21 12:00:00	1967/11/21 14:00:00	3	4.39	51.36%	0.31
190	1986/03/10 07:00:00	1986/03/10 20:00:00	14	4.39	51.63%	0.31
191	1982/01/01 09:00:00	1982/01/01 10:00:00	2	4.34	51.90%	0.3
192	1973/03/20 08:00:00	1973/03/20 11:00:00	4	4.32	52.17%	0.3
193	1978/03/30 15:00:00	1978/03/31 05:00:00	15	4.32	52.45%	0.3
194	1970/03/04 22:00:00	1970/03/05 02:00:00	5	4.31	52.72%	0.3
195	1982/02/10 13:00:00	1982/02/10 20:00:00	8	4.3	52.99%	0.3
196	1994/02/17 11:00:00	1994/02/17 13:00:00	3	4.21	53.26%	0.3
197	1955/01/10 10:00:00	1955/01/10 11:00:00	2	4.18	53.53%	0.29
198	1957/01/07 14:00:00	1957/01/07 20:00:00	7	4.13	53.80%	0.29
199	1954/03/30 04:00:00	1954/03/30 07:00:00	4	4.09	54.08%	0.29
200	1976/07/22 11:00:00	1976/07/22 14:00:00	4	4.03	54.35%	0.29
201	1982/01/05 08:00:00	1982/01/05 16:00:00	9	4.03	54.62%	0.29
202	1958/01/25 04:00:00	1958/01/25 05:00:00	2	3.99	54.89%	0.29
203	1985/12/11 04:00:00	1985/12/11 06:00:00	3	3.88	55.16%	0.29
204	1993/11/30 04:00:00	1993/11/30 04:00:00	1	3.88	55.43%	0.28
205	2001/11/24 17:00:00	2001/11/24 20:00:00	4	3.86	55.71%	0.28
206	1957/02/28 23:00:00	1957/03/01 11:00:00	13	3.8	55.98%	0.28
207	1969/02/22 02:00:00	1969/02/22 09:00:00	8	3.75	56.25%	0.28
208	1981/03/05 02:00:00	1981/03/05 09:00:00	8	3.72	56.52%	0.28
209	1957/10/14 04:00:00	1957/10/14 06:00:00	3	3.71	56.79%	0.28
210	1982/04/01 09:00:00	1982/04/01 12:00:00	4	3.68	57.07%	0.28
211	1966/12/06 19:00:00	1966/12/06 21:00:00	3	3.67	57.34%	0.28
212	1976/07/15 14:00:00	1976/07/15 16:00:00	3	3.65	57.61%	0.27
213	2001/04/07 17:00:00	2001/04/07 19:00:00	3	3.55	57.88%	0.27
214	1962/02/08 10:00:00	1962/02/08 19:00:00	10	3.52	58.15%	0.27
215	1981/01/29 18:00:00	1981/01/29 19:00:00	2	3.49	58.42%	0.27
216	1988/11/14 06:00:00	1988/11/14 09:00:00	4	3.45	58.70%	0.27
217	1973/03/08 13:00:00	1973/03/08 15:00:00	3	3.39	58.97%	0.27
218	2004/10/18 07:00:00	2004/10/18 07:00:00	1	3.32	59.24%	0.27
219	1979/03/19 03:00:00	1979/03/20 03:00:00	25	3.31	59.51%	0.27
220	1954/03/22 13:00:00	1954/03/23 12:00:00	24	3.3	59.78%	0.26
221	1978/03/11 21:00:00	1978/03/12 11:00:00	15	3.26	60.05%	0.26
222	1970/12/21 08:00:00	1970/12/21 09:00:00	2	3.24	60.33%	0.26
223	1974/12/04 09:00:00	1974/12/04 09:00:00	1	3.24	60.60%	0.26
224	1995/01/07 19:00:00	1995/01/08 07:00:00	13	3.2	60.87%	0.26
225	1957/04/20 15:00:00	1957/04/20 18:00:00	4	3.13	61.14%	0.26
226	1998/05/12 17:00:00	1998/05/12 20:00:00	4	3.11	61.41%	0.26
227	1964/01/21 07:00:00	1964/01/22 09:00:00	27	3.09	61.68%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1986/09/25 05:00:00	1986/09/25 06:00:00	2	3.08	61.96%	0.25
229	1958/01/26 09:00:00	1958/01/26 10:00:00	2	3	62.23%	0.25
230	1984/12/18 22:00:00	1984/12/20 04:00:00	31	3	62.50%	0.25
231	1979/03/17 05:00:00	1979/03/17 05:00:00	1	2.97	62.77%	0.25
232	1965/12/16 03:00:00	1965/12/16 09:00:00	7	2.94	63.04%	0.25
233	1951/11/23 05:00:00	1951/11/23 06:00:00	2	2.91	63.32%	0.25
234	1984/11/24 17:00:00	1984/11/24 21:00:00	5	2.87	63.59%	0.25
235	2006/04/04 20:00:00	2006/04/04 23:00:00	4	2.85	63.86%	0.25
236	1974/03/08 00:00:00	1974/03/08 10:00:00	11	2.84	64.13%	0.25
237	1993/03/28 02:00:00	1993/03/28 04:00:00	3	2.81	64.40%	0.25
238	1966/12/03 15:00:00	1966/12/03 17:00:00	3	2.8	64.67%	0.24
239	1970/11/30 14:00:00	1970/11/30 23:00:00	10	2.79	64.95%	0.24
240	1979/03/28 00:00:00	1979/03/28 10:00:00	11	2.78	65.22%	0.24
241	1978/02/05 11:00:00	1978/02/06 11:00:00	25	2.77	65.49%	0.24
242	2005/02/11 12:00:00	2005/02/12 00:00:00	13	2.75	65.76%	0.24
243	1985/02/09 11:00:00	1985/02/09 13:00:00	3	2.74	66.03%	0.24
244	1954/11/11 02:00:00	1954/11/11 10:00:00	9	2.73	66.30%	0.24
245	1959/02/21 10:00:00	1959/02/21 13:00:00	4	2.65	66.58%	0.24
246	1976/02/06 04:00:00	1976/02/06 06:00:00	3	2.6	66.85%	0.24
247	1983/03/21 04:00:00	1983/03/21 05:00:00	2	2.56	67.12%	0.24
248	2000/02/20 17:00:00	2000/02/21 20:00:00	28	2.5	67.39%	0.23
249	1966/02/06 13:00:00	1966/02/06 16:00:00	4	2.4	67.66%	0.23
250	1993/01/31 00:00:00	1993/01/31 00:00:00	1	2.34	67.93%	0.23
251	1966/01/30 07:00:00	1966/01/30 20:00:00	14	2.33	68.21%	0.23
252	1952/01/13 04:00:00	1952/01/13 13:00:00	10	2.32	68.48%	0.23
253	1996/02/27 21:00:00	1996/02/27 22:00:00	2	2.3	68.75%	0.23
254	1969/02/20 04:00:00	1969/02/20 05:00:00	2	2.22	69.02%	0.23
255	1996/12/11 09:00:00	1996/12/11 18:00:00	10	2.22	69.29%	0.23
256	2002/12/16 17:00:00	2002/12/16 18:00:00	2	2.22	69.57%	0.23
257	1969/02/18 08:00:00	1969/02/18 15:00:00	8	2.21	69.84%	0.23
258	1960/11/05 20:00:00	1960/11/06 11:00:00	16	2.19	70.11%	0.23
259	1987/02/25 01:00:00	1987/02/25 02:00:00	2	2.19	70.38%	0.22
260	1998/01/09 17:00:00	1998/01/09 20:00:00	4	2.18	70.65%	0.22
261	1983/11/12 19:00:00	1983/11/12 19:00:00	1	2.17	70.92%	0.22
262	1976/07/08 13:00:00	1976/07/08 14:00:00	2	2.16	71.20%	0.22
263	1974/01/07 17:00:00	1974/01/08 05:00:00	13	2.15	71.47%	0.22
264	1958/02/25 08:00:00	1958/02/25 09:00:00	2	2.14	71.74%	0.22
265	1975/03/08 09:00:00	1975/03/08 09:00:00	1	2.12	72.01%	0.22
266	1962/03/19 00:00:00	1962/03/19 02:00:00	3	2.11	72.28%	0.22
267	1983/02/26 13:00:00	1983/02/26 14:00:00	2	2.08	72.55%	0.22
268	1972/01/18 22:00:00	1972/01/19 04:00:00	7	2.07	72.83%	0.22
269	1954/01/24 10:00:00	1954/01/24 15:00:00	6	2.06	73.10%	0.22
270	1995/04/18 10:00:00	1995/04/18 12:00:00	3	2.05	73.37%	0.22
271	1994/02/07 14:00:00	1994/02/07 16:00:00	3	1.98	73.64%	0.21
272	2003/12/25 18:00:00	2003/12/25 18:00:00	1	1.91	73.91%	0.21
273	1978/03/04 14:00:00	1978/03/04 16:00:00	3	1.83	74.18%	0.21
274	1956/01/31 09:00:00	1956/01/31 12:00:00	4	1.81	74.46%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1997/12/06 17:00:00	1997/12/06 18:00:00	2	1.8	74.73%	0.21
276	1963/02/09 19:00:00	1963/02/11 00:00:00	30	1.77	75.00%	0.21
277	1973/02/15 11:00:00	1973/02/15 12:00:00	2	1.7	75.27%	0.21
278	1959/02/16 04:00:00	1959/02/16 20:00:00	17	1.67	75.54%	0.21
279	1982/01/20 06:00:00	1982/01/20 23:00:00	18	1.67	75.82%	0.21
280	1994/03/07 01:00:00	1994/03/07 06:00:00	6	1.65	76.09%	0.21
281	1983/03/06 05:00:00	1983/03/06 06:00:00	2	1.64	76.36%	0.21
282	1965/11/14 22:00:00	1965/11/15 02:00:00	5	1.61	76.63%	0.21
283	1978/01/19 08:00:00	1978/01/19 12:00:00	5	1.57	76.90%	0.21
284	1975/03/10 12:00:00	1975/03/11 00:00:00	13	1.55	77.17%	0.2
285	1981/02/09 05:00:00	1981/02/09 06:00:00	2	1.55	77.45%	0.2
286	1955/02/27 20:00:00	1955/02/27 20:00:00	1	1.53	77.72%	0.2
287	1982/03/14 23:00:00	1982/03/14 23:00:00	1	1.51	77.99%	0.2
288	1994/03/19 08:00:00	1994/03/20 06:00:00	23	1.51	78.26%	0.2
289	1995/01/24 00:00:00	1995/01/24 01:00:00	2	1.51	78.53%	0.2
290	2008/02/24 09:00:00	2008/02/24 10:00:00	2	1.4	78.80%	0.2
291	1998/03/25 17:00:00	1998/03/26 18:00:00	26	1.37	79.08%	0.2
292	1998/03/31 17:00:00	1998/03/31 19:00:00	3	1.37	79.35%	0.2
293	1973/02/11 07:00:00	1973/02/11 14:00:00	8	1.26	79.62%	0.2
294	2007/04/20 15:00:00	2007/04/20 15:00:00	1	1.25	79.89%	0.2
295	1983/02/08 06:00:00	1983/02/08 07:00:00	2	1.24	80.16%	0.2
296	1967/01/24 19:00:00	1967/01/24 23:00:00	5	1.2	80.43%	0.2
297	1965/12/14 16:00:00	1965/12/14 18:00:00	3	1.15	80.71%	0.2
298	1980/01/18 03:00:00	1980/01/18 04:00:00	2	1.15	80.98%	0.2
299	1962/02/21 05:00:00	1962/02/21 07:00:00	3	1.14	81.25%	0.19
300	1971/12/27 17:00:00	1971/12/28 15:00:00	23	1.08	81.52%	0.19
301	1954/03/24 19:00:00	1954/03/25 04:00:00	10	1.03	81.79%	0.19
302	1965/02/06 21:00:00	1965/02/06 22:00:00	2	1.01	82.07%	0.19
303	1976/02/10 07:00:00	1976/02/10 08:00:00	2	1.01	82.34%	0.19
304	1966/11/07 15:00:00	1966/11/07 16:00:00	2	1	82.61%	0.19
305	1979/01/31 08:00:00	1979/01/31 09:00:00	2	1	82.88%	0.19
306	1980/03/25 23:00:00	1980/03/26 00:00:00	2	0.99	83.15%	0.19
307	1977/03/24 21:00:00	1977/03/25 03:00:00	7	0.98	83.42%	0.19
308	1963/09/17 17:00:00	1963/09/17 17:00:00	1	0.95	83.70%	0.19
309	1996/02/26 13:00:00	1996/02/26 13:00:00	1	0.95	83.97%	0.19
310	1952/12/20 11:00:00	1952/12/20 14:00:00	4	0.94	84.24%	0.19
311	1991/01/09 14:00:00	1991/01/09 14:00:00	1	0.93	84.51%	0.19
312	1980/12/07 11:00:00	1980/12/07 12:00:00	2	0.9	84.78%	0.19
313	1957/03/16 10:00:00	1957/03/16 10:00:00	1	0.8	85.05%	0.19
314	1977/05/08 21:00:00	1977/05/09 02:00:00	6	0.77	85.33%	0.19
315	1977/12/26 06:00:00	1977/12/26 06:00:00	1	0.77	85.60%	0.18
316	1952/04/10 16:00:00	1952/04/10 19:00:00	4	0.71	85.87%	0.18
317	1998/11/08 08:00:00	1998/11/08 08:00:00	1	0.67	86.14%	0.18
318	1999/04/12 02:00:00	1999/04/12 03:00:00	2	0.66	86.41%	0.18
319	1970/01/16 18:00:00	1970/01/16 19:00:00	2	0.65	86.68%	0.18
320	1954/03/16 22:00:00	1954/03/16 22:00:00	1	0.64	86.96%	0.18
321	1984/12/08 00:00:00	1984/12/08 01:00:00	2	0.63	87.23%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1953/03/01 22:00:00	1953/03/01 22:00:00	1	0.59	87.50%	0.18
323	1992/03/22 16:00:00	1992/03/23 03:00:00	12	0.56	87.77%	0.18
324	2006/02/28 06:00:00	2006/02/28 06:00:00	1	0.54	88.04%	0.18
325	1983/03/18 06:00:00	1983/03/18 06:00:00	1	0.52	88.32%	0.18
326	1971/04/14 11:00:00	1971/04/14 11:00:00	1	0.51	88.59%	0.18
327	1980/03/10 16:00:00	1980/03/10 16:00:00	1	0.49	88.86%	0.18
328	1978/03/09 16:00:00	1978/03/09 17:00:00	2	0.48	89.13%	0.18
329	1987/12/04 21:00:00	1987/12/04 21:00:00	1	0.45	89.40%	0.18
330	1995/01/16 10:00:00	1995/01/16 11:00:00	2	0.45	89.67%	0.18
331	1958/03/06 10:00:00	1958/03/06 10:00:00	1	0.43	89.95%	0.18
332	1973/02/07 04:00:00	1973/02/07 04:00:00	1	0.4	90.22%	0.18
333	1988/12/16 10:00:00	1988/12/16 10:00:00	1	0.36	90.49%	0.17
334	1998/02/19 17:00:00	1998/02/19 18:00:00	2	0.36	90.76%	0.17
335	1969/11/07 09:00:00	1969/11/07 09:00:00	1	0.35	91.03%	0.17
336	1976/02/08 19:00:00	1976/02/08 23:00:00	5	0.34	91.30%	0.17
337	1969/03/21 13:00:00	1969/03/21 13:00:00	1	0.3	91.58%	0.17
338	1969/04/05 21:00:00	1969/04/05 21:00:00	1	0.3	91.85%	0.17
339	1983/04/18 08:00:00	1983/04/18 08:00:00	1	0.28	92.12%	0.17
340	1979/03/01 12:00:00	1979/03/01 12:00:00	1	0.26	92.39%	0.17
341	1996/01/31 20:00:00	1996/02/01 08:00:00	13	0.25	92.66%	0.17
342	1976/04/15 18:00:00	1976/04/15 18:00:00	1	0.22	92.93%	0.17
343	1998/04/11 17:00:00	1998/04/11 18:00:00	2	0.22	93.21%	0.17
344	1984/12/16 03:00:00	1984/12/16 03:00:00	1	0.21	93.48%	0.17
345	1963/04/17 07:00:00	1963/04/17 07:00:00	1	0.2	93.75%	0.17
346	1952/12/30 19:00:00	1952/12/30 19:00:00	1	0.19	94.02%	0.17
347	1983/04/29 08:00:00	1983/04/29 09:00:00	2	0.17	94.29%	0.17
348	1987/04/04 15:00:00	1987/04/04 15:00:00	1	0.16	94.57%	0.17
349	1954/12/09 23:00:00	1954/12/09 23:00:00	1	0.13	94.84%	0.17
350	2001/03/06 17:00:00	2001/03/06 18:00:00	2	0.11	95.11%	0.17
351	1978/12/17 01:00:00	1978/12/17 01:00:00	1	0.08	95.38%	0.17
352	1993/06/05 13:00:00	1993/06/05 13:00:00	1	0.08	95.65%	0.17
353	1998/12/06 06:00:00	1998/12/06 06:00:00	1	0.08	95.92%	0.16
354	1955/04/30 21:00:00	1955/04/30 21:00:00	1	0.07	96.20%	0.16
355	1985/12/02 23:00:00	1985/12/02 23:00:00	1	0.07	96.47%	0.16
356	1992/12/27 21:00:00	1992/12/27 21:00:00	1	0.07	96.74%	0.16
357	1962/03/06 20:00:00	1962/03/06 20:00:00	1	0.05	97.01%	0.16
358	1969/01/28 19:00:00	1969/01/28 19:00:00	1	0.05	97.28%	0.16
359	1957/12/17 05:00:00	1957/12/17 05:00:00	1	0.04	97.55%	0.16
360	1999/02/04 17:00:00	1999/02/04 17:00:00	1	0.04	97.83%	0.16
361	1976/03/01 16:00:00	1976/03/01 16:00:00	1	0.02	98.10%	0.16
362	1978/12/18 13:00:00	1978/12/18 13:00:00	1	0.02	98.37%	0.16
363	1996/01/22 06:00:00	1996/01/22 06:00:00	1	0.01	98.64%	0.16
364	1957/01/26 07:00:00	1957/01/26 07:00:00	1	0	98.91%	0.16
365	1965/03/31 14:00:00	1965/03/31 14:00:00	1	0	99.18%	0.16
366	1993/01/10 13:00:00	1993/01/10 13:00:00	1	0	99.46%	0.16
367	2000/02/13 17:00:00	2000/02/13 17:00:00	1	0	99.73%	0.16
--End of Data-----------------						

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM.out time stamp: 8/3/2021 1:19:24 PM

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/03 13:00:00	1995/01/17 02:00:00	326	33.57	0.20%	58
2	2003/02/25 08:00:00	2003/03/01 12:00:00	101	27.81	0.41%	29
3	1958/02/03 04:00:00	1958/02/07 07:00:00	100	26.84	0.61%	19.33
4	1969/02/18 08:00:00	1969/02/28 13:00:00	246	26.41	0.81%	14.5
5	2004/10/27 02:00:00	2004/10/30 13:00:00	84	24.49	1.01%	11.6
6	1980/02/13 13:00:00	1980/02/23 23:00:00	251	24.14	1.22%	9.67
7	1952/01/13 04:00:00	1952/01/21 01:00:00	190	23.61	1.42%	8.29
8	1978/02/27 19:00:00	1978/03/06 17:00:00	167	23.45	1.62%	7.25
9	2005/02/18 06:00:00	2005/02/25 23:00:00	186	20.71	1.83%	6.44
10	1978/02/05 10:00:00	1978/02/16 15:00:00	270	20.68	2.03%	5.8
11	1991/12/29 15:00:00	1992/01/01 20:00:00	78	20.33	2.23%	5.27
12	1965/11/22 04:00:00	1965/11/26 06:00:00	99	20.23	2.43%	4.83
13	1982/03/14 14:00:00	1982/03/21 00:00:00	155	20.22	2.64%	4.46
14	1998/02/14 10:00:00	1998/02/27 02:00:00	305	19.28	2.84%	4.14
15	1993/01/12 19:00:00	1993/01/21 09:00:00	207	18.56	3.04%	3.87
16	1998/02/03 09:00:00	1998/02/11 08:00:00	192	18.52	3.25%	3.63
17	2000/10/29 22:00:00	2000/11/01 18:00:00	69	17.46	3.45%	3.41
18	1978/01/03 19:00:00	1978/01/08 03:00:00	105	16.99	3.65%	3.22
19	1978/01/09 16:00:00	1978/01/20 19:00:00	268	16.97	3.85%	3.05
20	1980/01/28 10:00:00	1980/02/01 22:00:00	109	16.59	4.06%	2.9
21	1958/04/01 09:00:00	1958/04/10 07:00:00	215	16.21	4.26%	2.76
22	1980/03/02 20:00:00	1980/03/08 21:00:00	146	15.84	4.46%	2.64
23	1979/01/15 10:00:00	1979/01/19 20:00:00	107	15.69	4.67%	2.52
24	2008/02/22 02:00:00	2008/02/25 23:00:00	94	15.37	4.87%	2.42
25	1970/12/17 16:00:00	1970/12/23 14:00:00	143	14.34	5.07%	2.32
26	1977/08/17 02:00:00	1977/08/20 12:00:00	83	14.33	5.27%	2.23
27	1983/02/26 13:00:00	1983/03/07 14:00:00	218	14.03	5.48%	2.15
28	1991/02/27 18:00:00	1991/03/04 03:00:00	106	13.99	5.68%	2.07
29	2004/12/28 09:00:00	2005/01/14 01:00:00	401	13.53	5.88%	2
30	2008/01/27 00:00:00	2008/01/30 16:00:00	89	13.36	6.09%	1.93
31	1986/02/13 10:00:00	1986/02/18 04:00:00	115	13.28	6.29%	1.87
32	1995/03/11 02:00:00	1995/03/14 16:00:00	87	13.18	6.49%	1.81
33	1983/01/27 08:00:00	1983/01/31 22:00:00	111	13	6.69%	1.76
34	1980/01/09 04:00:00	1980/01/15 08:00:00	149	12.96	6.90%	1.71
35	1992/02/12 17:00:00	1992/02/18 06:00:00	134	12.88	7.10%	1.66
36	1997/01/12 15:00:00	1997/01/18 11:00:00	141	12.57	7.30%	1.61
37	1961/12/01 19:00:00	1961/12/05 10:00:00	88	12.54	7.51%	1.57
38	1979/01/05 08:00:00	1979/01/10 11:00:00	124	12.54	7.71%	1.53
39	1983/12/24 18:00:00	1983/12/28 19:00:00	98	12.44	7.91%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	2004/10/18 07:00:00	2004/10/23 08:00:00	122	12.44	8.11%	1.45
41	1952/11/14 16:00:00	1952/11/18 22:00:00	103	12.38	8.32%	1.42
42	1985/11/11 09:00:00	1985/11/14 21:00:00	85	12.08	8.52%	1.38
43	1968/03/08 01:00:00	1968/03/11 05:00:00	77	12.06	8.72%	1.35
44	1962/01/20 13:00:00	1962/01/24 13:00:00	97	12.04	8.92%	1.32
45	1993/02/18 12:00:00	1993/02/25 02:00:00	159	11.81	9.13%	1.29
46	1994/02/03 23:00:00	1994/02/09 14:00:00	136	11.67	9.33%	1.26
47	2008/01/05 04:00:00	2008/01/09 22:00:00	115	11.39	9.53%	1.23
48	1972/01/16 20:00:00	1972/01/21 16:00:00	117	11.33	9.74%	1.21
49	1963/03/17 00:00:00	1963/03/19 21:00:00	70	10.76	9.94%	1.18
50	1986/03/08 17:00:00	1986/03/19 00:00:00	248	10.62	10.14%	1.16
51	1960/04/27 06:00:00	1960/04/30 03:00:00	70	10.47	10.34%	1.14
52	1971/12/22 08:00:00	1971/12/29 18:00:00	179	10.45	10.55%	1.12
53	2007/11/30 08:00:00	2007/12/03 16:00:00	81	10.16	10.75%	1.09
54	2004/02/22 07:00:00	2004/02/29 02:00:00	164	10.09	10.95%	1.07
55	1981/03/19 20:00:00	1981/03/22 11:00:00	64	10.07	11.16%	1.06
56	2003/02/11 16:00:00	2003/02/16 00:00:00	105	9.94	11.36%	1.04
57	1993/02/07 22:00:00	1993/02/11 09:00:00	84	9.82	11.56%	1.02
58	1995/03/05 03:00:00	1995/03/08 19:00:00	89	9.62	11.76%	1
59	1966/12/03 08:00:00	1966/12/09 13:00:00	150	9.51	11.97%	0.98
60	1982/12/22 23:00:00	1982/12/25 07:00:00	57	9.34	12.17%	0.97
61	1988/12/21 03:00:00	1988/12/28 20:00:00	186	9.12	12.37%	0.95
62	2003/03/15 14:00:00	2003/03/18 18:00:00	77	9.08	12.58%	0.94
63	1957/05/10 23:00:00	1957/05/13 15:00:00	65	9.04	12.78%	0.92
64	1969/02/06 08:00:00	1969/02/09 10:00:00	75	9.03	12.98%	0.91
65	1996/11/21 16:00:00	1996/11/24 20:00:00	77	8.99	13.18%	0.89
66	1957/01/13 04:00:00	1957/01/16 02:00:00	71	8.91	13.39%	0.88
67	1963/09/17 07:00:00	1963/09/21 14:00:00	104	8.8	13.59%	0.87
68	1965/11/14 20:00:00	1965/11/19 20:00:00	121	8.72	13.79%	0.85
69	1960/01/10 15:00:00	1960/01/17 10:00:00	164	8.62	14.00%	0.84
70	1958/03/20 22:00:00	1958/03/24 23:00:00	98	8.55	14.20%	0.83
71	1991/03/25 03:00:00	1991/03/29 22:00:00	116	8.53	14.40%	0.82
72	1958/02/19 09:00:00	1958/02/22 08:00:00	72	8.52	14.60%	0.81
73	1983/09/30 00:00:00	1983/10/03 14:00:00	87	8.51	14.81%	0.8
74	2003/04/14 08:00:00	2003/04/17 17:00:00	82	8.43	15.01%	0.78
75	1969/01/24 07:00:00	1969/01/30 02:00:00	140	8.24	15.21%	0.77
76	2005/04/28 08:00:00	2005/04/30 10:00:00	51	8.23	15.42%	0.76
77	1957/01/26 06:00:00	1957/02/01 09:00:00	148	8.07	15.62%	0.75
78	1983/11/24 21:00:00	1983/11/27 10:00:00	62	8.06	15.82%	0.74
79	1960/02/01 20:00:00	1960/02/04 18:00:00	71	8.05	16.02%	0.73
80	2001/01/26 13:00:00	2001/01/29 14:00:00	74	7.95	16.23%	0.73
81	2001/02/13 16:00:00	2001/02/17 15:00:00	96	7.93	16.43%	0.72
82	1954/01/18 21:00:00	1954/01/22 19:00:00	95	7.87	16.63%	0.71
83	2002/11/08 15:00:00	2002/11/11 06:00:00	64	7.87	16.84%	0.7
84	1977/12/25 19:00:00	1978/01/01 00:00:00	150	7.86	17.04%	0.69
85	1965/04/07 04:00:00	1965/04/12 01:00:00	118	7.85	17.24%	0.68
86	1967/12/18 17:00:00	1967/12/22 06:00:00	86	7.84	17.44%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1988/11/25 07:00:00	1988/11/28 03:00:00	69	7.84	17.65%	0.67
88	1959/02/11 09:00:00	1959/02/14 05:00:00	69	7.61	17.85%	0.66
89	2007/01/30 23:00:00	2007/02/02 00:00:00	50	7.47	18.05%	0.65
90	1965/12/09 11:00:00	1965/12/18 11:00:00	217	7.33	18.26%	0.64
91	1994/03/24 22:00:00	1994/03/27 22:00:00	73	7.27	18.46%	0.64
92	1993/06/05 13:00:00	1993/06/06 22:00:00	34	7.24	18.66%	0.63
93	1963/11/20 03:00:00	1963/11/23 23:00:00	93	7.2	18.86%	0.62
94	1975/04/08 09:00:00	1975/04/11 21:00:00	85	7.16	19.07%	0.62
95	1952/03/15 20:00:00	1952/03/19 07:00:00	84	6.92	19.27%	0.61
96	1990/02/17 16:00:00	1990/02/20 17:00:00	74	6.91	19.47%	0.6
97	1986/11/18 03:00:00	1986/11/21 00:00:00	70	6.86	19.68%	0.6
98	1967/01/22 17:00:00	1967/01/27 06:00:00	110	6.84	19.88%	0.59
99	1978/09/05 18:00:00	1978/09/08 15:00:00	70	6.81	20.08%	0.59
100	1956/04/12 20:00:00	1956/04/16 09:00:00	86	6.66	20.28%	0.58
101	1958/03/15 18:00:00	1958/03/19 04:00:00	83	6.64	20.49%	0.57
102	1964/11/17 15:00:00	1964/11/19 21:00:00	55	6.61	20.69%	0.57
103	1987/12/16 13:00:00	1987/12/20 07:00:00	91	6.45	20.89%	0.56
104	1999/01/25 06:00:00	1999/01/29 04:00:00	95	6.44	21.10%	0.56
105	1967/04/11 07:00:00	1967/04/13 16:00:00	58	6.29	21.30%	0.55
106	1988/01/17 11:00:00	1988/01/20 08:00:00	70	6.26	21.50%	0.55
107	1985/11/29 06:00:00	1985/12/04 04:00:00	119	6.24	21.70%	0.54
108	1983/04/18 07:00:00	1983/04/22 20:00:00	110	6.18	21.91%	0.54
109	1966/02/06 12:00:00	1966/02/10 02:00:00	87	6.17	22.11%	0.53
110	2002/12/20 13:00:00	2002/12/23 11:00:00	71	6.17	22.31%	0.53
111	1968/12/25 19:00:00	1968/12/28 07:00:00	61	6.12	22.52%	0.52
112	1992/01/05 09:00:00	1992/01/10 17:00:00	129	6.12	22.72%	0.52
113	2001/02/25 11:00:00	2001/03/02 03:00:00	113	6.12	22.92%	0.51
114	2001/01/11 00:00:00	2001/01/15 00:00:00	97	6.11	23.12%	0.51
115	1988/04/20 02:00:00	1988/04/24 04:00:00	99	6.07	23.33%	0.5
116	1954/02/13 17:00:00	1954/02/16 19:00:00	75	5.98	23.53%	0.5
117	1992/03/20 23:00:00	1992/03/24 19:00:00	93	5.97	23.73%	0.5
118	1977/01/02 23:00:00	1977/01/09 23:00:00	169	5.91	23.94%	0.49
119	1952/11/30 01:00:00	1952/12/04 03:00:00	99	5.83	24.14%	0.49
120	1998/01/29 15:00:00	1998/01/31 19:00:00	53	5.78	24.34%	0.48
121	1967/11/30 16:00:00	1967/12/02 05:00:00	38	5.76	24.54%	0.48
122	1983/03/17 02:00:00	1983/03/26 08:00:00	223	5.68	24.75%	0.48
123	1959/12/24 10:00:00	1959/12/26 19:00:00	58	5.61	24.95%	0.47
124	1956/01/25 18:00:00	1956/01/30 01:00:00	104	5.54	25.15%	0.47
125	1972/11/14 14:00:00	1972/11/19 19:00:00	126	5.49	25.35%	0.46
126	1995/01/23 23:00:00	1995/01/28 06:00:00	104	5.36	25.56%	0.46
127	1992/12/07 10:00:00	1992/12/10 07:00:00	70	5.33	25.76%	0.46
128	1994/02/17 10:00:00	1994/02/19 13:00:00	52	5.31	25.96%	0.45
129	1973/11/22 23:00:00	1973/11/25 09:00:00	59	5.19	26.17%	0.45
130	1993/01/06 03:00:00	1993/01/11 09:00:00	127	5.1	26.37%	0.45
131	1976/07/22 10:00:00	1976/07/24 20:00:00	59	5.06	26.57%	0.44
132	1979/11/07 18:00:00	1979/11/09 19:00:00	50	5.06	26.77%	0.44
133	1987/10/11 17:00:00	1987/10/15 12:00:00	92	5.05	26.98%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1955/01/16 09:00:00	1955/01/21 09:00:00	121	4.98	27.18%	0.43
135	1976/09/10 05:00:00	1976/09/13 06:00:00	74	4.94	27.38%	0.43
136	1995/04/16 06:00:00	1995/04/20 13:00:00	104	4.86	27.59%	0.43
137	1981/11/27 01:00:00	1981/12/01 16:00:00	112	4.84	27.79%	0.42
138	2006/10/14 01:00:00	2006/10/15 17:00:00	41	4.75	27.99%	0.42
139	1967/11/19 08:00:00	1967/11/23 17:00:00	106	4.74	28.19%	0.42
140	1967/03/13 11:00:00	1967/03/16 14:00:00	76	4.71	28.40%	0.41
141	1951/12/29 11:00:00	1952/01/02 06:00:00	92	4.64	28.60%	0.41
142	1970/02/28 14:00:00	1970/03/06 21:00:00	152	4.6	28.80%	0.41
143	1997/01/25 19:00:00	1997/01/29 04:00:00	82	4.54	29.01%	0.41
144	2006/03/10 23:00:00	2006/03/13 02:00:00	52	4.52	29.21%	0.4
145	1973/02/11 07:00:00	1973/02/16 15:00:00	129	4.5	29.41%	0.4
146	2001/12/09 15:00:00	2001/12/11 16:00:00	50	4.46	29.61%	0.4
147	1982/12/07 22:00:00	1982/12/10 10:00:00	61	4.42	29.82%	0.4
148	2000/03/05 14:00:00	2000/03/08 22:00:00	81	4.29	30.02%	0.39
149	1991/03/19 00:00:00	1991/03/23 21:00:00	118	4.24	30.22%	0.39
150	1965/03/31 14:00:00	1965/04/05 16:00:00	123	4.21	30.43%	0.39
151	1965/12/29 19:00:00	1966/01/01 09:00:00	63	4.2	30.63%	0.38
152	1962/02/07 22:00:00	1962/02/11 23:00:00	98	4.06	30.83%	0.38
153	1960/02/28 23:00:00	1960/03/03 06:00:00	80	4.05	31.03%	0.38
154	1981/02/28 16:00:00	1981/03/07 13:00:00	166	4.04	31.24%	0.38
155	1978/03/30 15:00:00	1978/04/02 21:00:00	79	3.98	31.44%	0.37
156	1952/03/07 09:00:00	1952/03/14 05:00:00	165	3.96	31.64%	0.37
157	1981/12/30 08:00:00	1982/01/04 05:00:00	118	3.95	31.85%	0.37
158	1955/01/10 09:00:00	1955/01/12 07:00:00	47	3.81	32.05%	0.37
159	1985/11/24 23:00:00	1985/11/27 18:00:00	68	3.77	32.25%	0.37
160	1958/01/25 04:00:00	1958/01/28 18:00:00	87	3.72	32.45%	0.36
161	1973/03/11 12:00:00	1973/03/13 21:00:00	58	3.67	32.66%	0.36
162	1984/12/27 00:00:00	1984/12/30 13:00:00	86	3.67	32.86%	0.36
163	1954/03/30 04:00:00	1954/03/31 04:00:00	25	3.66	33.06%	0.36
164	1979/03/17 05:00:00	1979/03/22 04:00:00	120	3.65	33.27%	0.35
165	1982/02/10 09:00:00	1982/02/12 17:00:00	57	3.65	33.47%	0.35
166	1993/11/30 04:00:00	1993/12/01 12:00:00	33	3.62	33.67%	0.35
167	1973/03/20 08:00:00	1973/03/22 11:00:00	52	3.58	33.87%	0.35
168	1957/02/28 21:00:00	1957/03/03 12:00:00	64	3.56	34.08%	0.35
169	2005/02/11 03:00:00	2005/02/15 04:00:00	98	3.54	34.28%	0.34
170	1990/01/17 00:00:00	1990/01/19 12:00:00	61	3.53	34.48%	0.34
171	2001/11/24 17:00:00	2001/11/26 08:00:00	40	3.47	34.69%	0.34
172	1957/01/07 13:00:00	1957/01/11 13:00:00	97	3.36	34.89%	0.34
173	2001/04/07 17:00:00	2001/04/09 03:00:00	35	3.28	35.09%	0.34
174	1981/01/28 07:00:00	1981/02/01 03:00:00	93	3.27	35.29%	0.33
175	1974/03/08 00:00:00	1974/03/11 04:00:00	77	3.19	35.50%	0.33
176	1957/10/14 04:00:00	1957/10/15 20:00:00	41	3.15	35.70%	0.33
177	1978/03/11 21:00:00	1978/03/14 08:00:00	60	3.08	35.90%	0.33
178	1985/12/11 04:00:00	1985/12/13 17:00:00	62	3.06	36.11%	0.33
179	1986/09/24 19:00:00	1986/09/27 11:00:00	65	3	36.31%	0.32
180	1974/12/04 08:00:00	1974/12/06 09:00:00	50	2.97	36.51%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1980/03/25 23:00:00	1980/03/27 08:00:00	34	2.95	36.71%	0.32
182	1988/11/14 06:00:00	1988/11/16 03:00:00	46	2.89	36.92%	0.32
183	1982/01/05 06:00:00	1982/01/07 17:00:00	60	2.87	37.12%	0.32
184	1976/08/30 10:00:00	1976/09/01 05:00:00	44	2.86	37.32%	0.32
185	1998/05/12 17:00:00	1998/05/13 22:00:00	30	2.83	37.53%	0.31
186	1954/03/20 12:00:00	1954/03/26 16:00:00	149	2.82	37.73%	0.31
187	1976/07/15 13:00:00	1976/07/17 19:00:00	55	2.81	37.93%	0.31
188	1951/11/23 05:00:00	1951/11/24 11:00:00	31	2.72	38.13%	0.31
189	1957/04/20 15:00:00	1957/04/22 23:00:00	57	2.68	38.34%	0.31
190	1964/01/21 07:00:00	1964/01/24 10:00:00	76	2.65	38.54%	0.31
191	1982/04/01 09:00:00	1982/04/03 08:00:00	48	2.65	38.74%	0.3
192	1954/11/11 02:00:00	1954/11/14 05:00:00	76	2.61	38.95%	0.3
193	1977/03/24 22:00:00	1977/03/27 08:00:00	59	2.59	39.15%	0.3
194	1973/03/05 09:00:00	1973/03/10 06:00:00	118	2.58	39.35%	0.3
195	1984/11/24 17:00:00	1984/11/26 14:00:00	46	2.57	39.55%	0.3
196	1976/02/04 14:00:00	1976/02/12 08:00:00	187	2.48	39.76%	0.3
197	2006/04/04 18:00:00	2006/04/07 01:00:00	56	2.47	39.96%	0.29
198	1979/03/27 05:00:00	1979/03/30 06:00:00	74	2.44	40.16%	0.29
199	2000/02/20 16:00:00	2000/02/24 11:00:00	92	2.4	40.37%	0.29
200	1970/11/29 01:00:00	1970/12/03 16:00:00	112	2.39	40.57%	0.29
201	1993/03/26 01:00:00	1993/03/29 17:00:00	89	2.38	40.77%	0.29
202	1959/02/21 10:00:00	1959/02/23 18:00:00	57	2.36	40.97%	0.29
203	1966/01/30 07:00:00	1966/02/01 14:00:00	56	2.29	41.18%	0.29
204	2002/12/16 17:00:00	2002/12/18 05:00:00	37	2.15	41.38%	0.28
205	1960/11/05 20:00:00	1960/11/07 17:00:00	46	2.13	41.58%	0.28
206	1987/02/24 05:00:00	1987/02/26 18:00:00	62	2.13	41.78%	0.28
207	1984/12/18 14:00:00	1984/12/22 02:00:00	85	2.09	41.99%	0.28
208	1998/01/09 16:00:00	1998/01/12 03:00:00	60	2.08	42.19%	0.28
209	1975/03/08 08:00:00	1975/03/14 06:00:00	143	2.07	42.39%	0.28
210	1996/12/09 18:00:00	1996/12/14 09:00:00	112	2.07	42.60%	0.28
211	1974/01/07 15:00:00	1974/01/10 17:00:00	75	2.03	42.80%	0.28
212	1983/11/12 00:00:00	1983/11/14 21:00:00	70	2.02	43.00%	0.27
213	1985/02/09 06:00:00	1985/02/11 11:00:00	54	1.91	43.20%	0.27
214	1993/01/31 00:00:00	1993/02/01 15:00:00	40	1.89	43.41%	0.27
215	2003/12/25 05:00:00	2003/12/27 09:00:00	53	1.89	43.61%	0.27
216	1963/02/09 18:00:00	1963/02/15 00:00:00	127	1.87	43.81%	0.27
217	1996/02/25 11:00:00	1996/02/29 01:00:00	87	1.87	44.02%	0.27
218	1962/03/18 19:00:00	1962/03/20 22:00:00	52	1.83	44.22%	0.27
219	1976/07/08 13:00:00	1976/07/10 14:00:00	50	1.83	44.42%	0.27
220	1997/12/06 17:00:00	1997/12/08 14:00:00	46	1.77	44.62%	0.26
221	1954/01/24 10:00:00	1954/01/26 15:00:00	54	1.69	44.83%	0.26
222	1994/03/07 01:00:00	1994/03/09 10:00:00	58	1.52	45.03%	0.26
223	1955/02/27 08:00:00	1955/03/01 07:00:00	48	1.51	45.23%	0.26
224	1958/02/25 08:00:00	1958/02/26 22:00:00	39	1.51	45.44%	0.26
225	1979/02/14 03:00:00	1979/02/15 01:00:00	23	1.51	45.64%	0.26
226	1983/02/06 12:00:00	1983/02/09 01:00:00	62	1.45	45.84%	0.26
227	1959/02/16 04:00:00	1959/02/18 14:00:00	59	1.43	46.04%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1983/02/02 15:00:00	1983/02/04 00:00:00	34	1.38	46.25%	0.25
229	1998/03/31 17:00:00	1998/04/02 03:00:00	35	1.37	46.45%	0.25
230	1981/02/08 20:00:00	1981/02/11 08:00:00	61	1.36	46.65%	0.25
231	1982/01/20 06:00:00	1982/01/23 08:00:00	75	1.34	46.86%	0.25
232	1998/03/25 17:00:00	1998/03/29 02:00:00	82	1.34	47.06%	0.25
233	1994/03/19 03:00:00	1994/03/22 02:00:00	72	1.27	47.26%	0.25
234	2007/04/20 15:00:00	2007/04/22 00:00:00	34	1.26	47.46%	0.25
235	1965/02/06 02:00:00	1965/02/08 19:00:00	66	1.1	47.67%	0.25
236	1962/02/19 11:00:00	1962/02/22 16:00:00	78	1.07	47.87%	0.25
237	1991/01/09 14:00:00	1991/01/11 01:00:00	36	0.96	48.07%	0.25
238	1966/11/07 15:00:00	1966/11/09 20:00:00	54	0.95	48.28%	0.24
239	1977/05/08 13:00:00	1977/05/11 15:00:00	75	0.92	48.48%	0.24
240	1979/01/31 00:00:00	1979/02/03 13:00:00	86	0.92	48.68%	0.24
241	1952/12/20 11:00:00	1952/12/22 03:00:00	41	0.86	48.88%	0.24
242	1980/12/07 11:00:00	1980/12/08 19:00:00	33	0.85	49.09%	0.24
243	1957/03/16 10:00:00	1957/03/17 15:00:00	30	0.79	49.29%	0.24
244	1980/01/18 03:00:00	1980/01/20 10:00:00	56	0.7	49.49%	0.24
245	1998/11/08 08:00:00	1998/11/09 22:00:00	39	0.69	49.70%	0.24
246	1954/03/16 22:00:00	1954/03/18 11:00:00	38	0.67	49.90%	0.24
247	1970/01/16 18:00:00	1970/01/18 02:00:00	33	0.67	50.10%	0.24
248	1999/04/11 22:00:00	1999/04/13 18:00:00	45	0.67	50.30%	0.23
249	1952/04/10 16:00:00	1952/04/12 03:00:00	36	0.65	50.51%	0.23
250	2006/02/27 23:00:00	2006/03/02 05:00:00	55	0.65	50.71%	0.23
251	1956/01/31 10:00:00	1956/02/01 13:00:00	28	0.64	50.91%	0.23
252	1953/03/01 22:00:00	1953/03/02 22:00:00	25	0.61	51.12%	0.23
253	1984/12/08 00:00:00	1984/12/09 11:00:00	36	0.6	51.32%	0.23
254	1971/04/14 11:00:00	1971/04/15 23:00:00	37	0.53	51.52%	0.23
255	1987/12/04 21:00:00	1987/12/06 07:00:00	35	0.48	51.72%	0.23
256	1958/03/06 10:00:00	1958/03/08 08:00:00	47	0.46	51.93%	0.23
257	1969/11/06 22:00:00	1969/11/08 18:00:00	45	0.41	52.13%	0.23
258	1970/02/10 04:00:00	1970/02/12 19:00:00	64	0.38	52.33%	0.23
259	1973/02/07 04:00:00	1973/02/07 14:00:00	11	0.38	52.54%	0.22
260	1988/12/15 20:00:00	1988/12/19 17:00:00	94	0.38	52.74%	0.22
261	1969/03/21 13:00:00	1969/03/23 04:00:00	40	0.35	52.94%	0.22
262	1969/04/05 21:00:00	1969/04/06 14:00:00	18	0.32	53.14%	0.22
263	1996/01/31 04:00:00	1996/02/03 16:00:00	85	0.32	53.35%	0.22
264	1979/02/21 01:00:00	1979/02/23 17:00:00	65	0.3	53.55%	0.22
265	1963/04/17 07:00:00	1963/04/18 05:00:00	23	0.24	53.75%	0.22
266	1976/04/15 18:00:00	1976/04/16 18:00:00	25	0.23	53.96%	0.22
267	1998/04/11 17:00:00	1998/04/12 08:00:00	16	0.23	54.16%	0.22
268	1952/12/30 19:00:00	1953/01/01 06:00:00	36	0.2	54.36%	0.22
269	1980/03/10 16:00:00	1980/03/11 17:00:00	26	0.2	54.56%	0.22
270	1978/03/09 16:00:00	1978/03/10 19:00:00	28	0.17	54.77%	0.22
271	1978/12/17 00:00:00	1978/12/20 21:00:00	94	0.15	54.97%	0.21
272	1988/02/02 03:00:00	1988/02/04 18:00:00	64	0.15	55.17%	0.21
273	1988/04/14 20:00:00	1988/04/16 23:00:00	52	0.14	55.38%	0.21
274	1954/12/09 23:00:00	1954/12/11 06:00:00	32	0.13	55.58%	0.21

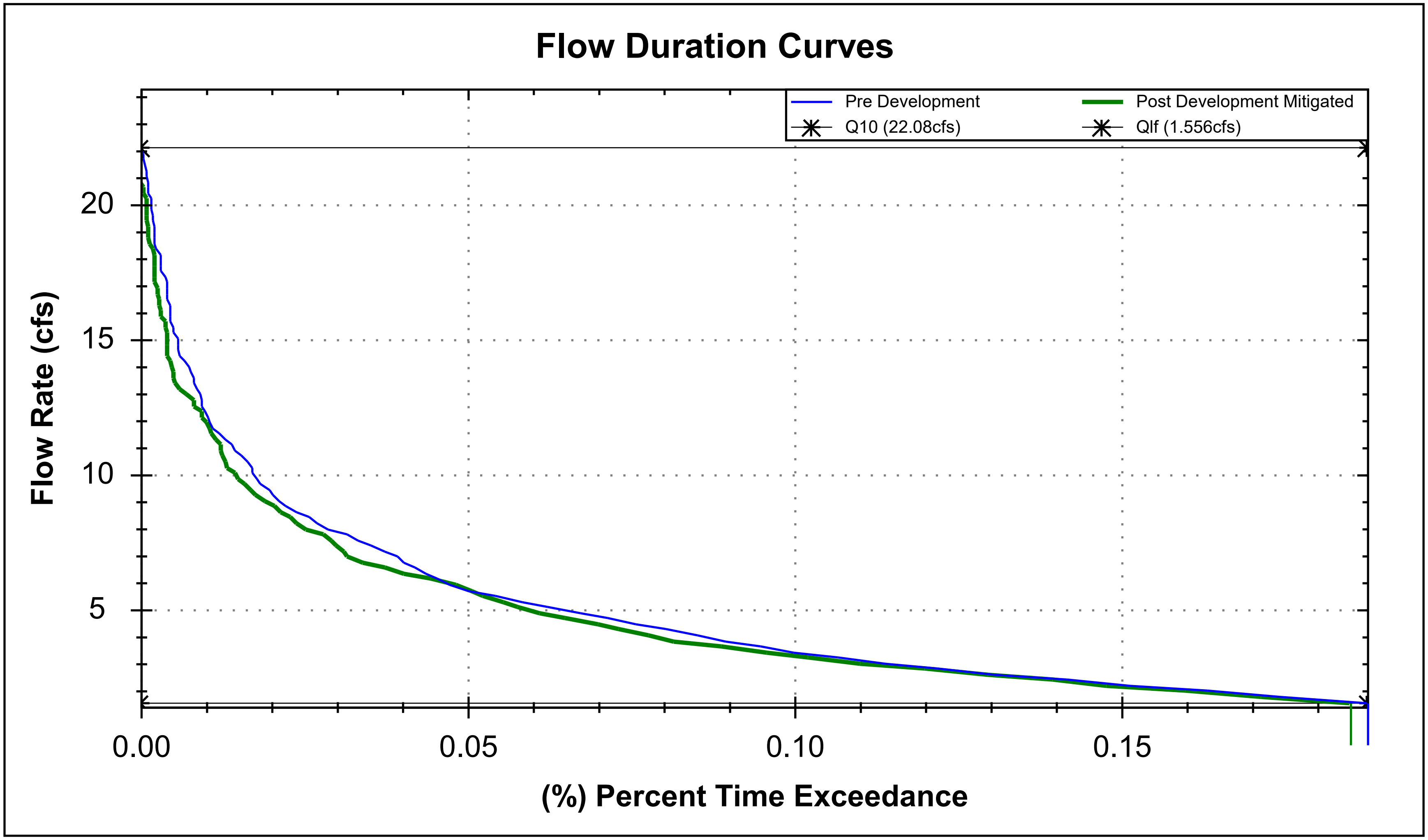
Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1976/03/01 16:00:00	1976/03/04 00:00:00	57	0.13	55.78%	0.21
276	1992/02/06 12:00:00	1992/02/09 05:00:00	66	0.13	55.98%	0.21
277	1955/04/30 21:00:00	1955/05/02 19:00:00	47	0.12	56.19%	0.21
278	2001/03/06 17:00:00	2001/03/08 10:00:00	42	0.12	56.39%	0.21
279	1961/01/26 10:00:00	1961/01/28 09:00:00	48	0.11	56.59%	0.21
280	1992/03/02 10:00:00	1992/03/04 12:00:00	51	0.11	56.80%	0.21
281	1992/12/27 21:00:00	1992/12/30 06:00:00	58	0.11	57.00%	0.21
282	1951/12/12 00:00:00	1951/12/13 21:00:00	46	0.1	57.20%	0.21
283	1987/01/06 20:00:00	1987/01/08 20:00:00	49	0.1	57.40%	0.21
284	1998/12/06 06:00:00	1998/12/07 00:00:00	19	0.1	57.61%	0.2
285	1952/01/25 05:00:00	1952/01/27 00:00:00	44	0.09	57.81%	0.2
286	1959/12/21 04:00:00	1959/12/22 18:00:00	39	0.09	58.01%	0.2
287	1969/01/14 02:00:00	1969/01/16 01:00:00	48	0.09	58.22%	0.2
288	1971/02/17 10:00:00	1971/02/18 20:00:00	35	0.09	58.42%	0.2
289	1974/10/28 13:00:00	1974/10/30 22:00:00	58	0.09	58.62%	0.2
290	1979/03/01 10:00:00	1979/03/03 03:00:00	42	0.09	58.82%	0.2
291	1982/11/09 20:00:00	1982/11/11 20:00:00	49	0.09	59.03%	0.2
292	1983/04/29 08:00:00	1983/05/01 12:00:00	53	0.09	59.23%	0.2
293	1986/02/07 23:00:00	1986/02/09 22:00:00	48	0.09	59.43%	0.2
294	1990/04/04 09:00:00	1990/04/05 22:00:00	38	0.09	59.63%	0.2
295	1996/10/30 14:00:00	1996/11/01 02:00:00	37	0.09	59.84%	0.2
296	1999/02/04 16:00:00	1999/02/06 03:00:00	36	0.09	60.04%	0.2
297	1951/08/28 10:00:00	1951/08/29 18:00:00	33	0.08	60.24%	0.2
298	1957/12/05 04:00:00	1957/12/06 17:00:00	38	0.08	60.45%	0.2
299	1960/09/11 05:00:00	1960/09/12 12:00:00	32	0.08	60.65%	0.19
300	1974/12/28 10:00:00	1974/12/30 14:00:00	53	0.08	60.85%	0.19
301	1976/12/30 15:00:00	1977/01/01 13:00:00	47	0.08	61.05%	0.19
302	1979/10/20 09:00:00	1979/10/21 23:00:00	39	0.08	61.26%	0.19
303	1980/10/16 05:00:00	1980/10/17 15:00:00	35	0.08	61.46%	0.19
304	1981/02/25 21:00:00	1981/02/27 04:00:00	32	0.08	61.66%	0.19
305	1982/11/29 13:00:00	1982/12/01 19:00:00	55	0.08	61.87%	0.19
306	1983/12/03 16:00:00	1983/12/05 03:00:00	36	0.08	62.07%	0.19
307	1986/04/06 05:00:00	1986/04/07 16:00:00	36	0.08	62.27%	0.19
308	1986/12/06 15:00:00	1986/12/08 09:00:00	43	0.08	62.47%	0.19
309	1989/03/25 13:00:00	1989/03/27 07:00:00	43	0.08	62.68%	0.19
310	1952/02/29 23:00:00	1952/03/02 11:00:00	37	0.07	62.88%	0.19
311	1953/01/06 19:00:00	1953/01/09 05:00:00	59	0.07	63.08%	0.19
312	1955/02/17 07:00:00	1955/02/18 12:00:00	30	0.07	63.29%	0.19
313	1957/12/15 12:00:00	1957/12/18 03:00:00	64	0.07	63.49%	0.19
314	1959/04/26 06:00:00	1959/04/27 11:00:00	30	0.07	63.69%	0.19
315	1959/12/10 03:00:00	1959/12/11 04:00:00	26	0.07	63.89%	0.18
316	1960/11/26 18:00:00	1960/11/27 21:00:00	28	0.07	64.10%	0.18
317	1961/11/25 18:00:00	1961/11/26 22:00:00	29	0.07	64.30%	0.18
318	1962/03/06 09:00:00	1962/03/07 20:00:00	36	0.07	64.50%	0.18
319	1964/12/27 10:00:00	1964/12/29 06:00:00	45	0.07	64.71%	0.18
320	1965/01/24 07:00:00	1965/01/25 11:00:00	29	0.07	64.91%	0.18
321	1969/01/18 23:00:00	1969/01/22 15:00:00	89	0.07	65.11%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1972/12/04 16:00:00	1972/12/05 22:00:00	31	0.07	65.31%	0.18
323	1975/02/03 10:00:00	1975/02/05 07:00:00	46	0.07	65.52%	0.18
324	1980/12/04 15:00:00	1980/12/06 09:00:00	43	0.07	65.72%	0.18
325	1986/01/30 05:00:00	1986/02/01 19:00:00	63	0.07	65.92%	0.18
326	1986/10/09 19:00:00	1986/10/11 13:00:00	43	0.07	66.13%	0.18
327	1987/04/04 15:00:00	1987/04/05 16:00:00	26	0.07	66.33%	0.18
328	1994/01/25 00:00:00	1994/01/28 06:00:00	79	0.07	66.53%	0.18
329	1995/02/14 06:00:00	1995/02/15 21:00:00	40	0.07	66.73%	0.18
330	1996/12/27 17:00:00	1996/12/29 06:00:00	38	0.07	66.94%	0.18
331	2000/02/12 17:00:00	2000/02/15 06:00:00	62	0.07	67.14%	0.18
332	2004/04/01 22:00:00	2004/04/03 00:00:00	27	0.07	67.34%	0.18
333	2004/12/05 13:00:00	2004/12/06 19:00:00	31	0.07	67.55%	0.17
334	2005/12/31 22:00:00	2006/01/04 02:00:00	77	0.07	67.75%	0.17
335	2007/12/07 06:00:00	2007/12/09 16:00:00	59	0.07	67.95%	0.17
336	1959/02/08 06:00:00	1959/02/09 18:00:00	37	0.06	68.15%	0.17
337	1960/01/25 21:00:00	1960/01/27 02:00:00	30	0.06	68.36%	0.17
338	1962/02/15 20:00:00	1962/02/17 13:00:00	42	0.06	68.56%	0.17
339	1963/11/15 18:00:00	1963/11/16 17:00:00	24	0.06	68.76%	0.17
340	1973/11/18 09:00:00	1973/11/19 20:00:00	36	0.06	68.97%	0.17
341	1975/02/09 18:00:00	1975/02/11 00:00:00	31	0.06	69.17%	0.17
342	1975/11/27 19:00:00	1975/11/29 18:00:00	48	0.06	69.37%	0.17
343	1982/01/29 00:00:00	1982/01/29 22:00:00	23	0.06	69.57%	0.17
344	1984/10/17 07:00:00	1984/10/18 04:00:00	22	0.06	69.78%	0.17
345	1984/12/16 04:00:00	1984/12/17 02:00:00	23	0.06	69.98%	0.17
346	1988/01/05 16:00:00	1988/01/06 15:00:00	24	0.06	70.18%	0.17
347	1990/05/28 10:00:00	1990/05/29 11:00:00	26	0.06	70.39%	0.17
348	1995/03/21 13:00:00	1995/03/24 14:00:00	74	0.06	70.59%	0.17
349	1996/01/21 20:00:00	1996/01/23 03:00:00	32	0.06	70.79%	0.17
350	1996/02/21 09:00:00	1996/02/22 20:00:00	36	0.06	70.99%	0.17
351	1996/03/13 05:00:00	1996/03/14 08:00:00	28	0.06	71.20%	0.17
352	1997/01/23 08:00:00	1997/01/24 15:00:00	32	0.06	71.40%	0.17
353	1999/03/25 16:00:00	1999/03/26 16:00:00	25	0.06	71.60%	0.16
354	2000/04/17 19:00:00	2000/04/19 02:00:00	32	0.06	71.81%	0.16
355	2000/10/27 09:00:00	2000/10/28 06:00:00	22	0.06	72.01%	0.16
356	2004/02/03 00:00:00	2004/02/04 10:00:00	35	0.06	72.21%	0.16
357	2005/10/16 20:00:00	2005/10/19 06:00:00	59	0.06	72.41%	0.16
358	2006/03/28 22:00:00	2006/03/30 05:00:00	32	0.06	72.62%	0.16
359	2006/05/22 06:00:00	2006/05/23 02:00:00	21	0.06	72.82%	0.16
360	2007/12/19 03:00:00	2007/12/20 09:00:00	31	0.06	73.02%	0.16
361	2008/02/03 09:00:00	2008/02/04 15:00:00	31	0.06	73.23%	0.16
362	1952/11/23 01:00:00	1952/11/24 03:00:00	27	0.05	73.43%	0.16
363	1953/11/14 18:00:00	1953/11/16 02:00:00	33	0.05	73.63%	0.16
364	1957/01/05 10:00:00	1957/01/06 08:00:00	23	0.05	73.83%	0.16
365	1957/10/31 01:00:00	1957/10/31 20:00:00	20	0.05	74.04%	0.16
366	1958/03/27 14:00:00	1958/03/28 07:00:00	18	0.05	74.24%	0.16
367	1960/02/08 23:00:00	1960/02/11 02:00:00	52	0.05	74.44%	0.16
368	1961/11/20 17:00:00	1961/11/21 12:00:00	20	0.05	74.65%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1964/03/23 01:00:00	1964/03/24 16:00:00	40	0.05	74.85%	0.16
370	1967/04/19 19:00:00	1967/04/20 14:00:00	20	0.05	75.05%	0.16
371	1967/04/22 00:00:00	1967/04/22 18:00:00	19	0.05	75.25%	0.16
372	1972/11/11 09:00:00	1972/11/12 01:00:00	17	0.05	75.46%	0.16
373	1973/02/28 02:00:00	1973/03/01 02:00:00	25	0.05	75.66%	0.16
374	1975/04/17 09:00:00	1975/04/18 01:00:00	17	0.05	75.86%	0.16
375	1978/01/30 18:00:00	1978/01/31 16:00:00	23	0.05	76.06%	0.16
376	1978/11/21 18:00:00	1978/11/22 17:00:00	24	0.05	76.27%	0.15
377	1978/11/24 11:00:00	1978/11/25 05:00:00	19	0.05	76.47%	0.15
378	1980/04/23 04:00:00	1980/04/23 22:00:00	19	0.05	76.67%	0.15
379	1982/01/10 20:00:00	1982/01/11 22:00:00	27	0.05	76.88%	0.15
380	1982/03/26 04:00:00	1982/03/26 23:00:00	20	0.05	77.08%	0.15
381	1982/09/26 05:00:00	1982/09/27 11:00:00	31	0.05	77.28%	0.15
382	1982/11/19 02:00:00	1982/11/20 15:00:00	38	0.05	77.48%	0.15
383	1982/12/29 20:00:00	1982/12/30 12:00:00	17	0.05	77.69%	0.15
384	1983/11/20 10:00:00	1983/11/21 10:00:00	25	0.05	77.89%	0.15
385	1984/12/11 04:00:00	1984/12/11 22:00:00	19	0.05	78.09%	0.15
386	1985/01/08 02:00:00	1985/01/08 21:00:00	20	0.05	78.30%	0.15
387	1988/08/24 05:00:00	1988/08/25 02:00:00	22	0.05	78.50%	0.15
388	1989/02/09 17:00:00	1989/02/10 20:00:00	28	0.05	78.70%	0.15
389	1990/06/10 09:00:00	1990/06/11 05:00:00	21	0.05	78.90%	0.15
390	1993/01/02 10:00:00	1993/01/03 04:00:00	19	0.05	79.11%	0.15
391	1993/12/11 18:00:00	1993/12/12 17:00:00	24	0.05	79.31%	0.15
392	1996/12/06 03:00:00	1996/12/06 23:00:00	21	0.05	79.51%	0.15
393	1997/01/03 07:00:00	1997/01/04 01:00:00	19	0.05	79.72%	0.15
394	2005/03/22 21:00:00	2005/03/23 13:00:00	17	0.05	79.92%	0.15
395	2006/02/19 05:00:00	2006/02/20 04:00:00	24	0.05	80.12%	0.15
396	2007/08/26 12:00:00	2007/08/27 04:00:00	17	0.05	80.32%	0.15
397	1951/12/05 03:00:00	1951/12/05 18:00:00	16	0.04	80.53%	0.15
398	1951/12/19 10:00:00	1951/12/20 00:00:00	15	0.04	80.73%	0.15
399	1953/04/27 23:00:00	1953/04/28 11:00:00	13	0.04	80.93%	0.15
400	1954/01/12 17:00:00	1954/01/13 15:00:00	23	0.04	81.14%	0.15
401	1955/01/31 07:00:00	1955/01/31 19:00:00	13	0.04	81.34%	0.15
402	1955/03/11 03:00:00	1955/03/11 17:00:00	15	0.04	81.54%	0.14
403	1955/04/22 06:00:00	1955/04/22 22:00:00	17	0.04	81.74%	0.14
404	1955/11/17 14:00:00	1955/11/18 05:00:00	16	0.04	81.95%	0.14
405	1957/02/23 10:00:00	1957/02/23 22:00:00	13	0.04	82.15%	0.14
406	1958/03/11 07:00:00	1958/03/12 12:00:00	30	0.04	82.35%	0.14
407	1958/09/24 05:00:00	1958/09/24 20:00:00	16	0.04	82.56%	0.14
408	1959/01/06 09:00:00	1959/01/06 23:00:00	15	0.04	82.76%	0.14
409	1963/04/26 03:00:00	1963/04/26 16:00:00	14	0.04	82.96%	0.14
410	1963/09/04 11:00:00	1963/09/05 03:00:00	17	0.04	83.16%	0.14
411	1965/03/12 21:00:00	1965/03/14 10:00:00	38	0.04	83.37%	0.14
412	1968/02/13 06:00:00	1968/02/14 00:00:00	19	0.04	83.57%	0.14
413	1968/04/01 21:00:00	1968/04/02 11:00:00	15	0.04	83.77%	0.14
414	1969/11/10 03:00:00	1969/11/10 18:00:00	16	0.04	83.98%	0.14
415	1970/01/10 03:00:00	1970/01/12 12:00:00	58	0.04	84.18%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1971/01/12 21:00:00	1971/01/13 14:00:00	18	0.04	84.38%	0.14
417	1971/02/23 05:00:00	1971/02/23 16:00:00	12	0.04	84.58%	0.14
418	1972/12/07 09:00:00	1972/12/09 01:00:00	41	0.04	84.79%	0.14
419	1974/03/02 11:00:00	1974/03/03 01:00:00	15	0.04	84.99%	0.14
420	1975/12/20 15:00:00	1975/12/21 09:00:00	19	0.04	85.19%	0.14
421	1977/12/18 07:00:00	1977/12/18 18:00:00	12	0.04	85.40%	0.14
422	1978/11/11 19:00:00	1978/11/12 20:00:00	26	0.04	85.60%	0.14
423	1983/04/12 23:00:00	1983/04/13 19:00:00	21	0.04	85.80%	0.14
424	1985/01/28 19:00:00	1985/01/29 15:00:00	21	0.04	86.00%	0.14
425	1985/02/02 11:00:00	1985/02/03 00:00:00	14	0.04	86.21%	0.14
426	1987/02/13 22:00:00	1987/02/14 13:00:00	16	0.04	86.41%	0.14
427	1987/03/06 07:00:00	1987/03/07 01:00:00	19	0.04	86.61%	0.14
428	1987/03/22 02:00:00	1987/03/22 15:00:00	14	0.04	86.82%	0.14
429	1987/10/31 09:00:00	1987/11/02 08:00:00	48	0.04	87.02%	0.14
430	1987/11/05 01:00:00	1987/11/06 01:00:00	25	0.04	87.22%	0.14
431	1989/02/04 17:00:00	1989/02/05 04:00:00	12	0.04	87.42%	0.14
432	1990/01/14 05:00:00	1990/01/15 00:00:00	20	0.04	87.63%	0.13
433	1990/01/31 01:00:00	1990/01/31 16:00:00	16	0.04	87.83%	0.13
434	1990/02/04 12:00:00	1990/02/05 04:00:00	17	0.04	88.03%	0.13
435	1990/04/17 10:00:00	1990/04/18 02:00:00	17	0.04	88.24%	0.13
436	1992/02/10 06:00:00	1992/02/10 17:00:00	12	0.04	88.44%	0.13
437	1995/01/21 04:00:00	1995/01/21 19:00:00	16	0.04	88.64%	0.13
438	1998/03/14 17:00:00	1998/03/15 10:00:00	18	0.04	88.84%	0.13
439	1998/12/01 17:00:00	1998/12/02 08:00:00	16	0.04	89.05%	0.13
440	2001/03/10 18:00:00	2001/03/11 11:00:00	18	0.04	89.25%	0.13
441	2004/03/02 01:00:00	2004/03/02 18:00:00	18	0.04	89.45%	0.13
442	2006/12/10 01:00:00	2006/12/11 05:00:00	29	0.04	89.66%	0.13
443	1952/12/28 08:00:00	1952/12/29 00:00:00	17	0.03	89.86%	0.13
444	1953/02/23 14:00:00	1953/02/24 06:00:00	17	0.03	90.06%	0.13
445	1955/11/14 09:00:00	1955/11/14 18:00:00	10	0.03	90.26%	0.13
446	1957/05/21 07:00:00	1957/05/21 17:00:00	11	0.03	90.47%	0.13
447	1957/06/10 05:00:00	1957/06/10 14:00:00	10	0.03	90.67%	0.13
448	1957/10/21 05:00:00	1957/10/21 13:00:00	9	0.03	90.87%	0.13
449	1960/11/12 23:00:00	1960/11/13 10:00:00	12	0.03	91.08%	0.13
450	1963/03/28 12:00:00	1963/03/28 21:00:00	10	0.03	91.28%	0.13
451	1964/11/10 18:00:00	1964/11/11 03:00:00	10	0.03	91.48%	0.13
452	1964/12/31 22:00:00	1965/01/01 06:00:00	9	0.03	91.68%	0.13
453	1966/10/10 14:00:00	1966/10/10 22:00:00	9	0.03	91.89%	0.13
454	1967/03/31 13:00:00	1967/03/31 21:00:00	9	0.03	92.09%	0.13
455	1968/11/14 22:00:00	1968/11/15 13:00:00	16	0.03	92.29%	0.13
456	1971/10/17 01:00:00	1971/10/17 16:00:00	16	0.03	92.49%	0.13
457	1976/04/13 10:00:00	1976/04/13 21:00:00	12	0.03	92.70%	0.13
458	1980/03/21 23:00:00	1980/03/22 07:00:00	9	0.03	92.90%	0.13
459	1983/01/23 13:00:00	1983/01/25 19:00:00	55	0.03	93.10%	0.13
460	1983/02/24 23:00:00	1983/02/25 08:00:00	10	0.03	93.31%	0.13
461	1983/12/09 16:00:00	1983/12/09 23:00:00	8	0.03	93.51%	0.13
462	1989/01/07 17:00:00	1989/01/08 00:00:00	8	0.03	93.71%	0.13

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
463	1991/12/28 04:00:00	1991/12/28 12:00:00	9	0.03	93.91%	0.13
464	1992/03/08 02:00:00	1992/03/08 19:00:00	18	0.03	94.12%	0.13
465	1995/03/03 12:00:00	1995/03/03 19:00:00	8	0.03	94.32%	0.13
466	1997/12/18 18:00:00	1997/12/19 09:00:00	16	0.03	94.52%	0.12
467	2001/02/20 18:00:00	2001/02/21 07:00:00	14	0.03	94.73%	0.12
468	2001/02/23 18:00:00	2001/02/24 05:00:00	12	0.03	94.93%	0.12
469	2007/02/11 13:00:00	2007/02/11 22:00:00	10	0.03	95.13%	0.12
470	2007/02/28 06:00:00	2007/03/01 02:00:00	21	0.03	95.33%	0.12
471	2008/01/23 22:00:00	2008/01/24 21:00:00	24	0.03	95.54%	0.12
472	1955/01/02 03:00:00	1955/01/02 11:00:00	9	0.02	95.74%	0.12
473	1991/03/15 15:00:00	1991/03/15 21:00:00	7	0.02	95.94%	0.12
474	1991/10/27 12:00:00	1991/10/27 17:00:00	6	0.02	96.15%	0.12
475	1992/03/27 06:00:00	1992/03/27 11:00:00	6	0.02	96.35%	0.12
476	1996/03/05 00:00:00	1996/03/05 03:00:00	4	0.02	96.55%	0.12
477	1998/01/03 20:00:00	1998/01/05 00:00:00	29	0.02	96.75%	0.12
478	2001/11/29 18:00:00	2001/11/30 03:00:00	10	0.02	96.96%	0.12
479	2001/12/04 18:00:00	2001/12/05 02:00:00	9	0.02	97.16%	0.12
480	2006/03/21 05:00:00	2006/03/21 10:00:00	6	0.02	97.36%	0.12
481	2007/02/19 09:00:00	2007/02/19 15:00:00	7	0.02	97.57%	0.12
482	2007/04/23 01:00:00	2007/04/23 05:00:00	5	0.02	97.77%	0.12
483	2008/02/20 12:00:00	2008/02/20 19:00:00	8	0.02	97.97%	0.12
484	1952/12/17 16:00:00	1952/12/17 17:00:00	2	0.01	98.17%	0.12
485	1958/05/11 09:00:00	1958/05/11 10:00:00	2	0.01	98.38%	0.12
486	1977/01/29 04:00:00	1977/01/29 05:00:00	2	0.01	98.58%	0.12
487	1984/12/03 11:00:00	1984/12/03 11:00:00	1	0.01	98.78%	0.12
488	1996/01/16 23:00:00	1996/01/17 01:00:00	3	0.01	98.99%	0.12
489	2005/03/05 04:00:00	2005/03/05 07:00:00	4	0.01	99.19%	0.12
490	1982/03/29 03:00:00	1982/03/29 03:00:00	1	0	99.39%	0.12
491	1982/09/17 14:00:00	1982/09/17 14:00:00	1	0	99.59%	0.12
492	2006/12/17 05:00:00	2006/12/17 05:00:00	1	0	99.80%	0.12
-End of Data-----------------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (22.08cfs)
Qlf (1.556cfs)
Flow Rate (cfs)
20
15
10
5
0.00
0.05
0.10
0.15
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve							
Flow Control Upper Limit: 22.08 (cfs)							
Flow Control Lower Limit: 1.556 (cfs)							
post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out							
post-development time stamp: 8/3/2021 1:19:24 PM							
Compared to:							
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out							
pre-development time stamp: 3/19/2021 1:46:15 PM							
Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	1.56	0.18	0.19	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
1	1.76	0.17	0.17	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
2	1.97	0.16	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
3	2.18	0.15	0.15	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
4	2.39	0.14	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
5	2.59	0.13	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
6	2.80	0.12	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
7	3.01	0.11	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
8	3.21	0.10	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
9	3.42	0.10	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
10	3.63	0.09	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
11	3.84	0.08	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
12	4.04	0.08	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
13	4.25	0.07	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
14	4.46	0.07	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
15	4.67	0.06	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
16	4.87	0.06	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
17	5.08	0.06	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
18	5.29	0.06	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
19	5.49	0.05	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
20	5.70	0.05	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
21	5.91	0.05	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
22	6.12	0.04	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
23	6.32	0.04	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
24	6.53	0.04	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
25	6.74	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
26	6.95	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
27	7.15	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
28	7.36	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
29	7.57	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
30	7.78	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
31	7.98	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
32	8.19	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
33	8.40	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
34	8.60	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
35	8.81	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
36	9.02	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
37	9.23	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
38	9.43	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
39	9.64	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
40	9.85	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
41	10.06	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
42	10.26	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
43	10.47	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
44	10.68	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
45	10.89	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
46	11.09	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
47	11.30	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
48	11.51	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
49	11.71	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
50	11.92	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
51	12.13	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
52	12.34	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
53	12.54	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
54	12.75	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
55	12.96	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
56	13.17	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
57	13.37	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
58	13.58	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
59	13.79	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
60	13.99	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
61	14.20	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
62	14.41	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
63	14.62	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
64	14.82	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
65	15.03	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
66	15.24	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
67	15.45	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
68	15.65	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
69	15.86	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
70	16.07	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
71	16.28	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
72	16.48	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
73	16.69	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
74	16.90	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
75	17.10	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
76	17.31	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
77	17.52	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
78	17.73	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
79	17.93	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
80	18.14	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
81	18.35	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
82	18.56	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
83	18.76	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
84	18.97	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
85	19.18	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
86	19.38	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
87	19.59	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
88	19.80	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
89	20.01	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
90	20.21	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
91	20.42	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
92	20.63	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
93	20.84	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
94	21.04	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
95	21.25	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
96	21.46	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
97	21.67	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
98	21.87	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
99	22.08	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out				
time stamp: 3/19/2021 1:46:15 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	1.56	66	933	0.188
2	1.76	55	867	0.174
3	1.97	59	812	0.163
4	2.18	48	753	0.151
5	2.39	56	705	0.142
6	2.59	43	649	0.130
7	2.80	39	606	0.122
8	3.01	36	567	0.114
9	3.21	34	531	0.107
10	3.42	26	497	0.100
11	3.63	26	471	0.095
12	3.84	22	445	0.089
13	4.04	23	423	0.085
14	4.25	23	400	0.080
15	4.46	22	377	0.076
16	4.67	20	355	0.071
17	4.87	26	335	0.067
18	5.08	19	309	0.062
19	5.29	20	290	0.058
20	5.49	20	270	0.054
21	5.70	15	250	0.050
22	5.91	10	235	0.047
23	6.12	8	225	0.045
24	6.32	9	217	0.044
25	6.53	8	208	0.042
26	6.74	5	200	0.040
27	6.95	9	195	0.039
28	7.15	11	186	0.037
29	7.36	10	175	0.035
30	7.57	8	165	0.033
31	7.78	14	157	0.032
32	7.98	9	143	0.029
33	8.19	6	134	0.027
34	8.40	9	128	0.026
35	8.60	9	119	0.024
36	8.81	5	110	0.022
37	9.02	4	105	0.021
38	9.23	3	101	0.020
39	9.43	7	98	0.020
40	9.64	3	91	0.018
41	9.85	3	88	0.018
42	10.06	0	85	0.017
43	10.26	4	85	0.017
44	10.47	4	81	0.016
45	10.68	5	77	0.015
46	10.89	3	72	0.014
47	11.09	5	69	0.014
48	11.30	4	64	0.013
49	11.51	5	60	0.012
50	11.71	2	55	0.011
51	11.92	2	53	0.011

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	12.13	2	51	0.010
53	12.34	2	49	0.010
54	12.54	1	47	0.009
55	12.75	1	46	0.009
56	12.96	2	45	0.009
57	13.17	3	43	0.009
58	13.37	0	40	0.008
59	13.58	2	40	0.008
60	13.79	1	38	0.008
61	13.99	4	37	0.007
62	14.20	3	33	0.007
63	14.41	1	30	0.006
64	14.62	1	29	0.006
65	14.82	0	28	0.006
66	15.03	3	28	0.006
67	15.24	0	25	0.005
68	15.45	2	25	0.005
69	15.65	0	23	0.005
70	15.86	1	23	0.005
71	16.07	0	22	0.004
72	16.28	2	22	0.004
73	16.48	0	20	0.004
74	16.69	0	20	0.004
75	16.90	0	20	0.004
76	17.10	1	20	0.004
77	17.31	4	19	0.004
78	17.52	0	15	0.003
79	17.73	0	15	0.003
80	17.93	0	15	0.003
81	18.14	3	15	0.003
82	18.35	1	12	0.002
83	18.56	0	11	0.002
84	18.76	1	11	0.002
85	18.97	0	10	0.002
86	19.18	1	10	0.002
87	19.38	0	9	0.002
88	19.59	1	9	0.002
89	19.80	0	8	0.002
90	20.01	0	8	0.002
91	20.21	2	8	0.002
92	20.42	0	6	0.001
93	20.63	0	6	0.001
94	20.84	1	6	0.001
95	21.04	1	5	0.001
96	21.25	1	4	0.001
97	21.46	1	3	0.001
98	21.67	0	2	0.000
99	21.87	2	2	0.000
100	22.08	0	0	0.000
---------End of Data-----------------				

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out				
time stamp: 8/3/2021 1:19:24 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	1.56	68	920	0.185
2	1.76	58	852	0.171
3	1.97	59	794	0.160
4	2.18	41	735	0.148
5	2.39	50	694	0.140
6	2.59	47	644	0.129
7	2.80	50	597	0.120
8	3.01	39	547	0.110
9	3.21	32	508	0.102
10	3.42	34	476	0.096
11	3.63	36	442	0.089
12	3.84	20	406	0.082
13	4.04	22	386	0.078
14	4.25	16	364	0.073
15	4.46	25	348	0.070
16	4.67	19	323	0.065
17	4.87	17	304	0.061
18	5.08	11	287	0.058
19	5.29	16	276	0.055
20	5.49	8	260	0.052
21	5.70	12	252	0.051
22	5.91	19	240	0.048
23	6.12	21	221	0.044
24	6.32	14	200	0.040
25	6.53	17	186	0.037
26	6.74	12	169	0.034
27	6.95	2	157	0.032
28	7.15	6	155	0.031
29	7.36	4	149	0.030
30	7.57	6	145	0.029
31	7.78	13	139	0.028
32	7.98	8	126	0.025
33	8.19	4	118	0.024
34	8.40	7	114	0.023
35	8.60	5	107	0.022
36	8.81	7	102	0.021
37	9.02	8	95	0.019
38	9.23	3	87	0.017
39	9.43	5	84	0.017
40	9.64	5	79	0.016
41	9.85	2	74	0.015
42	10.06	6	72	0.014
43	10.26	2	66	0.013
44	10.47	2	64	0.013
45	10.68	1	62	0.012
46	10.89	0	61	0.012
47	11.09	4	61	0.012
48	11.30	3	57	0.011
49	11.51	2	54	0.011
50	11.71	2	52	0.010
51	11.92	4	50	0.010

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	12.13	0	46	0.009
53	12.34	5	46	0.009
54	12.54	1	41	0.008
55	12.75	5	40	0.008
56	12.96	5	35	0.007
57	13.17	4	30	0.006
58	13.37	1	26	0.005
59	13.58	0	25	0.005
60	13.79	1	25	0.005
61	13.99	1	24	0.005
62	14.20	3	23	0.005
63	14.41	0	20	0.004
64	14.62	0	20	0.004
65	14.82	0	20	0.004
66	15.03	0	20	0.004
67	15.24	1	20	0.004
68	15.45	0	19	0.004
69	15.65	4	19	0.004
70	15.86	0	15	0.003
71	16.07	1	15	0.003
72	16.28	0	14	0.003
73	16.48	1	14	0.003
74	16.69	0	13	0.003
75	16.90	2	13	0.003
76	17.10	0	11	0.002
77	17.31	1	11	0.002
78	17.52	0	10	0.002
79	17.73	0	10	0.002
80	17.93	0	10	0.002
81	18.14	1	10	0.002
82	18.35	2	9	0.002
83	18.56	1	7	0.001
84	18.76	0	6	0.001
85	18.97	0	6	0.001
86	19.18	1	6	0.001
87	19.38	0	5	0.001
88	19.59	0	5	0.001
89	19.80	0	5	0.001
90	20.01	0	5	0.001
91	20.21	3	5	0.001
92	20.42	0	2	0.000
93	20.63	2	2	0.000
94	20.84	0	0	0.000
95	21.04	0	0	0.000
96	21.25	0	0	0.000
97	21.46	0	0	0.000
98	21.67	0	0	0.000
99	21.87	0	0	0.000
100	22.08	0	0	0.000
---------End of Data-----------------				

END OF STATISTICS ANALYSIS

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC-2

ANALYSIS DETAILS

Stream Susceptibility to Channel Erosion: High
Low Flow Threshold = (0.1)Q2 = (0.1)17.730 = Qlf = 1.7730 (cfs)
Flow Control Upper Limit = Q10 = 25.450 (cfs)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM file time stamp: 3/19/2021 1:46:15 PM
Selected Node to Analyze: POC-2

POST-DEVELOPMENT MITIGATED SWMM FILE

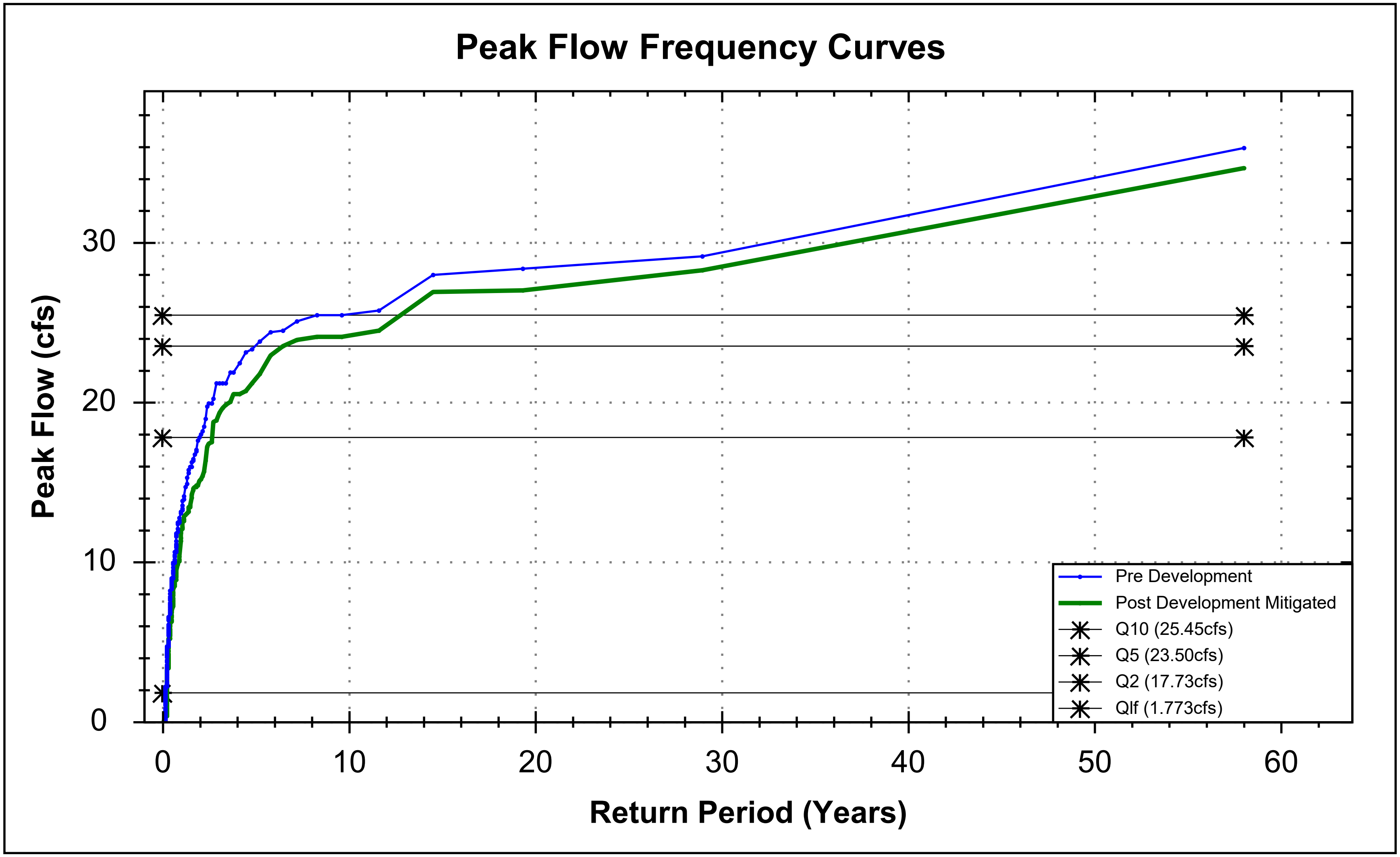
SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM file time stamp: 3/16/2021 1:46:28 PM
Selected Node to Analyze: POC-2

MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:
Peak Flow Conditions PASS
Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 383 points. Of the points, 4 point(s) are above the flow control upper limit (Q10 = 25.45 (cfs)), 151 point(s) are below the low flow threshold value (Qlf = 1.773 (cfs)). Of the points within the flow control range (Qlf to Q10), 228 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater discharge value. Within the flow control range, comparing the post-development flow duration curve to the pre-development flow duration curve, 97 post-development curve point(s) have a lower flow duration than pre-development conditions, and 3 point(s) have a flow duration that exceeds the pre-development flow duration by less than 10%. These points all pass. There are no points that failed, therefore the flow duration requirements have been met.



Peak Flow Frequency Curves
Peak Flow (cfs)
Return Period (Years)
0
10
20
30
0
10
20
30
40
50
60
Pre Development
Post Development Mitigated
Q10 (25.45cfs)
Q5 (23.50cfs)
Q2 (17.73cfs)
Qlf (1.773cfs)

Compare Post-Development Curve to Pre-Development Curve							
Flow Control Upper Limit: 25.45 (cfs)							
Flow Control Lower Limit: 1.773 (cfs)							
post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out							
post-development time stamp: 3/16/2021 1:46:28 PM							
Compared to:							
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out							
pre-development time stamp: 3/19/2021 1:46:15 PM							
Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	58.00	34.67	35.91	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (25.45 (cfs))
1	29.00	28.28	29.11	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (25.45 (cfs))
2	19.33	26.94	28.30	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (25.45 (cfs))
3	14.50	26.84	27.91	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (25.45 (cfs))
4	11.60	24.46	25.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
5	9.67	24.06	25.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
6	8.29	24.02	25.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
7	7.25	23.90	25.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
8	6.44	23.48	24.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	5.80	22.87	24.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	5.27	21.76	23.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	4.83	21.17	23.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	4.46	20.63	23.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	4.14	20.48	22.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.87	20.45	21.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	3.63	19.97	21.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	3.41	19.77	21.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	3.22	19.65	21.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	3.05	19.35	21.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.90	18.86	21.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.76	18.76	20.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.64	17.47	19.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	2.52	17.41	19.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	2.42	17.17	19.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	2.32	16.29	18.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	2.23	15.62	18.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	2.15	15.39	18.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	2.07	15.17	17.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	2.00	15.06	17.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.93	14.81	17.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.87	14.73	16.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.81	14.70	16.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
32	1.76	14.64	16.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.71	14.54	16.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
34	1.66	14.50	16.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.61	14.23	16.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.57	13.98	15.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.53	13.50	15.92	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.49	13.44	15.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.45	13.38	15.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.42	13.11	15.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.38	13.07	15.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.35	13.04	15.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.32	13.01	14.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.29	12.94	14.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	1.26	12.90	14.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	1.23	12.88	14.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	1.21	12.87	14.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	1.18	12.78	14.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	1.16	12.64	13.92	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	1.14	12.56	13.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	1.12	12.52	13.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	1.09	12.41	13.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	1.07	12.16	13.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
54	1.06	12.07	13.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
55	1.04	11.99	13.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
56	1.02	11.83	13.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
57	1.00	11.76	13.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
58	0.98	11.43	13.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
59	0.97	11.26	12.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
60	0.95	10.29	12.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
61	0.94	10.11	12.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
62	0.92	10.04	12.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
63	0.91	10.02	12.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
64	0.89	9.97	12.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
65	0.88	9.97	12.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
66	0.87	9.94	12.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
67	0.85	9.89	12.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
68	0.84	9.89	12.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
69	0.83	9.85	12.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
70	0.82	9.84	12.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
71	0.81	9.78	11.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
72	0.80	9.45	11.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
73	0.78	9.38	11.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
74	0.77	9.29	11.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
75	0.76	9.21	11.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
76	0.75	9.17	11.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
77	0.74	9.12	10.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
78	0.73	9.03	10.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
79	0.73	9.00	10.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
80	0.72	8.87	10.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
81	0.71	8.86	10.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
82	0.70	8.84	10.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
83	0.69	8.80	10.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
84	0.68	8.79	10.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
85	0.67	8.78	10.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
86	0.67	8.72	10.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
87	0.66	8.69	10.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
88	0.65	8.55	10.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
89	0.64	8.54	9.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
90	0.64	8.50	9.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
91	0.63	8.48	9.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
92	0.62	8.29	9.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
93	0.62	8.04	9.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
94	0.61	7.95	9.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
95	0.60	7.95	9.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
96	0.60	7.88	9.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
97	0.59	7.86	9.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
98	0.59	7.71	9.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
99	0.58	7.58	9.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
100	0.57	7.51	9.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
101	0.57	7.38	9.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
102	0.56	7.34	9.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
103	0.56	7.26	9.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
104	0.55	7.19	8.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
105	0.55	7.17	8.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
106	0.54	6.94	8.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
107	0.54	6.89	8.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
108	0.53	6.89	8.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
109	0.53	6.86	8.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
110	0.52	6.82	8.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
111	0.52	6.79	8.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
112	0.51	6.67	8.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
113	0.51	6.67	8.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
114	0.50	6.63	8.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
115	0.50	6.58	8.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
116	0.50	6.58	8.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
117	0.49	6.58	8.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
118	0.49	6.55	8.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
119	0.48	6.49	8.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
120	0.48	6.38	8.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
121	0.48	6.36	8.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
122	0.47	6.35	8.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
123	0.47	6.32	8.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
124	0.46	6.27	8.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
125	0.46	6.26	8.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
126	0.46	6.21	8.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
127	0.45	6.21	8.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
128	0.45	6.15	8.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
129	0.45	6.14	8.18	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
130	0.44	6.14	8.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
131	0.44	6.10	7.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
132	0.44	6.08	7.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
133	0.43	5.99	7.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
134	0.43	5.80	7.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
135	0.43	5.77	7.65	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
136	0.42	5.76	7.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
137	0.42	5.72	7.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
138	0.42	5.64	7.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
139	0.41	5.62	7.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
140	0.41	5.61	7.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
141	0.41	5.60	7.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
142	0.41	5.56	7.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
143	0.40	5.52	7.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
144	0.40	5.46	7.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
145	0.40	5.44	7.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
146	0.40	5.38	7.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
147	0.39	5.38	7.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
148	0.39	5.36	6.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
149	0.39	5.36	6.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
150	0.38	5.32	6.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
151	0.38	5.20	6.69	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
152	0.38	5.19	6.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
153	0.38	5.14	6.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
154	0.37	5.03	6.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
155	0.37	5.03	6.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
156	0.37	5.01	6.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
157	0.37	4.96	6.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
158	0.37	4.95	6.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
159	0.36	4.91	5.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
160	0.36	4.90	5.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
161	0.36	4.67	5.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
162	0.36	4.64	5.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
163	0.35	4.61	5.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
164	0.35	4.56	5.81	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
165	0.35	4.56	5.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
166	0.35	4.44	5.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
167	0.35	4.37	5.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
168	0.34	4.35	5.66	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
169	0.34	4.20	5.63	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
170	0.34	4.17	5.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
171	0.34	4.12	5.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
172	0.34	4.03	5.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
173	0.33	4.02	5.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
174	0.33	3.94	5.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
175	0.33	3.91	5.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
176	0.33	3.83	5.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
177	0.33	3.80	5.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
178	0.32	3.74	5.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
179	0.32	3.69	5.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
180	0.32	3.68	5.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
181	0.32	3.60	5.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
182	0.32	3.57	5.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
183	0.32	3.56	5.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
184	0.31	3.55	4.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
185	0.31	3.47	4.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
186	0.31	3.45	4.94	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
187	0.31	3.43	4.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
188	0.31	3.42	4.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
189	0.31	3.41	4.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
190	0.30	3.37	4.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
191	0.30	3.36	4.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
192	0.30	3.32	4.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
193	0.30	3.30	4.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
194	0.30	3.26	4.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
195	0.30	3.24	4.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
196	0.29	3.24	4.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
197	0.29	3.17	4.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
198	0.29	3.17	4.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
199	0.29	3.07	4.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
200	0.29	3.05	4.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
201	0.29	3.03	4.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
202	0.29	3.03	4.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
203	0.28	2.99	4.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
204	0.28	2.98	4.17	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
205	0.28	2.96	4.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
206	0.28	2.88	4.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
207	0.28	2.88	4.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
208	0.28	2.86	4.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
209	0.28	2.85	4.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
210	0.28	2.81	4.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
211	0.27	2.76	4.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
212	0.27	2.71	4.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
213	0.27	2.70	3.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
214	0.27	2.66	3.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
215	0.27	2.63	3.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
216	0.27	2.54	3.69	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
217	0.27	2.49	3.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
218	0.27	2.47	3.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
219	0.26	2.47	3.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
220	0.26	2.46	3.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
221	0.26	2.44	3.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
222	0.26	2.33	3.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
223	0.26	2.31	3.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
224	0.26	2.30	3.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
225	0.26	2.29	3.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
226	0.26	2.22	3.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
227	0.25	2.05	3.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
228	0.25	2.02	3.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
229	0.25	1.93	3.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
230	0.25	1.87	3.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
231	0.25	1.87	3.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
232	0.25	1.52	3.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
233	0.25	1.50	3.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
234	0.25	1.49	3.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
235	0.25	1.40	3.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
236	0.25	1.33	3.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
237	0.24	1.31	3.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
238	0.24	1.31	3.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
239	0.24	1.23	3.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
240	0.24	1.21	3.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
241	0.24	1.19	2.97	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
242	0.24	1.16	2.95	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
243	0.24	1.13	2.88	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
244	0.24	1.12	2.87	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
245	0.24	1.12	2.76	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
246	0.24	1.05	2.73	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
247	0.23	1.01	2.68	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
248	0.23	1.00	2.65	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
249	0.23	1.00	2.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
250	0.23	0.95	2.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
251	0.23	0.93	2.47	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
252	0.23	0.89	2.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
253	0.23	0.89	2.44	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
254	0.23	0.86	2.38	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
255	0.23	0.84	2.38	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
256	0.23	0.83	2.36	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
257	0.23	0.77	2.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
258	0.22	0.75	2.34	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
259	0.22	0.70	2.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
260	0.22	0.67	2.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
261	0.22	0.62	2.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
262	0.22	0.59	2.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
263	0.22	0.56	2.30	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
264	0.22	0.55	2.29	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
265	0.22	0.50	2.26	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
266	0.22	0.47	2.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
267	0.22	0.47	2.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
268	0.22	0.45	2.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
269	0.22	0.35	2.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
270	0.21	0.32	2.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
271	0.21	0.31	2.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
272	0.21	0.23	1.99	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
273	0.21	0.22	1.88	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
274	0.21	0.21	1.85	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
275	0.21	0.18	1.82	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
276	0.21	0.17	1.82	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
277	0.21	0.16	1.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
278	0.21	0.16	1.77	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
279	0.21	0.13	1.76	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
280	0.21	0.13	1.72	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
281	0.20	0.12	1.67	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
282	0.20	0.12	1.62	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
283	0.20	0.12	1.61	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
284	0.20	0.12	1.61	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
285	0.20	0.12	1.52	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
286	0.20	0.12	1.43	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
287	0.20	0.12	1.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
288	0.20	0.12	1.31	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
289	0.20	0.11	1.29	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
290	0.20	0.11	1.28	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
291	0.19	0.11	1.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
292	0.19	0.11	1.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
293	0.19	0.10	1.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
294	0.19	0.10	1.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
295	0.19	0.10	1.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
296	0.19	0.10	1.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
297	0.19	0.10	1.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
298	0.19	0.10	0.99	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
299	0.19	0.09	0.98	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
300	0.19	0.09	0.84	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
301	0.18	0.09	0.80	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
302	0.18	0.09	0.72	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
303	0.18	0.09	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
304	0.18	0.09	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
305	0.18	0.08	0.60	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
306	0.18	0.08	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
307	0.18	0.08	0.54	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
308	0.18	0.08	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
309	0.18	0.08	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
310	0.18	0.08	0.44	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
311	0.17	0.08	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
312	0.17	0.08	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
313	0.17	0.08	0.31	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
314	0.17	0.07	0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
315	0.17	0.07	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
316	0.17	0.07	0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
317	0.17	0.07	0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
318	0.17	0.07	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
319	0.17	0.07	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
320	0.17	0.06	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
321	0.16	0.06	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
322	0.16	0.06	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
323	0.16	0.06	0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
324	0.16	0.06	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
325	0.16	0.06	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
326	0.16	0.06	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
327	0.16	0.06	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
328	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
329	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
330	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
331	0.16	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
332	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
333	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
334	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
335	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
336	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
337	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
338	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
339	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
340	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
341	0.15	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
342	0.14	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
343	0.14	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
344	0.14	0.05	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
345	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
346	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
347	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
348	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
349	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
350	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
351	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
352	0.14	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
353	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
354	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
355	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
356	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
357	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
358	0.13	0.04	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
359	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
360	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
361	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
362	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
363	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
364	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
365	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
366	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
367	0.12	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
368	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
369	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
370	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
371	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
372	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
373	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
374	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
375	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
376	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
377	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
378	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
379	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
380	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
381	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))
382	0.11	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (1.773 (cfs))

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM.out time stamp: 3/19/2021 1:46:15 PM

Q10: 25.450 (cfs)
Q5: 23.500 (cfs)
Q2: 17.730 (cfs)

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/04 16:00:00	1995/01/04 23:00:00	8	35.91	0.27%	58
2	2003/02/25 15:00:00	2003/02/25 22:00:00	8	29.11	0.54%	29
3	1958/02/03 04:00:00	1958/02/04 14:00:00	35	28.3	0.82%	19.33
4	1969/02/23 23:00:00	1969/02/25 21:00:00	47	27.91	1.09%	14.5
5	2004/10/27 02:00:00	2004/10/27 09:00:00	8	25.67	1.36%	11.6
6	2005/02/18 05:00:00	2005/02/19 01:00:00	21	25.41	1.63%	9.67
7	1980/02/20 18:00:00	1980/02/21 07:00:00	14	25.39	1.90%	8.29
8	1952/01/16 07:00:00	1952/01/16 16:00:00	10	25.03	2.17%	7.25
9	1978/02/28 18:00:00	1978/03/01 10:00:00	17	24.49	2.45%	6.44
10	1993/01/12 20:00:00	1993/01/14 06:00:00	35	24.33	2.72%	5.8
11	2000/10/29 22:00:00	2000/10/30 00:00:00	3	23.81	2.99%	5.27
12	1958/04/01 12:00:00	1958/04/01 21:00:00	10	23.31	3.26%	4.83
13	1978/01/04 16:00:00	1978/01/04 18:00:00	3	23.13	3.53%	4.46
14	1979/01/15 13:00:00	1979/01/15 16:00:00	4	22.38	3.80%	4.14
15	1982/03/17 03:00:00	1982/03/18 04:00:00	26	21.85	4.08%	3.87
16	1978/02/07 17:00:00	1978/02/10 07:00:00	63	21.81	4.35%	3.63
17	1998/02/03 15:00:00	1998/02/03 23:00:00	9	21.13	4.62%	3.41
18	1965/11/22 04:00:00	1965/11/23 06:00:00	27	21.12	4.89%	3.22
19	1980/03/02 20:00:00	1980/03/03 11:00:00	16	21.12	5.16%	3.05
20	1991/12/29 15:00:00	1991/12/30 04:00:00	14	21.12	5.43%	2.9
21	1998/02/22 15:00:00	1998/02/24 01:00:00	35	20.22	5.71%	2.76
22	1970/12/19 02:00:00	1970/12/19 22:00:00	21	19.93	5.98%	2.64
23	1983/02/27 16:00:00	1983/02/27 20:00:00	5	19.89	6.25%	2.52
24	1983/01/29 00:00:00	1983/01/29 04:00:00	5	19.72	6.52%	2.42
25	1998/02/16 17:00:00	1998/02/18 00:00:00	32	18.97	6.79%	2.32
26	2008/01/27 00:00:00	2008/01/27 22:00:00	23	18.41	7.07%	2.23
27	1978/01/16 18:00:00	1978/01/17 03:00:00	10	18.14	7.34%	2.15
28	1980/02/16 18:00:00	1980/02/19 16:00:00	71	17.97	7.61%	2.07
29	1961/12/01 19:00:00	1961/12/02 15:00:00	21	17.73	7.88%	2
30	1980/01/28 20:00:00	1980/01/30 00:00:00	29	17.59	8.15%	1.93
31	2004/10/20 09:00:00	2004/10/20 15:00:00	7	16.99	8.42%	1.87
32	1952/11/15 13:00:00	1952/11/15 14:00:00	2	16.87	8.70%	1.81
33	1986/03/15 21:00:00	1986/03/16 20:00:00	24	16.73	8.97%	1.76
34	1998/02/14 15:00:00	1998/02/15 00:00:00	10	16.46	9.24%	1.71
35	1985/11/11 09:00:00	1985/11/11 13:00:00	5	16.3	9.51%	1.66
36	1986/02/14 23:00:00	1986/02/15 06:00:00	8	16.21	9.78%	1.61
37	1994/02/03 23:00:00	1994/02/04 11:00:00	13	15.96	10.05%	1.57
38	2008/01/05 05:00:00	2008/01/07 01:00:00	45	15.92	10.33%	1.53
39	2008/02/22 02:00:00	2008/02/22 09:00:00	8	15.88	10.60%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1972/01/16 21:00:00	1972/01/17 00:00:00	4	15.77	10.87%	1.45
41	1993/02/18 12:00:00	1993/02/18 13:00:00	2	15.73	11.14%	1.42
42	1993/01/15 12:00:00	1993/01/18 16:00:00	77	15.5	11.41%	1.38
43	1960/04/27 08:00:00	1960/04/27 11:00:00	4	15.28	11.68%	1.35
44	1963/03/17 00:00:00	1963/03/17 03:00:00	4	14.86	11.96%	1.32
45	1995/03/11 02:00:00	1995/03/12 00:00:00	23	14.71	12.23%	1.29
46	1977/08/17 02:00:00	1977/08/17 04:00:00	3	14.66	12.50%	1.26
47	1992/02/12 17:00:00	1992/02/13 08:00:00	16	14.62	12.77%	1.23
48	2005/01/11 00:00:00	2005/01/11 09:00:00	10	14.1	13.04%	1.21
49	2003/02/11 17:00:00	2003/02/12 21:00:00	29	14.09	13.32%	1.18
50	1981/03/19 20:00:00	1981/03/19 22:00:00	3	13.92	13.59%	1.16
51	1983/03/01 13:00:00	1983/03/04 09:00:00	69	13.89	13.86%	1.14
52	1993/02/08 01:00:00	1993/02/08 12:00:00	12	13.8	14.13%	1.12
53	2005/02/21 03:00:00	2005/02/23 07:00:00	53	13.5	14.40%	1.09
54	1978/01/14 16:00:00	1978/01/15 06:00:00	15	13.3	14.67%	1.07
55	1992/02/15 12:00:00	1992/02/15 17:00:00	6	13.21	14.95%	1.06
56	1988/12/24 21:00:00	1988/12/25 00:00:00	4	13.16	15.22%	1.04
57	1991/02/27 18:00:00	1991/03/01 11:00:00	42	13.16	15.49%	1.02
58	1980/01/10 23:00:00	1980/01/12 13:00:00	39	13.1	15.76%	1
59	1979/01/05 23:00:00	1979/01/06 07:00:00	9	13.06	16.03%	0.98
60	2003/03/15 15:00:00	2003/03/16 19:00:00	29	12.99	16.30%	0.97
61	1997/01/12 16:00:00	1997/01/13 08:00:00	17	12.7	16.58%	0.95
62	1963/09/18 18:00:00	1963/09/18 22:00:00	5	12.58	16.85%	0.94
63	1982/12/22 23:00:00	1982/12/23 00:00:00	2	12.49	17.12%	0.92
64	1983/01/27 07:00:00	1983/01/27 14:00:00	8	12.48	17.39%	0.91
65	2005/01/09 04:00:00	2005/01/09 23:00:00	20	12.45	17.66%	0.89
66	1968/03/08 05:00:00	1968/03/08 12:00:00	8	12.41	17.93%	0.88
67	1971/12/24 07:00:00	1971/12/24 23:00:00	17	12.4	18.21%	0.87
68	1983/12/24 18:00:00	1983/12/25 11:00:00	18	12.4	18.48%	0.85
69	1962/01/20 13:00:00	1962/01/20 20:00:00	8	12.38	18.75%	0.84
70	1960/01/12 02:00:00	1960/01/12 09:00:00	8	12.3	19.02%	0.83
71	2004/12/31 14:00:00	2004/12/31 16:00:00	3	12.05	19.29%	0.82
72	1958/02/19 12:00:00	1958/02/19 15:00:00	4	11.83	19.57%	0.81
73	1969/02/06 08:00:00	1969/02/06 17:00:00	10	11.72	19.84%	0.8
74	1983/11/24 22:00:00	1983/11/25 02:00:00	5	11.64	20.11%	0.78
75	1991/03/25 06:00:00	1991/03/27 06:00:00	49	11.53	20.38%	0.77
76	1988/11/25 08:00:00	1988/11/25 11:00:00	4	11.27	20.65%	0.76
77	1983/10/01 01:00:00	1983/10/01 03:00:00	3	11.06	20.92%	0.75
78	1994/03/24 22:00:00	1994/03/25 02:00:00	5	10.98	21.20%	0.74
79	1959/02/11 09:00:00	1959/02/12 04:00:00	20	10.89	21.47%	0.73
80	2001/01/26 16:00:00	2001/01/27 00:00:00	9	10.68	21.74%	0.73
81	2004/02/26 04:00:00	2004/02/26 10:00:00	7	10.64	22.01%	0.72
82	2001/02/13 17:00:00	2001/02/14 20:00:00	28	10.57	22.28%	0.71
83	2005/01/03 07:00:00	2005/01/03 11:00:00	5	10.45	22.55%	0.7
84	1960/02/01 22:00:00	1960/02/02 02:00:00	5	10.41	22.83%	0.69
85	1967/12/18 17:00:00	1967/12/19 12:00:00	20	10.37	23.10%	0.68
86	2002/11/08 17:00:00	2002/11/08 19:00:00	3	10.29	23.37%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	2005/04/28 08:00:00	2005/04/28 09:00:00	2	10.27	23.64%	0.67
88	1957/01/13 04:00:00	1957/01/13 09:00:00	6	10.12	23.91%	0.66
89	1977/12/29 06:00:00	1977/12/30 03:00:00	22	10.08	24.18%	0.65
90	1965/12/10 06:00:00	1965/12/10 10:00:00	5	9.98	24.46%	0.64
91	1975/04/08 16:00:00	1975/04/09 00:00:00	9	9.9	24.73%	0.64
92	1954/01/19 16:00:00	1954/01/19 23:00:00	8	9.88	25.00%	0.63
93	2007/11/30 08:00:00	2007/11/30 21:00:00	14	9.88	25.27%	0.62
94	1986/11/18 03:00:00	1986/11/18 07:00:00	5	9.87	25.54%	0.62
95	1966/12/05 02:00:00	1966/12/05 13:00:00	12	9.86	25.82%	0.61
96	1995/03/05 07:00:00	1995/03/05 23:00:00	17	9.78	26.09%	0.6
97	1990/02/17 16:00:00	1990/02/17 19:00:00	4	9.59	26.36%	0.6
98	1963/11/20 03:00:00	1963/11/21 07:00:00	29	9.48	26.63%	0.59
99	1980/01/09 04:00:00	1980/01/09 18:00:00	15	9.39	26.90%	0.59
100	1985/11/29 06:00:00	1985/11/29 14:00:00	9	9.29	27.17%	0.58
101	1956/04/12 20:00:00	1956/04/13 19:00:00	24	9.25	27.45%	0.57
102	2007/01/30 23:00:00	2007/01/31 00:00:00	2	9.25	27.72%	0.57
103	1987/12/16 17:00:00	1987/12/17 10:00:00	18	9.08	27.99%	0.56
104	2004/12/28 09:00:00	2004/12/29 10:00:00	26	9.03	28.26%	0.56
105	1967/04/11 07:00:00	1967/04/11 11:00:00	5	8.98	28.53%	0.55
106	1983/04/20 03:00:00	1983/04/20 06:00:00	4	8.98	28.80%	0.55
107	1958/03/15 19:00:00	1958/03/16 12:00:00	18	8.93	29.08%	0.54
108	1964/11/17 16:00:00	1964/11/17 20:00:00	5	8.93	29.35%	0.54
109	1965/11/16 10:00:00	1965/11/16 19:00:00	10	8.93	29.62%	0.53
110	1996/11/21 16:00:00	1996/11/22 03:00:00	12	8.87	29.89%	0.53
111	1952/12/02 01:00:00	1952/12/02 02:00:00	2	8.84	30.16%	0.52
112	2003/04/14 15:00:00	2003/04/14 23:00:00	9	8.84	30.43%	0.52
113	1980/02/14 00:00:00	1980/02/15 02:00:00	27	8.79	30.71%	0.51
114	1952/03/15 20:00:00	1952/03/16 06:00:00	11	8.75	30.98%	0.51
115	1988/01/17 11:00:00	1988/01/17 12:00:00	2	8.68	31.25%	0.5
116	1967/11/30 16:00:00	1967/11/30 17:00:00	2	8.54	31.52%	0.5
117	1988/12/21 03:00:00	1988/12/21 07:00:00	5	8.52	31.79%	0.5
118	1957/01/28 03:00:00	1957/01/29 19:00:00	41	8.51	32.07%	0.49
119	1958/03/20 22:00:00	1958/03/22 08:00:00	35	8.51	32.34%	0.49
120	1978/09/05 18:00:00	1978/09/05 19:00:00	2	8.51	32.61%	0.48
121	1969/01/24 07:00:00	1969/01/26 21:00:00	63	8.49	32.88%	0.48
122	1966/02/07 22:00:00	1966/02/08 00:00:00	3	8.46	33.15%	0.48
123	1993/02/19 19:00:00	1993/02/19 21:00:00	3	8.41	33.42%	0.47
124	1995/01/10 14:00:00	1995/01/12 15:00:00	50	8.38	33.70%	0.47
125	2002/12/20 16:00:00	2002/12/20 22:00:00	7	8.29	33.97%	0.46
126	1960/01/14 17:00:00	1960/01/14 22:00:00	6	8.21	34.24%	0.46
127	1988/04/20 08:00:00	1988/04/21 07:00:00	24	8.21	34.51%	0.46
128	1997/01/15 15:00:00	1997/01/15 20:00:00	6	8.21	34.78%	0.45
129	1992/03/20 23:00:00	1992/03/21 00:00:00	2	8.19	35.05%	0.45
130	2001/02/25 17:00:00	2001/02/27 18:00:00	50	8.18	35.33%	0.45
131	1999/01/26 22:00:00	1999/01/27 00:00:00	3	8.01	35.60%	0.44
132	2005/01/07 14:00:00	2005/01/07 21:00:00	8	7.97	35.87%	0.44
133	1955/01/18 15:00:00	1955/01/18 20:00:00	6	7.81	36.14%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	2001/01/11 05:00:00	2001/01/12 12:00:00	32	7.81	36.41%	0.43
135	1977/01/03 04:00:00	1977/01/03 05:00:00	2	7.74	36.68%	0.43
136	1998/01/29 17:00:00	1998/01/29 22:00:00	6	7.65	36.96%	0.43
137	2004/02/22 07:00:00	2004/02/23 07:00:00	25	7.61	37.23%	0.42
138	1968/12/25 19:00:00	1968/12/25 20:00:00	2	7.56	37.50%	0.42
139	1956/01/26 19:00:00	1956/01/27 08:00:00	14	7.37	37.77%	0.42
140	1965/04/08 14:00:00	1965/04/09 23:00:00	34	7.36	38.04%	0.41
141	1958/04/06 17:00:00	1958/04/07 16:00:00	24	7.31	38.32%	0.41
142	1952/11/30 01:00:00	1952/11/30 05:00:00	5	7.22	38.59%	0.41
143	1992/12/07 13:00:00	1992/12/07 16:00:00	4	7.15	38.86%	0.41
144	1957/05/11 01:00:00	1957/05/11 03:00:00	3	7.14	39.13%	0.4
145	1987/10/12 10:00:00	1987/10/12 15:00:00	6	7.08	39.40%	0.4
146	1972/11/16 11:00:00	1972/11/17 08:00:00	22	7.06	39.67%	0.4
147	1983/03/24 03:00:00	1983/03/24 06:00:00	4	7.03	39.95%	0.4
148	1993/01/06 03:00:00	1993/01/08 01:00:00	47	7.01	40.22%	0.39
149	1959/12/24 12:00:00	1959/12/24 14:00:00	3	6.95	40.49%	0.39
150	1952/01/17 21:00:00	1952/01/18 09:00:00	13	6.79	40.76%	0.39
151	1967/01/22 17:00:00	1967/01/23 00:00:00	8	6.7	41.03%	0.38
152	1973/11/22 23:00:00	1973/11/23 01:00:00	3	6.69	41.30%	0.38
153	1978/02/12 17:00:00	1978/02/14 00:00:00	32	6.56	41.58%	0.38
154	1998/02/07 17:00:00	1998/02/08 21:00:00	29	6.54	41.85%	0.38
155	1992/01/07 19:00:00	1992/01/07 23:00:00	5	6.52	42.12%	0.37
156	1995/01/25 08:00:00	1995/01/26 11:00:00	28	6.46	42.39%	0.37
157	1973/02/13 00:00:00	1973/02/13 04:00:00	5	6.35	42.66%	0.37
158	1958/04/03 10:00:00	1958/04/03 13:00:00	4	6.32	42.93%	0.37
159	1977/01/05 19:00:00	1977/01/07 07:00:00	37	6.02	43.21%	0.37
160	1976/09/10 05:00:00	1976/09/10 11:00:00	7	5.9	43.48%	0.36
161	1954/02/13 19:00:00	1954/02/13 23:00:00	5	5.88	43.75%	0.36
162	1967/03/13 20:00:00	1967/03/13 22:00:00	3	5.87	44.02%	0.36
163	1982/12/07 23:00:00	1982/12/08 01:00:00	3	5.84	44.29%	0.36
164	1979/11/07 18:00:00	1979/11/07 19:00:00	2	5.82	44.57%	0.35
165	1992/01/05 09:00:00	1992/01/06 04:00:00	20	5.81	44.84%	0.35
166	1972/11/14 14:00:00	1972/11/14 16:00:00	3	5.8	45.11%	0.35
167	1981/11/28 03:00:00	1981/11/28 21:00:00	19	5.8	45.38%	0.35
168	1970/02/28 16:00:00	1970/03/02 04:00:00	37	5.73	45.65%	0.35
169	1991/03/20 07:00:00	1991/03/21 10:00:00	28	5.66	45.92%	0.34
170	2001/12/09 17:00:00	2001/12/09 20:00:00	4	5.63	46.20%	0.34
171	1981/03/01 11:00:00	1981/03/02 13:00:00	27	5.62	46.47%	0.34
172	1952/03/07 14:00:00	1952/03/08 10:00:00	21	5.55	46.74%	0.34
173	1967/11/19 08:00:00	1967/11/19 18:00:00	11	5.54	47.01%	0.34
174	1978/01/09 16:00:00	1978/01/11 00:00:00	33	5.52	47.28%	0.33
175	2006/10/14 01:00:00	2006/10/14 01:00:00	1	5.51	47.55%	0.33
176	1980/03/05 23:00:00	1980/03/06 13:00:00	15	5.47	47.83%	0.33
177	1991/03/19 00:00:00	1991/03/19 04:00:00	5	5.41	48.10%	0.33
178	2006/03/11 07:00:00	2006/03/11 08:00:00	2	5.37	48.37%	0.33
179	2000/03/05 17:00:00	2000/03/05 21:00:00	5	5.34	48.64%	0.32
180	1973/03/11 12:00:00	1973/03/12 09:00:00	22	5.11	48.91%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1997/01/25 22:00:00	1997/01/26 07:00:00	10	5.1	49.18%	0.32
182	1951/12/29 23:00:00	1951/12/30 13:00:00	15	5.07	49.46%	0.32
183	1990/01/17 00:00:00	1990/01/17 03:00:00	4	5.03	49.73%	0.32
184	1986/03/10 07:00:00	1986/03/10 20:00:00	14	5	50.00%	0.32
185	1965/12/29 19:00:00	1965/12/29 21:00:00	3	4.99	50.27%	0.31
186	1984/12/27 02:00:00	1984/12/27 21:00:00	20	4.97	50.54%	0.31
187	1965/04/03 05:00:00	1965/04/03 08:00:00	4	4.94	50.82%	0.31
188	1970/03/04 22:00:00	1970/03/05 02:00:00	5	4.91	51.09%	0.31
189	1985/11/25 01:00:00	1985/11/25 06:00:00	6	4.9	51.36%	0.31
190	1967/11/21 12:00:00	1967/11/21 14:00:00	3	4.85	51.63%	0.31
191	1960/02/29 08:00:00	1960/03/01 06:00:00	23	4.82	51.90%	0.3
192	1982/02/10 13:00:00	1982/02/10 20:00:00	8	4.77	52.17%	0.3
193	1994/02/17 11:00:00	1994/02/17 13:00:00	3	4.71	52.45%	0.3
194	1957/01/07 14:00:00	1957/01/07 20:00:00	7	4.7	52.72%	0.3
195	1976/07/22 11:00:00	1976/07/22 14:00:00	4	4.68	52.99%	0.3
196	1982/01/01 09:00:00	1982/01/01 10:00:00	2	4.67	53.26%	0.3
197	1973/03/20 08:00:00	1973/03/20 11:00:00	4	4.6	53.53%	0.29
198	1978/03/30 15:00:00	1978/03/31 06:00:00	16	4.59	53.80%	0.29
199	1955/01/10 10:00:00	1955/01/10 11:00:00	2	4.5	54.08%	0.29
200	1985/12/11 04:00:00	1985/12/11 06:00:00	3	4.47	54.35%	0.29
201	1982/01/05 08:00:00	1982/01/05 16:00:00	9	4.46	54.62%	0.29
202	1954/03/30 04:00:00	1954/03/30 07:00:00	4	4.4	54.89%	0.29
203	1969/02/22 02:00:00	1969/02/22 09:00:00	8	4.31	55.16%	0.29
204	1958/01/25 04:00:00	1958/01/25 05:00:00	2	4.25	55.43%	0.28
205	2001/11/24 17:00:00	2001/11/24 20:00:00	4	4.17	55.71%	0.28
206	1981/03/05 02:00:00	1981/03/05 09:00:00	8	4.14	55.98%	0.28
207	1982/04/01 09:00:00	1982/04/01 12:00:00	4	4.13	56.25%	0.28
208	1957/10/14 04:00:00	1957/10/14 06:00:00	3	4.12	56.52%	0.28
209	1976/07/15 14:00:00	1976/07/15 17:00:00	4	4.11	56.79%	0.28
210	1993/11/30 04:00:00	1993/11/30 04:00:00	1	4.11	57.07%	0.28
211	1962/02/08 10:00:00	1962/02/08 19:00:00	10	4.08	57.34%	0.28
212	1957/02/28 23:00:00	1957/03/01 11:00:00	13	4.06	57.61%	0.27
213	1966/12/06 19:00:00	1966/12/06 21:00:00	3	4.01	57.88%	0.27
214	1988/11/14 06:00:00	1988/11/14 09:00:00	4	3.85	58.15%	0.27
215	2001/04/07 17:00:00	2001/04/07 19:00:00	3	3.77	58.42%	0.27
216	1981/01/29 18:00:00	1981/01/29 19:00:00	2	3.72	58.70%	0.27
217	1973/03/08 13:00:00	1973/03/08 15:00:00	3	3.69	58.97%	0.27
218	1954/03/22 13:00:00	1954/03/23 12:00:00	24	3.67	59.24%	0.27
219	1995/01/07 19:00:00	1995/01/08 07:00:00	13	3.57	59.51%	0.27
220	1978/03/11 21:00:00	1978/03/12 11:00:00	15	3.53	59.78%	0.26
221	1979/03/19 03:00:00	1979/03/20 03:00:00	25	3.52	60.05%	0.26
222	1964/01/21 07:00:00	1964/01/22 09:00:00	27	3.5	60.33%	0.26
223	2004/10/18 07:00:00	2004/10/18 07:00:00	1	3.5	60.60%	0.26
224	1974/12/04 09:00:00	1974/12/04 09:00:00	1	3.49	60.87%	0.26
225	1957/04/20 15:00:00	1957/04/20 18:00:00	4	3.47	61.14%	0.26
226	1970/12/21 08:00:00	1970/12/21 09:00:00	2	3.46	61.41%	0.26
227	1965/12/16 03:00:00	1965/12/16 09:00:00	7	3.36	61.68%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1998/05/12 17:00:00	1998/05/12 20:00:00	4	3.32	61.96%	0.25
229	1974/03/08 00:00:00	1974/03/08 11:00:00	12	3.28	62.23%	0.25
230	1986/09/25 05:00:00	1986/09/25 06:00:00	2	3.26	62.50%	0.25
231	1984/12/18 22:00:00	1984/12/20 04:00:00	31	3.22	62.77%	0.25
232	1970/11/30 14:00:00	1970/11/30 23:00:00	10	3.21	63.04%	0.25
233	1958/01/26 09:00:00	1958/01/26 10:00:00	2	3.18	63.32%	0.25
234	2006/04/04 20:00:00	2006/04/04 23:00:00	4	3.18	63.59%	0.25
235	1984/11/24 17:00:00	1984/11/24 21:00:00	5	3.15	63.86%	0.25
236	1993/03/28 02:00:00	1993/03/28 04:00:00	3	3.14	64.13%	0.25
237	1966/12/03 15:00:00	1966/12/03 17:00:00	3	3.13	64.40%	0.25
238	1979/03/17 05:00:00	1979/03/17 05:00:00	1	3.13	64.67%	0.24
239	1951/11/23 05:00:00	1951/11/23 06:00:00	2	3.09	64.95%	0.24
240	2005/02/11 12:00:00	2005/02/12 00:00:00	13	3.09	65.22%	0.24
241	1978/02/05 11:00:00	1978/02/06 11:00:00	25	3.03	65.49%	0.24
242	1979/03/28 00:00:00	1979/03/28 10:00:00	11	2.97	65.76%	0.24
243	1985/02/09 11:00:00	1985/02/09 13:00:00	3	2.95	66.03%	0.24
244	1959/02/21 10:00:00	1959/02/21 13:00:00	4	2.88	66.30%	0.24
245	1954/11/11 02:00:00	1954/11/11 10:00:00	9	2.87	66.58%	0.24
246	1976/02/06 04:00:00	1976/02/06 06:00:00	3	2.76	66.85%	0.24
247	1983/03/21 04:00:00	1983/03/21 05:00:00	2	2.73	67.12%	0.24
248	1952/01/13 04:00:00	1952/01/13 13:00:00	10	2.68	67.39%	0.23
249	2000/02/20 17:00:00	2000/02/21 20:00:00	28	2.65	67.66%	0.23
250	1966/02/06 13:00:00	1966/02/06 16:00:00	4	2.63	67.93%	0.23
251	1993/01/31 00:00:00	1993/01/31 00:00:00	1	2.49	68.21%	0.23
252	1996/02/27 21:00:00	1996/02/27 22:00:00	2	2.47	68.48%	0.23
253	1966/01/30 07:00:00	1966/01/30 20:00:00	14	2.46	68.75%	0.23
254	1976/07/08 13:00:00	1976/07/08 14:00:00	2	2.44	69.02%	0.23
255	1996/12/11 09:00:00	1996/12/11 18:00:00	10	2.38	69.29%	0.23
256	1969/02/18 08:00:00	1969/02/18 15:00:00	8	2.37	69.57%	0.23
257	1954/01/24 10:00:00	1954/01/24 15:00:00	6	2.36	69.84%	0.23
258	1969/02/20 04:00:00	1969/02/20 05:00:00	2	2.35	70.11%	0.23
259	1983/11/12 19:00:00	1983/11/12 19:00:00	1	2.34	70.38%	0.22
260	1974/01/07 17:00:00	1974/01/08 05:00:00	13	2.33	70.65%	0.22
261	1995/04/18 10:00:00	1995/04/18 12:00:00	3	2.33	70.92%	0.22
262	2002/12/16 17:00:00	2002/12/16 18:00:00	2	2.33	71.20%	0.22
263	1998/01/09 17:00:00	1998/01/09 20:00:00	4	2.31	71.47%	0.22
264	1987/02/25 01:00:00	1987/02/25 02:00:00	2	2.3	71.74%	0.22
265	1960/11/05 20:00:00	1960/11/06 11:00:00	16	2.29	72.01%	0.22
266	1958/02/25 08:00:00	1958/02/25 09:00:00	2	2.26	72.28%	0.22
267	1975/03/08 09:00:00	1975/03/08 09:00:00	1	2.23	72.55%	0.22
268	1962/03/19 00:00:00	1962/03/19 03:00:00	4	2.22	72.83%	0.22
269	1972/01/18 22:00:00	1972/01/19 04:00:00	7	2.21	73.10%	0.22
270	1983/02/26 13:00:00	1983/02/26 14:00:00	2	2.2	73.37%	0.22
271	1994/02/07 14:00:00	1994/02/07 16:00:00	3	2.2	73.64%	0.21
272	1978/03/04 14:00:00	1978/03/04 16:00:00	3	2.07	73.91%	0.21
273	1956/01/31 09:00:00	1956/01/31 12:00:00	4	1.99	74.18%	0.21
274	2003/12/25 18:00:00	2003/12/25 18:00:00	1	1.99	74.46%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1997/12/06 17:00:00	1997/12/06 18:00:00	2	1.88	74.73%	0.21
276	1963/02/09 19:00:00	1963/02/11 00:00:00	30	1.85	75.00%	0.21
277	1965/11/14 22:00:00	1965/11/15 02:00:00	5	1.82	75.27%	0.21
278	1994/03/07 01:00:00	1994/03/07 06:00:00	6	1.79	75.54%	0.21
279	1973/02/15 11:00:00	1973/02/15 12:00:00	2	1.77	75.82%	0.21
280	1975/03/10 12:00:00	1975/03/11 00:00:00	13	1.77	76.09%	0.21
281	1959/02/16 04:00:00	1959/02/16 20:00:00	17	1.76	76.36%	0.21
282	1982/01/20 06:00:00	1982/01/20 23:00:00	18	1.74	76.63%	0.21
283	1983/03/06 05:00:00	1983/03/06 06:00:00	2	1.72	76.90%	0.21
284	1994/03/19 08:00:00	1994/03/20 07:00:00	24	1.67	77.17%	0.2
285	1978/01/19 08:00:00	1978/01/19 12:00:00	5	1.64	77.45%	0.2
286	1981/02/09 05:00:00	1981/02/09 07:00:00	3	1.62	77.72%	0.2
287	1955/02/27 20:00:00	1955/02/27 20:00:00	1	1.61	77.99%	0.2
288	1982/03/14 23:00:00	1982/03/14 23:00:00	1	1.61	78.26%	0.2
289	1995/01/24 00:00:00	1995/01/24 01:00:00	2	1.59	78.53%	0.2
290	2008/02/24 09:00:00	2008/02/24 10:00:00	2	1.52	78.80%	0.2
291	1998/03/25 17:00:00	1998/03/26 18:00:00	26	1.43	79.08%	0.2
292	1998/03/31 17:00:00	1998/03/31 19:00:00	3	1.43	79.35%	0.2
293	1967/01/24 19:00:00	1967/01/24 23:00:00	5	1.33	79.62%	0.2
294	1973/02/11 07:00:00	1973/02/11 14:00:00	8	1.31	79.89%	0.2
295	1983/02/08 06:00:00	1983/02/08 07:00:00	2	1.29	80.16%	0.2
296	2007/04/20 15:00:00	2007/04/20 15:00:00	1	1.29	80.43%	0.2
297	1980/01/18 03:00:00	1980/01/18 05:00:00	3	1.28	80.71%	0.2
298	1962/02/21 05:00:00	1962/02/21 07:00:00	3	1.23	80.98%	0.2
299	1965/12/14 16:00:00	1965/12/14 18:00:00	3	1.23	81.25%	0.19
300	1971/12/27 17:00:00	1971/12/28 15:00:00	23	1.16	81.52%	0.19
301	1966/11/07 15:00:00	1966/11/07 16:00:00	2	1.09	81.79%	0.19
302	1979/01/31 08:00:00	1979/01/31 09:00:00	2	1.09	82.07%	0.19
303	1980/03/25 23:00:00	1980/03/26 00:00:00	2	1.08	82.34%	0.19
304	1954/03/24 19:00:00	1954/03/25 05:00:00	11	1.07	82.61%	0.19
305	1976/02/10 07:00:00	1976/02/10 08:00:00	2	1.06	82.88%	0.19
306	1952/12/20 11:00:00	1952/12/20 14:00:00	4	1.05	83.15%	0.19
307	1965/02/06 21:00:00	1965/02/06 22:00:00	2	1.05	83.42%	0.19
308	1977/03/24 21:00:00	1977/03/25 03:00:00	7	1.02	83.70%	0.19
309	1963/09/17 17:00:00	1963/09/17 17:00:00	1	1.01	83.97%	0.19
310	1996/02/26 13:00:00	1996/02/26 14:00:00	2	0.99	84.24%	0.19
311	1980/12/07 11:00:00	1980/12/07 12:00:00	2	0.98	84.51%	0.19
312	1991/01/09 14:00:00	1991/01/09 14:00:00	1	0.96	84.78%	0.19
313	1957/03/16 10:00:00	1957/03/16 10:00:00	1	0.84	85.05%	0.19
314	1977/12/26 06:00:00	1977/12/26 06:00:00	1	0.81	85.33%	0.19
315	1977/05/08 21:00:00	1977/05/09 02:00:00	6	0.8	85.60%	0.18
316	1952/04/10 16:00:00	1952/04/10 19:00:00	4	0.78	85.87%	0.18
317	1999/04/12 02:00:00	1999/04/12 03:00:00	2	0.72	86.14%	0.18
318	1984/12/08 00:00:00	1984/12/08 01:00:00	2	0.69	86.41%	0.18
319	1998/11/08 08:00:00	1998/11/08 08:00:00	1	0.69	86.68%	0.18
320	1970/01/16 18:00:00	1970/01/16 20:00:00	3	0.68	86.96%	0.18
321	1954/03/16 22:00:00	1954/03/16 22:00:00	1	0.66	87.23%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1953/03/01 22:00:00	1953/03/01 22:00:00	1	0.6	87.50%	0.18
323	1992/03/22 16:00:00	1992/03/23 03:00:00	12	0.59	87.77%	0.18
324	2006/02/28 06:00:00	2006/02/28 06:00:00	1	0.56	88.04%	0.18
325	1983/03/18 06:00:00	1983/03/18 06:00:00	1	0.54	88.32%	0.18
326	1971/04/14 11:00:00	1971/04/14 11:00:00	1	0.53	88.59%	0.18
327	1978/03/09 16:00:00	1978/03/09 17:00:00	2	0.51	88.86%	0.18
328	1980/03/10 16:00:00	1980/03/10 16:00:00	1	0.51	89.13%	0.18
329	1987/12/04 21:00:00	1987/12/04 21:00:00	1	0.46	89.40%	0.18
330	1995/01/16 10:00:00	1995/01/16 11:00:00	2	0.46	89.67%	0.18
331	1958/03/06 10:00:00	1958/03/06 10:00:00	1	0.44	89.95%	0.18
332	1973/02/07 04:00:00	1973/02/07 04:00:00	1	0.41	90.22%	0.18
333	1976/02/08 19:00:00	1976/02/08 23:00:00	5	0.37	90.49%	0.17
334	1988/12/16 10:00:00	1988/12/16 10:00:00	1	0.37	90.76%	0.17
335	1998/02/19 17:00:00	1998/02/19 18:00:00	2	0.37	91.03%	0.17
336	1969/11/07 09:00:00	1969/11/07 09:00:00	1	0.36	91.30%	0.17
337	1969/03/21 13:00:00	1969/03/21 13:00:00	1	0.31	91.58%	0.17
338	1969/04/05 21:00:00	1969/04/05 21:00:00	1	0.31	91.85%	0.17
339	1983/04/18 08:00:00	1983/04/18 08:00:00	1	0.29	92.12%	0.17
340	1979/03/01 12:00:00	1979/03/01 12:00:00	1	0.27	92.39%	0.17
341	1996/01/31 20:00:00	1996/02/01 08:00:00	13	0.25	92.66%	0.17
342	1976/04/15 18:00:00	1976/04/15 18:00:00	1	0.23	92.93%	0.17
343	1998/04/11 17:00:00	1998/04/11 18:00:00	2	0.23	93.21%	0.17
344	1984/12/16 03:00:00	1984/12/16 03:00:00	1	0.22	93.48%	0.17
345	1963/04/17 07:00:00	1963/04/17 07:00:00	1	0.21	93.75%	0.17
346	1952/12/30 19:00:00	1952/12/30 19:00:00	1	0.19	94.02%	0.17
347	1983/04/29 08:00:00	1983/04/29 09:00:00	2	0.18	94.29%	0.17
348	1987/04/04 15:00:00	1987/04/04 15:00:00	1	0.16	94.57%	0.17
349	1954/12/09 23:00:00	1954/12/09 23:00:00	1	0.13	94.84%	0.17
350	2001/03/06 17:00:00	2001/03/06 18:00:00	2	0.11	95.11%	0.17
351	1978/12/17 01:00:00	1978/12/17 01:00:00	1	0.08	95.38%	0.17
352	1993/06/05 13:00:00	1993/06/05 13:00:00	1	0.08	95.65%	0.17
353	1998/12/06 06:00:00	1998/12/06 06:00:00	1	0.08	95.92%	0.16
354	1955/04/30 21:00:00	1955/04/30 21:00:00	1	0.07	96.20%	0.16
355	1985/12/02 23:00:00	1985/12/02 23:00:00	1	0.07	96.47%	0.16
356	1992/12/27 21:00:00	1992/12/27 21:00:00	1	0.07	96.74%	0.16
357	1962/03/06 20:00:00	1962/03/06 20:00:00	1	0.05	97.01%	0.16
358	1969/01/28 19:00:00	1969/01/28 19:00:00	1	0.05	97.28%	0.16
359	1957/12/17 05:00:00	1957/12/17 05:00:00	1	0.04	97.55%	0.16
360	1999/02/04 17:00:00	1999/02/04 17:00:00	1	0.04	97.83%	0.16
361	1976/03/01 16:00:00	1976/03/01 16:00:00	1	0.02	98.10%	0.16
362	1978/12/18 13:00:00	1978/12/18 13:00:00	1	0.02	98.37%	0.16
363	1996/01/22 06:00:00	1996/01/22 06:00:00	1	0.01	98.64%	0.16
364	1957/01/26 07:00:00	1957/01/26 07:00:00	1	0	98.91%	0.16
365	1965/03/31 14:00:00	1965/03/31 14:00:00	1	0	99.18%	0.16
366	1993/01/10 13:00:00	1993/01/10 13:00:00	1	0	99.46%	0.16
367	2000/02/13 17:00:00	2000/02/13 17:00:00	1	0	99.73%	0.16
--End of Data-----------------						

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM.out time stamp: 3/16/2021 1:46:28 PM

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/03 09:00:00	1995/01/17 13:00:00	341	34.67	0.19%	58
2	2003/02/25 07:00:00	2003/03/01 13:00:00	103	28.28	0.37%	29
3	1969/02/18 07:00:00	1969/02/28 06:00:00	240	26.94	0.56%	19.33
4	1958/02/03 04:00:00	1958/02/07 01:00:00	94	26.84	0.74%	14.5
5	2004/10/27 02:00:00	2004/10/30 08:00:00	79	24.46	0.93%	11.6
6	1978/02/27 10:00:00	1978/03/07 00:00:00	183	24.06	1.11%	9.67
7	1952/01/13 04:00:00	1952/01/20 19:00:00	184	24.02	1.30%	8.29
8	1980/02/13 13:00:00	1980/02/23 16:00:00	244	23.9	1.48%	7.25
9	2005/02/18 05:00:00	2005/02/25 17:00:00	181	23.48	1.67%	6.44
10	1993/01/12 19:00:00	1993/01/21 02:00:00	200	22.87	1.86%	5.8
11	1982/03/14 14:00:00	1982/03/20 19:00:00	150	21.76	2.04%	5.27
12	1978/01/03 19:00:00	1978/01/08 03:00:00	105	21.17	2.23%	4.83
13	1965/11/22 04:00:00	1965/11/26 05:00:00	98	20.63	2.41%	4.46
14	1991/12/28 03:00:00	1992/01/01 13:00:00	107	20.48	2.60%	4.14
15	2000/10/29 22:00:00	2000/11/01 13:00:00	64	20.45	2.78%	3.87
16	1978/02/05 11:00:00	1978/02/16 09:00:00	263	19.97	2.97%	3.63
17	1980/03/02 20:00:00	1980/03/08 22:00:00	147	19.77	3.15%	3.41
18	1998/02/14 09:00:00	1998/02/26 23:00:00	303	19.65	3.34%	3.22
19	1998/02/03 07:00:00	1998/02/11 08:00:00	194	19.35	3.53%	3.05
20	1979/01/15 08:00:00	1979/01/20 03:00:00	116	18.86	3.71%	2.9
21	1958/04/01 09:00:00	1958/04/10 01:00:00	209	18.76	3.90%	2.76
22	1978/01/14 15:00:00	1978/01/20 23:00:00	153	17.47	4.08%	2.64
23	1970/12/17 00:00:00	1970/12/23 15:00:00	160	17.41	4.27%	2.52
24	1980/01/28 07:00:00	1980/02/01 18:00:00	108	17.17	4.45%	2.42
25	1961/12/01 19:00:00	1961/12/05 04:00:00	82	16.29	4.64%	2.32
26	2008/02/20 11:00:00	2008/02/26 01:00:00	135	15.62	4.82%	2.23
27	2008/01/05 04:00:00	2008/01/09 15:00:00	108	15.39	5.01%	2.15
28	1983/02/24 22:00:00	1983/03/07 17:00:00	260	15.17	5.19%	2.07
29	1991/02/27 18:00:00	1991/03/03 20:00:00	99	15.06	5.38%	2
30	1972/01/16 20:00:00	1972/01/21 13:00:00	114	14.81	5.57%	1.93
31	1983/01/27 07:00:00	1983/01/31 17:00:00	107	14.73	5.75%	1.87
32	1952/11/14 16:00:00	1952/11/18 16:00:00	97	14.7	5.94%	1.81
33	1995/03/11 02:00:00	1995/03/14 10:00:00	81	14.64	6.12%	1.76
34	1985/11/11 08:00:00	1985/11/14 18:00:00	83	14.54	6.31%	1.71
35	1977/08/16 23:00:00	1977/08/20 09:00:00	83	14.5	6.49%	1.66
36	1960/04/27 05:00:00	1960/04/29 20:00:00	64	14.23	6.68%	1.61
37	1994/02/03 22:00:00	1994/02/09 21:00:00	144	13.98	6.86%	1.57
38	2004/10/18 07:00:00	2004/10/23 01:00:00	115	13.5	7.05%	1.53
39	2008/01/27 00:00:00	2008/01/30 09:00:00	82	13.44	7.24%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1986/02/13 10:00:00	1986/02/18 00:00:00	111	13.38	7.42%	1.45
41	1969/02/06 08:00:00	1969/02/09 03:00:00	68	13.11	7.61%	1.42
42	1980/01/09 04:00:00	1980/01/15 02:00:00	143	13.07	7.79%	1.38
43	1979/01/05 07:00:00	1979/01/10 17:00:00	131	13.04	7.98%	1.35
44	1993/02/18 12:00:00	1993/02/22 17:00:00	102	13.01	8.16%	1.32
45	2004/12/28 09:00:00	2005/01/13 18:00:00	394	12.94	8.35%	1.29
46	2003/02/11 14:00:00	2003/02/15 23:00:00	106	12.9	8.53%	1.26
47	1997/01/12 15:00:00	1997/01/18 05:00:00	135	12.88	8.72%	1.23
48	1983/12/24 18:00:00	1983/12/28 19:00:00	98	12.87	8.91%	1.21
49	1992/02/12 17:00:00	1992/02/18 04:00:00	132	12.78	9.09%	1.18
50	1993/02/07 22:00:00	1993/02/11 04:00:00	79	12.64	9.28%	1.16
51	1968/03/08 00:00:00	1968/03/10 22:00:00	71	12.56	9.46%	1.14
52	1962/01/20 13:00:00	1962/01/24 15:00:00	99	12.52	9.65%	1.12
53	1988/12/15 14:00:00	1988/12/29 00:00:00	323	12.41	9.83%	1.09
54	1963/03/16 23:00:00	1963/03/19 16:00:00	66	12.16	10.02%	1.07
55	1963/09/17 07:00:00	1963/09/21 07:00:00	97	12.07	10.20%	1.06
56	1971/12/22 08:00:00	1971/12/30 01:00:00	186	11.99	10.39%	1.04
57	1958/02/19 09:00:00	1958/02/22 01:00:00	65	11.83	10.58%	1.02
58	1991/03/25 02:00:00	1991/03/29 15:00:00	110	11.76	10.76%	1
59	1986/03/08 16:00:00	1986/03/19 02:00:00	251	11.43	10.95%	0.98
60	2001/02/13 14:00:00	2001/02/17 09:00:00	92	11.26	11.13%	0.97
61	1982/12/22 19:00:00	1982/12/25 11:00:00	65	10.29	11.32%	0.95
62	1981/03/19 19:00:00	1981/03/22 10:00:00	64	10.11	11.50%	0.94
63	1988/11/24 05:00:00	1988/11/27 20:00:00	88	10.04	11.69%	0.92
64	1975/04/08 08:00:00	1975/04/11 16:00:00	81	10.02	11.87%	0.91
65	1986/11/18 02:00:00	1986/11/20 17:00:00	64	9.97	12.06%	0.89
66	1995/03/03 12:00:00	1995/03/08 14:00:00	123	9.97	12.24%	0.88
67	1960/02/01 20:00:00	1960/02/04 11:00:00	64	9.94	12.43%	0.87
68	1960/01/10 12:00:00	1960/01/17 15:00:00	172	9.89	12.62%	0.85
69	2007/11/30 08:00:00	2007/12/03 10:00:00	75	9.89	12.80%	0.84
70	1966/12/03 07:00:00	1966/12/09 08:00:00	146	9.85	12.99%	0.83
71	2004/02/22 07:00:00	2004/02/28 19:00:00	157	9.84	13.17%	0.82
72	2005/04/28 08:00:00	2005/04/30 16:00:00	57	9.78	13.36%	0.81
73	1965/12/09 10:00:00	1965/12/18 18:00:00	225	9.45	13.54%	0.8
74	1996/11/21 16:00:00	1996/11/24 14:00:00	71	9.38	13.73%	0.78
75	1983/09/29 23:00:00	1983/10/03 16:00:00	90	9.29	13.91%	0.77
76	1967/12/18 16:00:00	1967/12/22 00:00:00	81	9.21	14.10%	0.76
77	1954/01/18 19:00:00	1954/01/22 15:00:00	93	9.17	14.29%	0.75
78	1963/11/20 03:00:00	1963/11/23 16:00:00	86	9.12	14.47%	0.74
79	1994/03/24 22:00:00	1994/03/27 17:00:00	68	9.03	14.66%	0.73
80	2007/01/30 23:00:00	2007/02/02 08:00:00	58	9	14.84%	0.73
81	2001/01/26 13:00:00	2001/01/29 21:00:00	81	8.87	15.03%	0.72
82	1957/05/10 23:00:00	1957/05/13 15:00:00	65	8.86	15.21%	0.71
83	2003/04/14 07:00:00	2003/04/17 10:00:00	76	8.84	15.40%	0.7
84	1957/01/13 04:00:00	1957/01/15 19:00:00	64	8.8	15.58%	0.69
85	2003/03/15 13:00:00	2003/03/19 03:00:00	87	8.79	15.77%	0.68
86	1987/12/16 13:00:00	1987/12/20 05:00:00	89	8.78	15.96%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1977/12/25 19:00:00	1978/01/01 08:00:00	158	8.72	16.14%	0.67
88	1985/11/29 06:00:00	1985/12/04 11:00:00	126	8.69	16.33%	0.66
89	1965/11/14 19:00:00	1965/11/19 18:00:00	120	8.55	16.51%	0.65
90	1969/01/24 07:00:00	1969/01/30 08:00:00	146	8.54	16.70%	0.64
91	1958/03/20 22:00:00	1958/03/24 17:00:00	92	8.5	16.88%	0.64
92	2002/11/08 13:00:00	2002/11/11 11:00:00	71	8.48	17.07%	0.63
93	1990/02/17 15:00:00	1990/02/20 16:00:00	74	8.29	17.25%	0.62
94	1983/11/24 21:00:00	1983/11/27 11:00:00	63	8.04	17.44%	0.62
95	1952/03/15 20:00:00	1952/03/19 03:00:00	80	7.95	17.63%	0.61
96	1978/09/05 18:00:00	1978/09/08 15:00:00	70	7.95	17.81%	0.6
97	1965/04/07 04:00:00	1965/04/11 21:00:00	114	7.88	18.00%	0.6
98	1957/01/26 05:00:00	1957/02/01 05:00:00	145	7.86	18.18%	0.59
99	1992/12/07 09:00:00	1992/12/10 04:00:00	68	7.71	18.37%	0.59
100	1978/01/09 16:00:00	1978/01/13 09:00:00	90	7.58	18.55%	0.58
101	1999/01/25 06:00:00	1999/01/29 10:00:00	101	7.51	18.74%	0.57
102	1968/12/25 18:00:00	1968/12/28 12:00:00	67	7.38	18.92%	0.57
103	1959/02/11 09:00:00	1959/02/14 06:00:00	70	7.34	19.11%	0.56
104	1987/10/11 16:00:00	1987/10/15 05:00:00	86	7.26	19.29%	0.56
105	1967/01/22 15:00:00	1967/01/27 08:00:00	114	7.19	19.48%	0.55
106	1979/11/07 18:00:00	1979/11/10 05:00:00	60	7.17	19.67%	0.55
107	1967/11/30 16:00:00	1967/12/02 13:00:00	46	6.94	19.85%	0.54
108	1958/03/15 17:00:00	1958/03/18 21:00:00	77	6.89	20.04%	0.54
109	1993/01/06 03:00:00	1993/01/11 11:00:00	129	6.89	20.22%	0.53
110	1973/03/20 08:00:00	1973/03/22 20:00:00	61	6.86	20.41%	0.53
111	2001/01/10 21:00:00	2001/01/14 21:00:00	97	6.82	20.59%	0.52
112	1964/11/17 14:00:00	1964/11/20 04:00:00	63	6.79	20.78%	0.52
113	1952/11/30 01:00:00	1952/12/04 07:00:00	103	6.67	20.96%	0.51
114	1988/01/17 10:00:00	1988/01/20 07:00:00	70	6.67	21.15%	0.51
115	1973/11/22 23:00:00	1973/11/25 11:00:00	61	6.63	21.34%	0.5
116	1956/04/12 20:00:00	1956/04/16 02:00:00	79	6.58	21.52%	0.5
117	1959/12/24 10:00:00	1959/12/27 02:00:00	65	6.58	21.71%	0.5
118	2006/10/14 01:00:00	2006/10/16 02:00:00	50	6.58	21.89%	0.49
119	1995/01/23 23:00:00	1995/01/28 14:00:00	112	6.55	22.08%	0.49
120	1992/03/20 22:00:00	1992/03/25 04:00:00	103	6.49	22.26%	0.48
121	1967/03/13 11:00:00	1967/03/16 07:00:00	69	6.38	22.45%	0.48
122	2002/12/20 11:00:00	2002/12/23 19:00:00	81	6.36	22.63%	0.48
123	2001/02/23 18:00:00	2001/03/02 09:00:00	160	6.35	22.82%	0.47
124	1972/11/14 14:00:00	1972/11/19 22:00:00	129	6.32	23.01%	0.47
125	1976/09/10 04:00:00	1976/09/13 11:00:00	80	6.27	23.19%	0.46
126	1988/04/20 02:00:00	1988/04/24 08:00:00	103	6.26	23.38%	0.46
127	1966/02/06 11:00:00	1966/02/10 10:00:00	96	6.21	23.56%	0.46
128	1983/03/17 02:00:00	1983/03/26 17:00:00	232	6.21	23.75%	0.45
129	1976/12/30 15:00:00	1977/01/09 16:00:00	242	6.15	23.93%	0.45
130	1954/02/13 17:00:00	1954/02/16 12:00:00	68	6.14	24.12%	0.45
131	1981/11/27 00:00:00	1981/12/01 11:00:00	108	6.14	24.30%	0.44
132	1967/04/11 07:00:00	1967/04/13 22:00:00	64	6.1	24.49%	0.44
133	1998/01/29 13:00:00	1998/02/01 06:00:00	66	6.08	24.68%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1992/01/04 04:00:00	1992/01/10 12:00:00	153	5.99	24.86%	0.43
135	2006/03/10 18:00:00	2006/03/13 10:00:00	65	5.8	25.05%	0.43
136	1991/03/19 00:00:00	1991/03/23 19:00:00	116	5.77	25.23%	0.43
137	1956/01/25 17:00:00	1956/01/29 18:00:00	98	5.76	25.42%	0.42
138	1983/04/18 03:00:00	1983/04/23 00:00:00	118	5.72	25.60%	0.42
139	1985/11/24 22:00:00	1985/11/27 18:00:00	69	5.64	25.79%	0.42
140	1986/09/24 19:00:00	1986/09/27 15:00:00	69	5.62	25.97%	0.41
141	1978/03/30 15:00:00	1978/04/03 02:00:00	84	5.61	26.16%	0.41
142	1997/01/23 07:00:00	1997/01/29 00:00:00	138	5.6	26.35%	0.41
143	1965/03/31 14:00:00	1965/04/06 02:00:00	133	5.56	26.53%	0.41
144	1965/12/29 19:00:00	1966/01/01 14:00:00	68	5.52	26.72%	0.4
145	1951/12/29 06:00:00	1952/01/01 23:00:00	90	5.46	26.90%	0.4
146	1995/04/16 06:00:00	1995/04/20 21:00:00	112	5.44	27.09%	0.4
147	1952/03/07 09:00:00	1952/03/14 13:00:00	173	5.38	27.27%	0.4
148	1970/02/28 13:00:00	1970/03/07 07:00:00	163	5.38	27.46%	0.39
149	1960/02/28 21:00:00	1960/03/03 15:00:00	91	5.36	27.64%	0.39
150	1967/11/19 08:00:00	1967/11/23 19:00:00	108	5.36	27.83%	0.39
151	1993/11/30 04:00:00	1993/12/02 00:00:00	45	5.32	28.01%	0.38
152	1984/12/26 22:00:00	1984/12/30 06:00:00	81	5.2	28.20%	0.38
153	1958/01/25 04:00:00	1958/01/29 01:00:00	94	5.19	28.39%	0.38
154	1955/01/16 09:00:00	1955/01/21 09:00:00	121	5.14	28.57%	0.38
155	1979/03/17 05:00:00	1979/03/22 14:00:00	130	5.03	28.76%	0.37
156	2001/12/09 14:00:00	2001/12/12 03:00:00	62	5.03	28.94%	0.37
157	1981/12/30 08:00:00	1982/01/08 02:00:00	211	5.01	29.13%	0.37
158	1982/12/07 22:00:00	1982/12/10 10:00:00	61	4.96	29.31%	0.37
159	2000/03/05 10:00:00	2000/03/09 04:00:00	91	4.95	29.50%	0.37
160	1957/02/28 20:00:00	1957/03/03 20:00:00	73	4.91	29.68%	0.36
161	1955/01/10 06:00:00	1955/01/12 15:00:00	58	4.9	29.87%	0.36
162	1954/03/30 04:00:00	1954/03/31 13:00:00	34	4.67	30.06%	0.36
163	1973/02/11 07:00:00	1973/02/16 23:00:00	137	4.64	30.24%	0.36
164	2001/04/07 16:00:00	2001/04/09 14:00:00	47	4.61	30.43%	0.35
165	1976/07/22 11:00:00	1976/07/24 23:00:00	61	4.56	30.61%	0.35
166	1981/01/28 06:00:00	1981/02/01 13:00:00	104	4.56	30.80%	0.35
167	1990/01/17 00:00:00	1990/01/19 19:00:00	68	4.44	30.98%	0.35
168	1981/02/25 21:00:00	1981/03/07 20:00:00	240	4.37	31.17%	0.35
169	2001/11/24 15:00:00	2001/11/26 18:00:00	52	4.35	31.35%	0.34
170	1985/12/11 04:00:00	1985/12/13 19:00:00	64	4.2	31.54%	0.34
171	1954/11/11 01:00:00	1954/11/13 23:00:00	71	4.17	31.73%	0.34
172	1963/02/09 18:00:00	1963/02/15 05:00:00	132	4.12	31.91%	0.34
173	1962/02/07 21:00:00	1962/02/11 20:00:00	96	4.03	32.10%	0.34
174	1973/03/05 08:00:00	1973/03/14 05:00:00	214	4.02	32.28%	0.33
175	1951/11/23 05:00:00	1951/11/24 21:00:00	41	3.94	32.47%	0.33
176	1982/02/10 06:00:00	1982/02/13 03:00:00	70	3.91	32.65%	0.33
177	1998/05/12 17:00:00	1998/05/14 11:00:00	43	3.83	32.84%	0.33
178	1974/12/04 08:00:00	1974/12/06 20:00:00	61	3.8	33.02%	0.33
179	1978/03/09 16:00:00	1978/03/14 17:00:00	122	3.74	33.21%	0.32
180	2005/02/11 03:00:00	2005/02/14 22:00:00	92	3.69	33.40%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1964/01/21 07:00:00	1964/01/24 22:00:00	88	3.68	33.58%	0.32
182	1960/11/05 20:00:00	1960/11/08 03:00:00	56	3.6	33.77%	0.32
183	1966/01/30 07:00:00	1966/02/01 22:00:00	64	3.57	33.95%	0.32
184	1994/02/17 11:00:00	1994/02/19 23:00:00	61	3.56	34.14%	0.32
185	1976/02/04 10:00:00	1976/02/12 20:00:00	203	3.55	34.32%	0.31
186	1980/03/25 23:00:00	1980/03/27 16:00:00	42	3.47	34.51%	0.31
187	2002/12/16 16:00:00	2002/12/18 17:00:00	50	3.45	34.69%	0.31
188	1974/01/07 15:00:00	1974/01/10 19:00:00	77	3.43	34.88%	0.31
189	1970/11/28 22:00:00	1970/12/03 09:00:00	108	3.42	35.06%	0.31
190	2000/02/20 15:00:00	2000/02/24 19:00:00	101	3.41	35.25%	0.31
191	1957/10/14 04:00:00	1957/10/16 07:00:00	52	3.37	35.44%	0.3
192	1977/03/24 22:00:00	1977/03/27 15:00:00	66	3.36	35.62%	0.3
193	1979/03/27 05:00:00	1979/03/30 15:00:00	83	3.32	35.81%	0.3
194	1957/01/05 10:00:00	1957/01/11 22:00:00	157	3.3	35.99%	0.3
195	1987/02/24 04:00:00	1987/02/27 02:00:00	71	3.26	36.18%	0.3
196	1975/03/08 08:00:00	1975/03/14 13:00:00	150	3.24	36.36%	0.3
197	1984/11/24 17:00:00	1984/11/26 22:00:00	54	3.24	36.55%	0.29
198	1974/03/08 00:00:00	1974/03/10 21:00:00	70	3.17	36.73%	0.29
199	2003/12/25 01:00:00	2003/12/27 18:00:00	66	3.17	36.92%	0.29
200	1998/01/09 15:00:00	1998/01/12 12:00:00	70	3.07	37.11%	0.29
201	1962/03/18 18:00:00	1962/03/21 08:00:00	63	3.05	37.29%	0.29
202	1984/12/16 03:00:00	1984/12/22 13:00:00	155	3.03	37.48%	0.29
203	1988/11/14 06:00:00	1988/11/16 13:00:00	56	3.03	37.66%	0.29
204	1997/12/06 16:00:00	1997/12/09 01:00:00	58	2.99	37.85%	0.28
205	1976/07/15 13:00:00	1976/07/18 01:00:00	61	2.98	38.03%	0.28
206	1954/03/20 11:00:00	1954/03/27 00:00:00	158	2.96	38.22%	0.28
207	1957/04/20 15:00:00	1957/04/23 07:00:00	65	2.88	38.40%	0.28
208	1976/08/30 10:00:00	1976/09/01 02:00:00	41	2.88	38.59%	0.28
209	1993/01/31 00:00:00	1993/02/02 00:00:00	49	2.86	38.78%	0.28
210	1982/04/01 09:00:00	1982/04/03 17:00:00	57	2.85	38.96%	0.28
211	1985/02/09 06:00:00	1985/02/11 21:00:00	64	2.81	39.15%	0.28
212	1959/02/21 10:00:00	1959/02/24 06:00:00	69	2.76	39.33%	0.27
213	1996/12/09 18:00:00	1996/12/14 05:00:00	108	2.71	39.52%	0.27
214	1977/05/07 21:00:00	1977/05/11 17:00:00	93	2.7	39.70%	0.27
215	1976/07/08 13:00:00	1976/07/10 23:00:00	59	2.66	39.89%	0.27
216	2006/04/04 18:00:00	2006/04/07 13:00:00	68	2.63	40.07%	0.27
217	1983/11/11 22:00:00	1983/11/15 09:00:00	84	2.54	40.26%	0.27
218	1996/02/25 11:00:00	1996/02/29 08:00:00	94	2.49	40.45%	0.27
219	1982/01/20 06:00:00	1982/01/23 20:00:00	87	2.47	40.63%	0.27
220	1993/03/26 00:00:00	1993/03/30 01:00:00	98	2.47	40.82%	0.26
221	2007/04/20 15:00:00	2007/04/23 13:00:00	71	2.46	41.00%	0.26
222	1958/02/25 07:00:00	1958/02/27 06:00:00	48	2.44	41.19%	0.26
223	1998/03/31 16:00:00	1998/04/02 11:00:00	44	2.33	41.37%	0.26
224	1998/03/25 17:00:00	1998/03/29 22:00:00	102	2.31	41.56%	0.26
225	1955/02/27 07:00:00	1955/03/01 15:00:00	57	2.3	41.74%	0.26
226	1981/02/08 20:00:00	1981/02/11 16:00:00	69	2.29	41.93%	0.26
227	1959/02/16 03:00:00	1959/02/18 22:00:00	68	2.22	42.12%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1965/02/06 02:00:00	1965/02/09 05:00:00	76	2.05	42.30%	0.25
229	1991/01/09 14:00:00	1991/01/11 12:00:00	47	2.02	42.49%	0.25
230	1954/01/24 10:00:00	1954/01/27 00:00:00	63	1.93	42.67%	0.25
231	1983/02/06 13:00:00	1983/02/09 06:00:00	66	1.87	42.86%	0.25
232	1994/03/07 01:00:00	1994/03/09 17:00:00	65	1.87	43.04%	0.25
233	1954/03/16 22:00:00	1954/03/18 22:00:00	49	1.52	43.23%	0.25
234	1998/11/08 08:00:00	1998/11/10 09:00:00	50	1.5	43.41%	0.25
235	1979/02/14 03:00:00	1979/02/15 11:00:00	33	1.49	43.60%	0.25
236	1994/03/19 03:00:00	1994/03/22 12:00:00	82	1.4	43.78%	0.25
237	1953/03/01 22:00:00	1953/03/03 06:00:00	33	1.33	43.97%	0.25
238	1962/02/19 11:00:00	1962/02/23 02:00:00	88	1.31	44.16%	0.24
239	2006/02/27 20:00:00	2006/03/02 14:00:00	67	1.31	44.34%	0.24
240	1957/03/16 09:00:00	1957/03/18 01:00:00	41	1.23	44.53%	0.24
241	1971/04/14 11:00:00	1971/04/16 09:00:00	47	1.21	44.71%	0.24
242	1979/01/31 00:00:00	1979/02/03 21:00:00	94	1.19	44.90%	0.24
243	1958/03/27 13:00:00	1958/03/28 16:00:00	28	1.16	45.08%	0.24
244	1966/11/07 14:00:00	1966/11/10 06:00:00	65	1.13	45.27%	0.24
245	1987/12/04 21:00:00	1987/12/06 18:00:00	46	1.12	45.45%	0.24
246	1993/06/05 13:00:00	1993/06/07 10:00:00	46	1.12	45.64%	0.24
247	1970/01/16 17:00:00	1970/01/18 11:00:00	43	1.05	45.83%	0.24
248	1984/12/08 00:00:00	1984/12/09 19:00:00	44	1.01	46.01%	0.23
249	1956/01/31 09:00:00	1956/02/01 21:00:00	37	1	46.20%	0.23
250	1980/12/04 14:00:00	1980/12/09 03:00:00	110	1	46.38%	0.23
251	1958/03/06 10:00:00	1958/03/08 17:00:00	56	0.95	46.57%	0.23
252	1952/12/20 11:00:00	1952/12/22 11:00:00	49	0.93	46.75%	0.23
253	1969/11/06 20:00:00	1969/11/11 02:00:00	103	0.89	46.94%	0.23
254	1983/12/09 16:00:00	1983/12/10 07:00:00	16	0.89	47.12%	0.23
255	1973/02/07 04:00:00	1973/02/07 22:00:00	19	0.86	47.31%	0.23
256	1980/01/18 03:00:00	1980/01/20 15:00:00	61	0.84	47.50%	0.23
257	1999/04/11 22:00:00	1999/04/14 03:00:00	54	0.83	47.68%	0.23
258	1969/03/21 13:00:00	1969/03/23 14:00:00	50	0.77	47.87%	0.23
259	1969/04/05 21:00:00	1969/04/06 22:00:00	26	0.75	48.05%	0.22
260	1952/04/10 14:00:00	1952/04/12 13:00:00	48	0.7	48.24%	0.22
261	1996/01/31 04:00:00	1996/02/03 22:00:00	91	0.67	48.42%	0.22
262	1988/02/02 02:00:00	1988/02/05 02:00:00	73	0.62	48.61%	0.22
263	1988/04/14 19:00:00	1988/04/17 09:00:00	63	0.59	48.79%	0.22
264	1976/04/15 18:00:00	1976/04/17 01:00:00	32	0.56	48.98%	0.22
265	1998/04/11 17:00:00	1998/04/12 18:00:00	26	0.55	49.17%	0.22
266	1952/12/30 19:00:00	1953/01/01 16:00:00	46	0.5	49.35%	0.22
267	1951/12/11 23:00:00	1951/12/14 17:00:00	67	0.47	49.54%	0.22
268	1963/04/17 05:00:00	1963/04/18 17:00:00	37	0.47	49.72%	0.22
269	1980/03/10 16:00:00	1980/03/12 02:00:00	35	0.45	49.91%	0.22
270	1954/12/09 23:00:00	1954/12/11 16:00:00	42	0.35	50.09%	0.22
271	1978/12/17 00:00:00	1978/12/21 08:00:00	105	0.32	50.28%	0.21
272	2001/03/06 17:00:00	2001/03/08 18:00:00	50	0.31	50.46%	0.21
273	1955/04/30 20:00:00	1955/05/03 04:00:00	57	0.23	50.65%	0.21
274	1998/12/06 06:00:00	1998/12/07 07:00:00	26	0.23	50.83%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1970/02/10 04:00:00	1970/02/13 05:00:00	74	0.22	51.02%	0.21
276	1992/12/27 21:00:00	1992/12/30 15:00:00	67	0.21	51.21%	0.21
277	1995/03/21 12:00:00	1995/03/24 22:00:00	83	0.18	51.39%	0.21
278	1999/02/04 16:00:00	1999/02/06 13:00:00	46	0.17	51.58%	0.21
279	1957/12/15 11:00:00	1957/12/18 11:00:00	73	0.16	51.76%	0.21
280	1983/04/29 07:00:00	1983/05/02 14:00:00	80	0.16	51.95%	0.21
281	1961/01/26 09:00:00	1961/01/28 20:00:00	60	0.13	52.13%	0.21
282	1976/03/01 16:00:00	1976/03/04 11:00:00	68	0.13	52.32%	0.21
283	1992/02/06 12:00:00	1992/02/10 23:00:00	108	0.13	52.50%	0.21
284	1952/01/25 05:00:00	1952/01/27 09:00:00	53	0.12	52.69%	0.2
285	1969/01/14 02:00:00	1969/01/16 11:00:00	58	0.12	52.88%	0.2
286	1971/02/17 06:00:00	1971/02/19 07:00:00	50	0.12	53.06%	0.2
287	1972/12/04 15:00:00	1972/12/09 07:00:00	113	0.12	53.25%	0.2
288	1974/10/28 12:00:00	1974/10/31 07:00:00	68	0.12	53.43%	0.2
289	1979/03/01 10:00:00	1979/03/03 12:00:00	51	0.12	53.62%	0.2
290	1980/10/16 04:00:00	1980/10/18 01:00:00	46	0.12	53.80%	0.2
291	1982/11/09 18:00:00	1982/11/12 07:00:00	62	0.12	53.99%	0.2
292	1987/01/06 20:00:00	1987/01/09 06:00:00	59	0.12	54.17%	0.2
293	1990/04/04 08:00:00	1990/04/06 10:00:00	51	0.12	54.36%	0.2
294	1992/03/02 08:00:00	1992/03/04 22:00:00	63	0.12	54.55%	0.2
295	1996/10/30 14:00:00	1996/11/01 14:00:00	49	0.12	54.73%	0.2
296	1951/08/28 09:00:00	1951/08/30 06:00:00	46	0.11	54.92%	0.2
297	1959/12/21 02:00:00	1959/12/23 04:00:00	51	0.11	55.10%	0.2
298	1979/10/20 07:00:00	1979/10/22 09:00:00	51	0.11	55.29%	0.2
299	1983/12/03 16:00:00	1983/12/05 13:00:00	46	0.11	55.47%	0.19
300	1986/01/30 05:00:00	1986/02/02 05:00:00	73	0.11	55.66%	0.19
301	1989/03/25 13:00:00	1989/03/27 18:00:00	54	0.11	55.84%	0.19
302	1957/12/05 04:00:00	1957/12/07 04:00:00	49	0.1	56.03%	0.19
303	1959/04/26 06:00:00	1959/04/27 23:00:00	42	0.1	56.22%	0.19
304	1960/09/11 05:00:00	1960/09/13 00:00:00	44	0.1	56.40%	0.19
305	1960/11/26 18:00:00	1960/11/28 08:00:00	39	0.1	56.59%	0.19
306	1962/03/06 09:00:00	1962/03/08 06:00:00	46	0.1	56.77%	0.19
307	1986/02/07 23:00:00	1986/02/10 07:00:00	57	0.1	56.96%	0.19
308	1986/04/06 05:00:00	1986/04/08 03:00:00	47	0.1	57.14%	0.19
309	1986/12/06 08:00:00	1986/12/08 19:00:00	60	0.1	57.33%	0.19
310	1994/01/25 00:00:00	1994/01/28 13:00:00	86	0.1	57.51%	0.19
311	1955/02/17 06:00:00	1955/02/18 23:00:00	42	0.09	57.70%	0.19
312	1964/12/27 09:00:00	1964/12/29 17:00:00	57	0.09	57.88%	0.19
313	1965/01/24 07:00:00	1965/01/25 21:00:00	39	0.09	58.07%	0.19
314	1974/12/28 09:00:00	1974/12/31 00:00:00	64	0.09	58.26%	0.19
315	1975/02/03 09:00:00	1975/02/05 17:00:00	57	0.09	58.44%	0.18
316	1979/02/21 02:00:00	1979/02/23 23:00:00	70	0.09	58.63%	0.18
317	1982/11/29 13:00:00	1982/12/02 04:00:00	64	0.09	58.81%	0.18
318	1986/10/09 21:00:00	1986/10/11 20:00:00	48	0.09	59.00%	0.18
319	1995/02/14 05:00:00	1995/02/16 08:00:00	52	0.09	59.18%	0.18
320	2004/04/01 21:00:00	2004/04/03 12:00:00	40	0.09	59.37%	0.18
321	2004/12/05 13:00:00	2004/12/07 06:00:00	42	0.09	59.55%	0.18

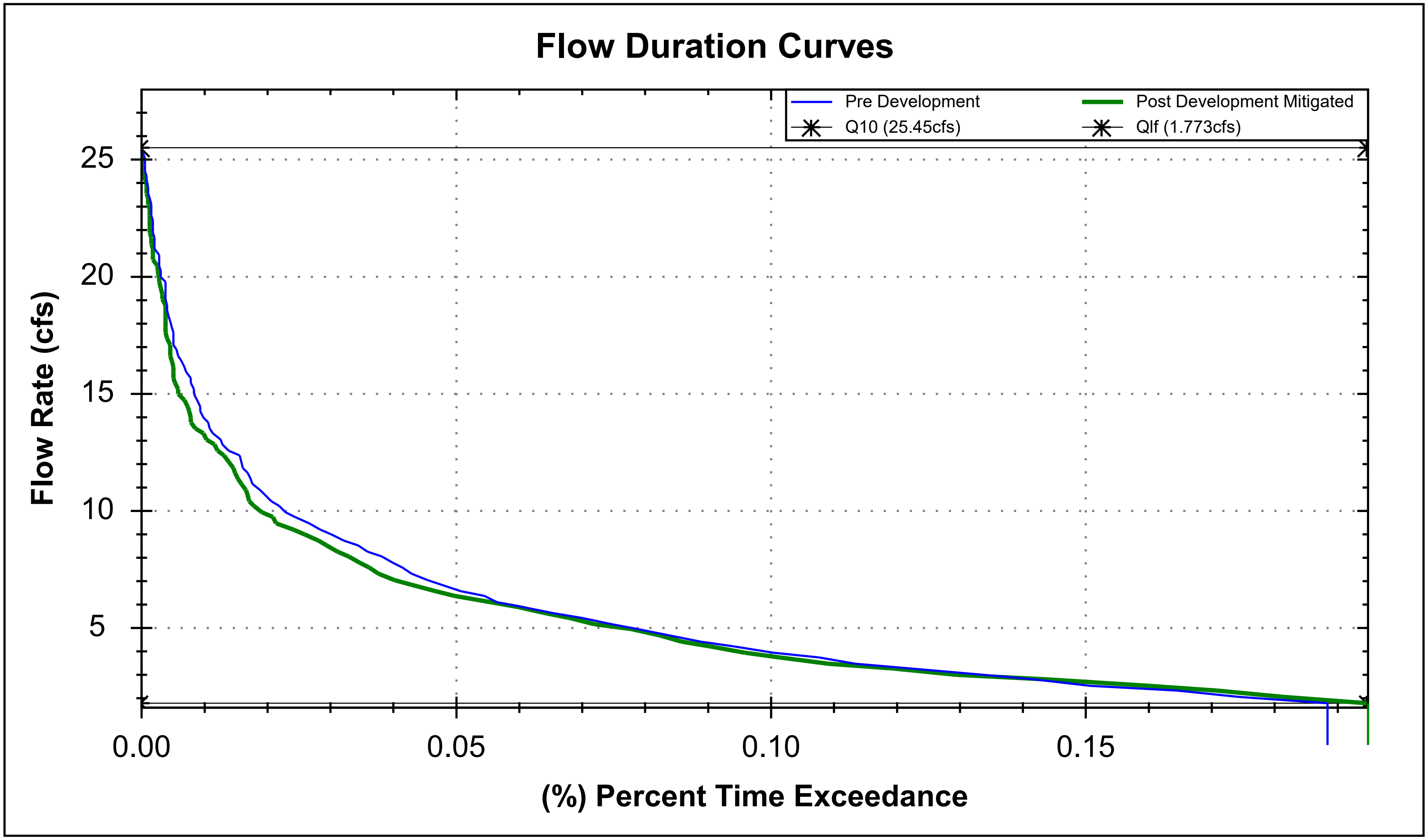
Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1952/02/29 22:00:00	1952/03/02 22:00:00	49	0.08	59.74%	0.18
323	1953/01/06 18:00:00	1953/01/09 16:00:00	71	0.08	59.93%	0.18
324	1959/12/10 01:00:00	1959/12/11 16:00:00	40	0.08	60.11%	0.18
325	1960/01/25 21:00:00	1960/01/27 12:00:00	40	0.08	60.30%	0.18
326	1961/11/25 18:00:00	1961/11/27 08:00:00	39	0.08	60.48%	0.18
327	1963/11/15 17:00:00	1963/11/17 07:00:00	39	0.08	60.67%	0.18
328	1969/01/18 23:00:00	1969/01/22 20:00:00	94	0.08	60.85%	0.18
329	1973/11/18 08:00:00	1973/11/20 07:00:00	48	0.08	61.04%	0.18
330	1987/04/04 15:00:00	1987/04/06 02:00:00	36	0.08	61.22%	0.18
331	1990/05/28 09:00:00	1990/05/29 23:00:00	39	0.08	61.41%	0.18
332	1993/02/23 19:00:00	1993/02/25 11:00:00	41	0.08	61.60%	0.18
333	1996/12/27 17:00:00	1996/12/29 19:00:00	51	0.08	61.78%	0.17
334	1999/03/25 15:00:00	1999/03/27 06:00:00	40	0.08	61.97%	0.17
335	2000/02/11 18:00:00	2000/02/15 15:00:00	94	0.08	62.15%	0.17
336	2000/04/17 17:00:00	2000/04/19 14:00:00	46	0.08	62.34%	0.17
337	2005/12/31 18:00:00	2006/01/04 12:00:00	91	0.08	62.52%	0.17
338	2007/12/07 06:00:00	2007/12/09 23:00:00	66	0.08	62.71%	0.17
339	1975/02/09 11:00:00	1975/02/11 09:00:00	47	0.07	62.89%	0.17
340	1982/01/29 00:00:00	1982/01/30 08:00:00	33	0.07	63.08%	0.17
341	1983/02/02 16:00:00	1983/02/04 07:00:00	40	0.07	63.27%	0.17
342	1984/10/17 07:00:00	1984/10/18 17:00:00	35	0.07	63.45%	0.17
343	1988/01/05 16:00:00	1988/01/07 01:00:00	34	0.07	63.64%	0.17
344	1996/02/21 06:00:00	1996/02/23 06:00:00	49	0.07	63.82%	0.17
345	1996/03/13 02:00:00	1996/03/14 18:00:00	41	0.07	64.01%	0.17
346	2000/10/27 09:00:00	2000/10/28 17:00:00	33	0.07	64.19%	0.17
347	2004/02/02 23:00:00	2004/02/04 19:00:00	45	0.07	64.38%	0.17
348	2006/03/28 21:00:00	2006/03/30 16:00:00	44	0.07	64.56%	0.17
349	2006/05/22 05:00:00	2006/05/23 15:00:00	35	0.07	64.75%	0.17
350	2008/02/03 09:00:00	2008/02/05 00:00:00	40	0.07	64.94%	0.17
351	1952/11/23 00:00:00	1952/11/24 13:00:00	38	0.06	65.12%	0.17
352	1957/10/31 01:00:00	1957/11/01 07:00:00	31	0.06	65.31%	0.17
353	1958/09/24 05:00:00	1958/09/25 09:00:00	29	0.06	65.49%	0.16
354	1959/02/08 05:00:00	1959/02/10 05:00:00	49	0.06	65.68%	0.16
355	1961/11/20 17:00:00	1961/11/22 01:00:00	33	0.06	65.86%	0.16
356	1962/02/15 20:00:00	1962/02/17 22:00:00	51	0.06	66.05%	0.16
357	1967/04/18 22:00:00	1967/04/23 03:00:00	102	0.06	66.23%	0.16
358	1975/11/27 19:00:00	1975/11/30 03:00:00	57	0.06	66.42%	0.16
359	1980/04/23 04:00:00	1980/04/24 10:00:00	31	0.06	66.60%	0.16
360	1982/03/26 01:00:00	1982/03/27 08:00:00	32	0.06	66.79%	0.16
361	1982/09/26 05:00:00	1982/09/27 22:00:00	42	0.06	66.98%	0.16
362	1985/01/08 01:00:00	1985/01/09 06:00:00	30	0.06	67.16%	0.16
363	1996/01/21 19:00:00	1996/01/23 11:00:00	41	0.06	67.35%	0.16
364	2006/02/19 04:00:00	2006/02/20 16:00:00	37	0.06	67.53%	0.16
365	2007/08/26 12:00:00	2007/08/27 16:00:00	29	0.06	67.72%	0.16
366	2007/12/19 01:00:00	2007/12/20 19:00:00	43	0.06	67.90%	0.16
367	1953/04/27 22:00:00	1953/04/29 01:00:00	28	0.05	68.09%	0.16
368	1953/11/14 18:00:00	1953/11/16 12:00:00	43	0.05	68.27%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1954/01/12 16:00:00	1954/01/14 02:00:00	35	0.05	68.46%	0.16
370	1955/03/11 02:00:00	1955/03/12 04:00:00	27	0.05	68.65%	0.16
371	1955/04/22 06:00:00	1955/04/23 11:00:00	30	0.05	68.83%	0.16
372	1957/02/23 08:00:00	1957/02/24 10:00:00	27	0.05	69.02%	0.16
373	1959/01/06 09:00:00	1959/01/07 12:00:00	28	0.05	69.20%	0.16
374	1960/02/08 23:00:00	1960/02/11 09:00:00	59	0.05	69.39%	0.16
375	1960/11/13 00:00:00	1960/11/13 19:00:00	20	0.05	69.57%	0.16
376	1963/09/04 10:00:00	1963/09/05 16:00:00	31	0.05	69.76%	0.15
377	1964/03/23 00:00:00	1964/03/25 00:00:00	49	0.05	69.94%	0.15
378	1965/03/12 19:00:00	1965/03/14 19:00:00	49	0.05	70.13%	0.15
379	1968/02/13 05:00:00	1968/02/14 15:00:00	35	0.05	70.32%	0.15
380	1968/04/01 20:00:00	1968/04/02 23:00:00	28	0.05	70.50%	0.15
381	1972/11/11 09:00:00	1972/11/12 14:00:00	30	0.05	70.69%	0.15
382	1973/02/28 02:00:00	1973/03/01 12:00:00	35	0.05	70.87%	0.15
383	1974/03/02 11:00:00	1974/03/03 19:00:00	33	0.05	71.06%	0.15
384	1974/03/27 08:00:00	1974/03/28 10:00:00	27	0.05	71.24%	0.15
385	1976/04/13 06:00:00	1976/04/14 11:00:00	30	0.05	71.43%	0.15
386	1977/12/18 06:00:00	1977/12/19 08:00:00	27	0.05	71.61%	0.15
387	1978/01/30 18:00:00	1978/02/01 01:00:00	32	0.05	71.80%	0.15
388	1978/11/21 18:00:00	1978/11/23 02:00:00	33	0.05	71.99%	0.15
389	1978/11/24 10:00:00	1978/11/25 13:00:00	28	0.05	72.17%	0.15
390	1982/01/10 20:00:00	1982/01/12 07:00:00	36	0.05	72.36%	0.15
391	1982/11/19 02:00:00	1982/11/20 19:00:00	42	0.05	72.54%	0.15
392	1982/12/29 20:00:00	1982/12/30 21:00:00	26	0.05	72.73%	0.15
393	1983/04/12 23:00:00	1983/04/14 05:00:00	31	0.05	72.91%	0.15
394	1983/11/20 10:00:00	1983/11/21 19:00:00	34	0.05	73.10%	0.15
395	1984/12/10 21:00:00	1984/12/13 03:00:00	55	0.05	73.28%	0.15
396	1987/10/31 07:00:00	1987/11/02 13:00:00	55	0.05	73.47%	0.15
397	1990/01/31 01:00:00	1990/02/01 02:00:00	26	0.05	73.65%	0.15
398	1990/02/04 12:00:00	1990/02/05 12:00:00	25	0.05	73.84%	0.15
399	1990/04/17 09:00:00	1990/04/18 14:00:00	30	0.05	74.03%	0.15
400	1990/06/10 08:00:00	1990/06/11 15:00:00	32	0.05	74.21%	0.15
401	1993/01/02 09:00:00	1993/01/03 12:00:00	28	0.05	74.40%	0.15
402	1993/12/11 17:00:00	1993/12/13 02:00:00	34	0.05	74.58%	0.14
403	1995/01/21 04:00:00	1995/01/22 03:00:00	24	0.05	74.77%	0.14
404	1996/12/06 02:00:00	1996/12/07 09:00:00	32	0.05	74.95%	0.14
405	1998/12/01 17:00:00	1998/12/02 17:00:00	25	0.05	75.14%	0.14
406	2005/03/22 21:00:00	2005/03/23 23:00:00	27	0.05	75.32%	0.14
407	2005/10/16 19:00:00	2005/10/19 15:00:00	69	0.05	75.51%	0.14
408	2006/12/10 01:00:00	2006/12/11 13:00:00	37	0.05	75.70%	0.14
409	1951/12/05 02:00:00	1951/12/06 02:00:00	25	0.04	75.88%	0.14
410	1951/12/19 09:00:00	1951/12/20 09:00:00	25	0.04	76.07%	0.14
411	1952/12/28 09:00:00	1952/12/29 08:00:00	24	0.04	76.25%	0.14
412	1953/02/23 11:00:00	1953/02/24 17:00:00	31	0.04	76.44%	0.14
413	1955/01/31 04:00:00	1955/02/01 04:00:00	25	0.04	76.62%	0.14
414	1955/11/14 08:00:00	1955/11/15 08:00:00	25	0.04	76.81%	0.14
415	1955/11/17 13:00:00	1955/11/18 13:00:00	25	0.04	76.99%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1957/05/21 06:00:00	1957/05/22 02:00:00	21	0.04	77.18%	0.14
417	1957/06/10 04:00:00	1957/06/11 03:00:00	24	0.04	77.37%	0.14
418	1957/10/21 05:00:00	1957/10/21 22:00:00	18	0.04	77.55%	0.14
419	1958/03/11 02:00:00	1958/03/12 16:00:00	39	0.04	77.74%	0.14
420	1963/03/28 11:00:00	1963/03/29 07:00:00	21	0.04	77.92%	0.14
421	1963/04/26 02:00:00	1963/04/27 02:00:00	25	0.04	78.11%	0.14
422	1964/11/09 15:00:00	1964/11/11 13:00:00	47	0.04	78.29%	0.14
423	1966/10/10 14:00:00	1966/10/11 12:00:00	23	0.04	78.48%	0.14
424	1967/03/31 12:00:00	1967/04/01 09:00:00	22	0.04	78.66%	0.14
425	1968/11/14 19:00:00	1968/11/16 00:00:00	30	0.04	78.85%	0.14
426	1970/01/10 02:00:00	1970/01/12 17:00:00	64	0.04	79.04%	0.14
427	1971/01/12 20:00:00	1971/01/14 00:00:00	29	0.04	79.22%	0.14
428	1971/02/23 05:00:00	1971/02/24 01:00:00	21	0.04	79.41%	0.14
429	1971/10/17 00:00:00	1971/10/18 03:00:00	28	0.04	79.59%	0.14
430	1975/04/17 08:00:00	1975/04/18 07:00:00	24	0.04	79.78%	0.14
431	1975/12/20 15:00:00	1975/12/21 18:00:00	28	0.04	79.96%	0.14
432	1978/11/11 13:00:00	1978/11/14 03:00:00	63	0.04	80.15%	0.13
433	1980/03/21 22:00:00	1980/03/22 16:00:00	19	0.04	80.33%	0.13
434	1985/01/28 18:00:00	1985/01/30 00:00:00	31	0.04	80.52%	0.13
435	1985/02/02 10:00:00	1985/02/04 04:00:00	43	0.04	80.71%	0.13
436	1987/02/13 22:00:00	1987/02/14 22:00:00	25	0.04	80.89%	0.13
437	1987/03/06 02:00:00	1987/03/07 08:00:00	31	0.04	81.08%	0.13
438	1987/03/22 02:00:00	1987/03/23 00:00:00	23	0.04	81.26%	0.13
439	1987/11/05 01:00:00	1987/11/06 09:00:00	33	0.04	81.45%	0.13
440	1988/08/24 04:00:00	1988/08/25 03:00:00	24	0.04	81.63%	0.13
441	1989/02/03 23:00:00	1989/02/05 12:00:00	38	0.04	81.82%	0.13
442	1989/02/09 17:00:00	1989/02/11 03:00:00	35	0.04	82.00%	0.13
443	1990/01/14 05:00:00	1990/01/15 09:00:00	29	0.04	82.19%	0.13
444	1997/01/03 06:00:00	1997/01/04 09:00:00	28	0.04	82.37%	0.13
445	1997/12/18 18:00:00	1997/12/19 18:00:00	25	0.04	82.56%	0.13
446	1998/03/13 18:00:00	1998/03/15 17:00:00	48	0.04	82.75%	0.13
447	2001/02/20 18:00:00	2001/02/21 16:00:00	23	0.04	82.93%	0.13
448	2001/03/10 17:00:00	2001/03/11 20:00:00	28	0.04	83.12%	0.13
449	2004/03/02 01:00:00	2004/03/03 01:00:00	25	0.04	83.30%	0.13
450	2007/02/11 12:00:00	2007/02/12 09:00:00	22	0.04	83.49%	0.13
451	2007/02/28 06:00:00	2007/03/01 06:00:00	25	0.04	83.67%	0.13
452	1952/12/17 13:00:00	1952/12/18 02:00:00	14	0.03	83.86%	0.13
453	1953/10/22 08:00:00	1953/10/22 21:00:00	14	0.03	84.04%	0.13
454	1955/01/02 00:00:00	1955/01/02 21:00:00	22	0.03	84.23%	0.13
455	1956/02/24 09:00:00	1956/02/25 02:00:00	18	0.03	84.42%	0.13
456	1960/11/03 21:00:00	1960/11/04 09:00:00	13	0.03	84.60%	0.13
457	1964/12/31 22:00:00	1965/01/01 13:00:00	16	0.03	84.79%	0.13
458	1976/11/12 06:00:00	1976/11/12 19:00:00	14	0.03	84.97%	0.13
459	1977/01/29 03:00:00	1977/01/29 17:00:00	15	0.03	85.16%	0.13
460	1977/05/24 09:00:00	1977/05/24 21:00:00	13	0.03	85.34%	0.13
461	1979/12/21 12:00:00	1979/12/22 02:00:00	15	0.03	85.53%	0.13
462	1982/03/29 02:00:00	1982/03/29 13:00:00	12	0.03	85.71%	0.13

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
463	1982/09/17 08:00:00	1982/09/18 03:00:00	20	0.03	85.90%	0.13
464	1983/01/23 04:00:00	1983/01/26 01:00:00	70	0.03	86.09%	0.13
465	1984/04/27 23:00:00	1984/04/28 13:00:00	15	0.03	86.27%	0.13
466	1984/12/03 10:00:00	1984/12/03 22:00:00	13	0.03	86.46%	0.12
467	1989/01/07 17:00:00	1989/01/08 08:00:00	16	0.03	86.64%	0.12
468	1989/03/02 19:00:00	1989/03/03 08:00:00	14	0.03	86.83%	0.12
469	1989/05/15 07:00:00	1989/05/15 20:00:00	14	0.03	87.01%	0.12
470	1991/03/15 15:00:00	1991/03/16 04:00:00	14	0.03	87.20%	0.12
471	1991/10/27 02:00:00	1991/10/28 02:00:00	25	0.03	87.38%	0.12
472	1992/03/08 02:00:00	1992/03/09 01:00:00	24	0.03	87.57%	0.12
473	1992/03/27 06:00:00	1992/03/27 19:00:00	14	0.03	87.76%	0.12
474	1994/11/10 13:00:00	1994/11/11 01:00:00	13	0.03	87.94%	0.12
475	1996/01/16 21:00:00	1996/01/17 14:00:00	18	0.03	88.13%	0.12
476	1996/03/04 23:00:00	1996/03/05 12:00:00	14	0.03	88.31%	0.12
477	1998/01/03 18:00:00	1998/01/05 05:00:00	36	0.03	88.50%	0.12
478	1998/11/28 19:00:00	1998/11/29 13:00:00	19	0.03	88.68%	0.12
479	2001/11/29 18:00:00	2001/11/30 11:00:00	18	0.03	88.87%	0.12
480	2001/12/04 18:00:00	2001/12/05 10:00:00	17	0.03	89.05%	0.12
481	2005/03/04 22:00:00	2005/03/05 15:00:00	18	0.03	89.24%	0.12
482	2006/03/21 02:00:00	2006/03/21 19:00:00	18	0.03	89.42%	0.12
483	2007/02/19 08:00:00	2007/02/19 23:00:00	16	0.03	89.61%	0.12
484	2008/01/23 21:00:00	2008/01/25 01:00:00	29	0.03	89.80%	0.12
485	1956/12/06 05:00:00	1956/12/06 15:00:00	11	0.02	89.98%	0.12
486	1957/01/20 19:00:00	1957/01/21 02:00:00	8	0.02	90.17%	0.12
487	1957/05/19 09:00:00	1957/05/19 18:00:00	10	0.02	90.35%	0.12
488	1958/02/13 06:00:00	1958/02/13 17:00:00	12	0.02	90.54%	0.12
489	1958/05/11 09:00:00	1958/05/11 10:00:00	2	0.02	90.72%	0.12
490	1960/03/28 06:00:00	1960/03/28 12:00:00	7	0.02	90.91%	0.12
491	1961/03/28 13:00:00	1961/03/28 22:00:00	10	0.02	91.09%	0.12
492	1962/01/13 02:00:00	1962/01/13 11:00:00	10	0.02	91.28%	0.12
493	1962/02/24 23:00:00	1962/02/25 08:00:00	10	0.02	91.47%	0.12
494	1962/03/23 00:00:00	1962/03/23 07:00:00	8	0.02	91.65%	0.12
495	1964/10/15 13:00:00	1964/10/15 20:00:00	8	0.02	91.84%	0.12
496	1965/09/17 06:00:00	1965/09/17 18:00:00	13	0.02	92.02%	0.12
497	1965/12/22 03:00:00	1965/12/22 19:00:00	17	0.02	92.21%	0.12
498	1967/12/08 07:00:00	1967/12/08 18:00:00	12	0.02	92.39%	0.12
499	1975/03/22 10:00:00	1975/03/22 21:00:00	12	0.02	92.58%	0.12
500	1975/12/12 18:00:00	1975/12/13 01:00:00	8	0.02	92.76%	0.12
501	1976/07/27 01:00:00	1976/07/27 10:00:00	10	0.02	92.95%	0.12
502	1977/02/24 23:00:00	1977/02/25 09:00:00	11	0.02	93.14%	0.12
503	1977/03/16 22:00:00	1977/03/22 16:00:00	139	0.02	93.32%	0.12
504	1978/04/08 17:00:00	1978/04/09 02:00:00	10	0.02	93.51%	0.12
505	1978/04/15 21:00:00	1978/04/16 03:00:00	7	0.02	93.69%	0.12
506	1981/04/19 06:00:00	1981/04/19 13:00:00	8	0.02	93.88%	0.12
507	1985/03/27 17:00:00	1985/03/28 18:00:00	26	0.02	94.06%	0.11
508	1987/03/15 10:00:00	1987/03/15 18:00:00	9	0.02	94.25%	0.11
509	1987/03/25 06:00:00	1987/03/26 04:00:00	23	0.02	94.43%	0.11

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
510	1989/01/23 21:00:00	1989/01/24 06:00:00	10	0.02	94.62%	0.11
511	1989/02/02 09:00:00	1989/02/02 20:00:00	12	0.02	94.81%	0.11
512	1992/12/18 02:00:00	1992/12/18 09:00:00	8	0.02	94.99%	0.11
513	1993/12/14 20:00:00	1993/12/15 11:00:00	16	0.02	95.18%	0.11
514	1995/12/13 08:00:00	1995/12/13 19:00:00	12	0.02	95.36%	0.11
515	1996/01/25 15:00:00	1996/01/25 23:00:00	9	0.02	95.55%	0.11
516	1997/02/10 23:00:00	1997/02/11 05:00:00	7	0.02	95.73%	0.11
517	2001/04/10 18:00:00	2001/04/11 05:00:00	12	0.02	95.92%	0.11
518	2004/11/21 08:00:00	2004/11/21 17:00:00	10	0.02	96.10%	0.11
519	2006/12/17 03:00:00	2006/12/17 14:00:00	12	0.02	96.29%	0.11
520	2006/12/27 08:00:00	2006/12/27 17:00:00	10	0.02	96.47%	0.11
521	2007/02/22 22:00:00	2007/02/23 06:00:00	9	0.02	96.66%	0.11
522	1952/12/06 07:00:00	1952/12/06 08:00:00	2	0.01	96.85%	0.11
523	1964/03/02 14:00:00	1964/03/02 17:00:00	4	0.01	97.03%	0.11
524	1966/01/27 12:00:00	1966/01/27 18:00:00	7	0.01	97.22%	0.11
525	1967/11/26 19:00:00	1967/11/27 01:00:00	7	0.01	97.40%	0.11
526	1969/03/10 19:00:00	1969/03/10 23:00:00	5	0.01	97.59%	0.11
527	1972/10/20 02:00:00	1972/10/20 07:00:00	6	0.01	97.77%	0.11
528	1978/03/23 14:00:00	1978/03/23 19:00:00	6	0.01	97.96%	0.11
529	1984/01/16 09:00:00	1984/01/16 11:00:00	3	0.01	98.14%	0.11
530	1984/11/13 10:00:00	1984/11/13 13:00:00	4	0.01	98.33%	0.11
531	1994/12/25 05:00:00	1994/12/25 11:00:00	7	0.01	98.52%	0.11
532	1995/12/23 11:00:00	1995/12/23 16:00:00	6	0.01	98.70%	0.11
533	1999/01/20 17:00:00	1999/01/20 20:00:00	4	0.01	98.89%	0.11
534	1999/06/04 01:00:00	1999/06/04 06:00:00	6	0.01	99.07%	0.11
535	2004/12/08 09:00:00	2004/12/08 14:00:00	6	0.01	99.26%	0.11
536	2006/03/03 16:00:00	2006/03/03 20:00:00	5	0.01	99.44%	0.11
537	1969/03/13 06:00:00	1969/03/13 07:00:00	2	0	99.63%	0.11
538	1993/02/26 23:00:00	1993/02/26 23:00:00	1	0	99.81%	0.11
-End of Data-----------------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (25.45cfs)
Qlf (1.773cfs)
Flow Rate (cfs)
25
20
15
10
5
0.00
0.05
0.10
0.15
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 25.45 (cfs)
Flow Control Lower Limit: 1.773 (cfs)

post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
post-development time stamp: 3/16/2021 1:46:28 PM
Compared to:
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
pre-development time stamp: 3/19/2021 1:46:15 PM

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	1.77	0.19	0.19	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
1	2.01	0.18	0.17	FALSE	TRUE	FALSE	Pass: Post Duration <= 110% Pre Duration
2	2.25	0.17	0.16	FALSE	TRUE	FALSE	Pass: Post Duration <= 110% Pre Duration
3	2.49	0.16	0.15	FALSE	TRUE	FALSE	Pass: Post Duration <= 110% Pre Duration
4	2.73	0.14	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
5	2.97	0.13	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
6	3.21	0.12	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
7	3.45	0.11	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
8	3.69	0.10	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
9	3.93	0.10	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
10	4.16	0.09	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
11	4.40	0.09	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
12	4.64	0.08	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
13	4.88	0.08	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
14	5.12	0.07	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
15	5.36	0.07	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
16	5.60	0.06	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
17	5.84	0.06	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
18	6.08	0.06	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
19	6.32	0.05	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
20	6.56	0.05	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
21	6.80	0.04	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
22	7.03	0.04	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
23	7.27	0.04	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
24	7.51	0.04	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
25	7.75	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
26	7.99	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
27	8.23	0.03	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
28	8.47	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
29	8.71	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
30	8.95	0.03	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
31	9.19	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
32	9.43	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
33	9.67	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
34	9.90	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
35	10.14	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
36	10.38	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
37	10.62	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
38	10.86	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
39	11.10	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
40	11.34	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
41	11.58	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
42	11.82	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
43	12.06	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
44	12.30	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
45	12.54	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
46	12.77	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
47	13.01	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
48	13.25	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
49	13.49	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
50	13.73	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
51	13.97	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
52	14.21	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
53	14.45	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
54	14.69	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
55	14.93	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
56	15.17	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
57	15.41	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
58	15.64	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
59	15.88	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
60	16.12	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
61	16.36	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
62	16.60	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
63	16.84	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
64	17.08	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
65	17.32	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
66	17.56	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
67	17.80	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
68	18.04	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
69	18.28	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
70	18.51	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
71	18.75	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
72	18.99	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
73	19.23	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
74	19.47	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
75	19.71	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
76	19.95	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
77	20.19	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
78	20.43	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
79	20.67	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
80	20.91	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
81	21.15	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
82	21.38	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
83	21.62	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
84	21.86	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
85	22.10	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
86	22.34	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
87	22.58	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
88	22.82	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
89	23.06	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
90	23.30	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
91	23.54	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
92	23.78	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
93	24.02	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
94	24.25	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
95	24.49	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
96	24.73	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
97	24.97	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
98	25.21	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
99	25.45	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Duration Table Summary at Project Discharge Point

file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
time stamp: 3/19/2021 1:46:15 PM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	1.77	69	937	0.188
2	2.01	49	868	0.175
3	2.25	68	819	0.165
4	2.49	44	751	0.151
5	2.73	42	707	0.142
6	2.97	57	665	0.134
7	3.21	43	608	0.122
8	3.45	29	565	0.114
9	3.69	36	536	0.108
10	3.93	31	500	0.101
11	4.16	27	469	0.094
12	4.40	24	442	0.089
13	4.64	25	418	0.084
14	4.88	21	393	0.079
15	5.12	23	372	0.075
16	5.36	23	349	0.070
17	5.60	25	326	0.066
18	5.84	20	301	0.061
19	6.08	9	281	0.056
20	6.32	19	272	0.055
21	6.56	15	253	0.051
22	6.80	12	238	0.048
23	7.03	12	226	0.045
24	7.27	7	214	0.043
25	7.51	8	207	0.042
26	7.75	9	199	0.040
27	7.99	11	190	0.038
28	8.23	7	179	0.036
29	8.47	12	172	0.035
30	8.71	10	160	0.032
31	8.95	8	150	0.030
32	9.19	9	142	0.029
33	9.43	11	133	0.027
34	9.67	8	122	0.025
35	9.90	5	114	0.023
36	10.14	6	109	0.022
37	10.38	5	103	0.021
38	10.62	3	98	0.020
39	10.86	7	95	0.019
40	11.10	1	88	0.018
41	11.34	3	87	0.017
42	11.58	3	84	0.017
43	11.82	2	81	0.016
44	12.06	1	79	0.016
45	12.30	8	78	0.016
46	12.54	5	70	0.014
47	12.77	2	65	0.013
48	13.01	6	63	0.013
49	13.25	3	57	0.011
50	13.49	1	54	0.011
51	13.73	3	53	0.011

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	13.97	3	50	0.010
53	14.21	0	47	0.009
54	14.45	2	47	0.009
55	14.69	3	45	0.009
56	14.93	0	42	0.008
57	15.17	2	42	0.008
58	15.41	1	40	0.008
59	15.64	3	39	0.008
60	15.88	2	36	0.007
61	16.12	2	34	0.007
62	16.36	2	32	0.006
63	16.60	2	30	0.006
64	16.84	2	28	0.006
65	17.08	0	26	0.005
66	17.32	0	26	0.005
67	17.56	2	26	0.005
68	17.80	1	24	0.005
69	18.04	1	23	0.005
70	18.28	1	22	0.004
71	18.51	0	21	0.004
72	18.75	1	21	0.004
73	18.99	0	20	0.004
74	19.23	0	20	0.004
75	19.47	0	20	0.004
76	19.71	4	20	0.004
77	19.95	0	16	0.003
78	20.19	1	16	0.003
79	20.43	0	15	0.003
80	20.67	0	15	0.003
81	20.91	4	15	0.003
82	21.15	0	11	0.002
83	21.38	0	11	0.002
84	21.62	2	11	0.002
85	21.86	0	9	0.002
86	22.10	0	9	0.002
87	22.34	1	9	0.002
88	22.58	0	8	0.002
89	22.82	0	8	0.002
90	23.06	1	8	0.002
91	23.30	1	7	0.001
92	23.54	0	6	0.001
93	23.78	1	6	0.001
94	24.02	0	5	0.001
95	24.25	2	5	0.001
96	24.49	0	3	0.001
97	24.73	0	3	0.001
98	24.97	1	3	0.001
99	25.21	2	2	0.000
100	25.45	0	0	0.000
---------End of Data-----------------				

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out				
time stamp: 3/16/2021 1:46:28 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	1.77	66	969	0.195
2	2.01	53	903	0.182
3	2.25	54	850	0.171
4	2.49	78	796	0.160
5	2.73	73	718	0.144
6	2.97	51	645	0.130
7	3.21	50	594	0.119
8	3.45	39	544	0.109
9	3.69	28	505	0.102
10	3.93	27	477	0.096
11	4.16	22	450	0.090
12	4.40	18	428	0.086
13	4.64	23	410	0.082
14	4.88	28	387	0.078
15	5.12	20	359	0.072
16	5.36	19	339	0.068
17	5.60	22	320	0.064
18	5.84	22	298	0.060
19	6.08	28	276	0.055
20	6.32	15	248	0.050
21	6.56	19	233	0.047
22	6.80	14	214	0.043
23	7.03	12	200	0.040
24	7.27	7	188	0.038
25	7.51	8	181	0.036
26	7.75	9	173	0.035
27	7.99	8	164	0.033
28	8.23	9	156	0.031
29	8.47	6	147	0.030
30	8.71	12	141	0.028
31	8.95	9	129	0.026
32	9.19	13	120	0.024
33	9.43	3	107	0.022
34	9.67	8	104	0.021
35	9.90	6	96	0.019
36	10.14	4	90	0.018
37	10.38	1	86	0.017
38	10.62	2	85	0.017
39	10.86	3	83	0.017
40	11.10	3	80	0.016
41	11.34	2	77	0.015
42	11.58	2	75	0.015
43	11.82	4	73	0.015
44	12.06	3	69	0.014
45	12.30	5	66	0.013
46	12.54	3	61	0.012
47	12.77	6	58	0.012
48	13.01	3	52	0.010
49	13.25	6	49	0.010
50	13.49	4	43	0.009
51	13.73	0	39	0.008

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	13.97	1	39	0.008
53	14.21	1	38	0.008
54	14.45	3	37	0.007
55	14.69	4	34	0.007
56	14.93	1	30	0.006
57	15.17	2	29	0.006
58	15.41	1	27	0.005
59	15.64	0	26	0.005
60	15.88	0	26	0.005
61	16.12	2	26	0.005
62	16.36	1	24	0.005
63	16.60	0	23	0.005
64	16.84	0	23	0.005
65	17.08	2	23	0.005
66	17.32	2	21	0.004
67	17.56	0	19	0.004
68	17.80	0	19	0.004
69	18.04	0	19	0.004
70	18.28	0	19	0.004
71	18.51	0	19	0.004
72	18.75	2	19	0.004
73	18.99	0	17	0.003
74	19.23	1	17	0.003
75	19.47	1	16	0.003
76	19.71	1	15	0.003
77	19.95	1	14	0.003
78	20.19	0	13	0.003
79	20.43	4	13	0.003
80	20.67	0	9	0.002
81	20.91	0	9	0.002
82	21.15	1	9	0.002
83	21.38	0	8	0.002
84	21.62	1	8	0.002
85	21.86	0	7	0.001
86	22.10	0	7	0.001
87	22.34	0	7	0.001
88	22.58	0	7	0.001
89	22.82	1	7	0.001
90	23.06	0	6	0.001
91	23.30	1	6	0.001
92	23.54	0	5	0.001
93	23.78	1	5	0.001
94	24.02	2	4	0.001
95	24.25	1	2	0.000
96	24.49	0	1	0.000
97	24.73	0	1	0.000
98	24.97	0	1	0.000
99	25.21	1	1	0.000
100	25.45	0	0	0.000
---------End of Data-----------------				

END OF STATISTICS ANALYSIS

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC-3

ANALYSIS DETAILS

Stream Susceptibility to Channel Erosion: High
Low Flow Threshold = (0.1)Q2 = (0.1)2.300 = Qlf = 0.2300 (cfs)
Flow Control Upper Limit = Q10 = 3.000 (cfs)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM file time stamp: 3/12/2021 3:55:33 PM
Selected Node to Analyze: POC-3

POST-DEVELOPMENT MITIGATED SWMM FILE

SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM file time stamp: 3/16/2021 1:46:28 PM
Selected Node to Analyze: POC-3

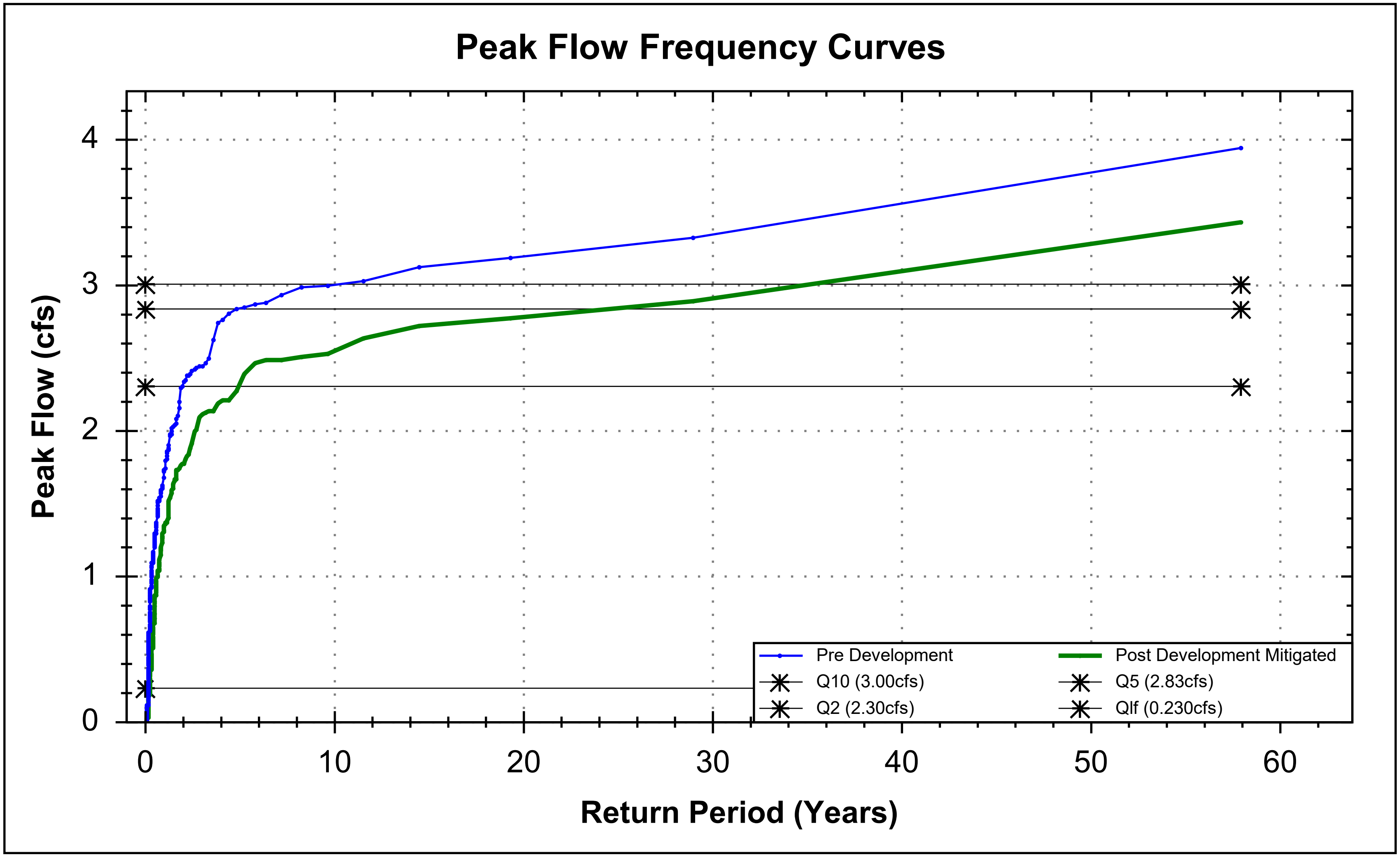
MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:

Peak Flow Conditions PASS
Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 401 points. Of the points, 1 point(s) are above the flow control upper limit (Q10 = 3.00 (cfs)), 178 point(s) are below the low flow threshold value (Qlf = 0.230 (cfs)). Of the points within the flow control range (Qlf to Q10), 222 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater discharge value. Within the flow control range, comparing the post-development flow duration curve to the pre-development flow duration curve, 100 post-development curve point(s) have a lower flow duration than pre-development conditions. These points all pass. There are no points that failed, therefore the flow duration requirements have been met.



Peak Flow Frequency Curves
Peak Flow (cfs)
Return Period (Years)
0
1
2
3
4
0
10
20
30
40
50
60
Pre Development
Post Development Mitigated
Q10 (3.00cfs)
Q5 (2.83cfs)
Q2 (2.30cfs)
Qlf (0.230cfs)

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 3.00 (cfs)
Flow Control Lower Limit: 0.230 (cfs)

post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
post-development time stamp: 3/16/2021 1:46:28 PM
Compared to:
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
pre-development time stamp: 3/12/2021 3:55:33 PM

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	58.00	3.43	3.94	FALSE	FALSE	FALSE	Pass- Qpost Above Q10 (3.00 (cfs))
1	29.00	2.89	3.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
2	19.33	2.77	3.18	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
3	14.50	2.71	3.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
4	11.60	2.63	3.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
5	9.67	2.52	2.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
6	8.29	2.50	2.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
7	7.25	2.48	2.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
8	6.44	2.48	2.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	5.80	2.46	2.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	5.27	2.39	2.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	4.83	2.27	2.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	4.46	2.21	2.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	4.14	2.21	2.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.87	2.18	2.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	3.63	2.13	2.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	3.41	2.13	2.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	3.22	2.12	2.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	3.05	2.11	2.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.90	2.09	2.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.76	2.00	2.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.64	1.99	2.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	2.52	1.91	2.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	2.42	1.88	2.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	2.32	1.83	2.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	2.23	1.82	2.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	2.15	1.80	2.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	2.07	1.77	2.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	2.00	1.77	2.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.93	1.76	2.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.87	1.74	2.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.81	1.74	2.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
32	1.76	1.73	2.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.71	1.73	2.08	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
34	1.66	1.66	2.05	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.61	1.66	2.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.57	1.65	2.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.53	1.63	2.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.49	1.60	2.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.45	1.59	2.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.42	1.57	1.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.38	1.57	1.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.35	1.54	1.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.32	1.53	1.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.29	1.51	1.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	1.26	1.51	1.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	1.23	1.40	1.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	1.21	1.38	1.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	1.18	1.38	1.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	1.16	1.37	1.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	1.14	1.37	1.80	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	1.12	1.36	1.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	1.09	1.36	1.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	1.07	1.36	1.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
54	1.06	1.35	1.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
55	1.04	1.34	1.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
56	1.02	1.33	1.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
57	1.00	1.31	1.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
58	0.98	1.30	1.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
59	0.97	1.29	1.62	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
60	0.95	1.27	1.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
61	0.94	1.27	1.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
62	0.92	1.27	1.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
63	0.91	1.26	1.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
64	0.89	1.23	1.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
65	0.88	1.19	1.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
66	0.87	1.18	1.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
67	0.85	1.17	1.58	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
68	0.84	1.17	1.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
69	0.83	1.14	1.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
70	0.82	1.14	1.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
71	0.81	1.11	1.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
72	0.80	1.09	1.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
73	0.78	1.09	1.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
74	0.77	1.08	1.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
75	0.76	1.07	1.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
76	0.75	1.05	1.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
77	0.74	1.04	1.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
78	0.73	1.04	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
79	0.73	1.03	1.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
80	0.72	1.03	1.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
81	0.71	1.02	1.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
82	0.70	1.02	1.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
83	0.69	1.02	1.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
84	0.68	1.00	1.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
85	0.67	0.99	1.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
86	0.67	0.99	1.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
87	0.66	0.99	1.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
88	0.65	0.99	1.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
89	0.64	0.98	1.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
90	0.64	0.96	1.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
91	0.63	0.95	1.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
92	0.62	0.94	1.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
93	0.62	0.93	1.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
94	0.61	0.93	1.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
95	0.60	0.93	1.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
96	0.60	0.92	1.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
97	0.59	0.91	1.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
98	0.59	0.90	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
99	0.58	0.90	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
100	0.57	0.90	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
101	0.57	0.89	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
102	0.56	0.86	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
103	0.56	0.86	1.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
104	0.55	0.86	1.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
105	0.55	0.85	1.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
106	0.54	0.84	1.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
107	0.54	0.82	1.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
108	0.53	0.82	1.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
109	0.53	0.81	1.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
110	0.52	0.81	1.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
111	0.52	0.81	1.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
112	0.51	0.81	1.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
113	0.51	0.79	1.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
114	0.50	0.79	1.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
115	0.50	0.74	1.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
116	0.50	0.74	1.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
117	0.49	0.71	1.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
118	0.49	0.71	1.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
119	0.48	0.67	1.19	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
120	0.48	0.67	1.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
121	0.48	0.66	1.16	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
122	0.47	0.66	1.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
123	0.47	0.66	1.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
124	0.46	0.64	1.15	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
125	0.46	0.64	1.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
126	0.46	0.63	1.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
127	0.45	0.62	1.14	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
128	0.45	0.61	1.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
129	0.45	0.61	1.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
130	0.44	0.61	1.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
131	0.44	0.61	1.13	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
132	0.44	0.61	1.12	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
133	0.43	0.60	1.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
134	0.43	0.58	1.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
135	0.43	0.57	1.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
136	0.42	0.57	1.11	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
137	0.42	0.56	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
138	0.42	0.56	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
139	0.41	0.55	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
140	0.41	0.54	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
141	0.41	0.53	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
142	0.41	0.51	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
143	0.40	0.51	1.10	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
144	0.40	0.50	1.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
145	0.40	0.50	1.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
146	0.40	0.50	1.09	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
147	0.39	0.49	1.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
148	0.39	0.46	1.07	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
149	0.39	0.46	1.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
150	0.38	0.45	1.06	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
151	0.38	0.45	1.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
152	0.38	0.44	1.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
153	0.38	0.44	1.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
154	0.37	0.43	1.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
155	0.37	0.43	1.04	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
156	0.37	0.43	1.03	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
157	0.37	0.43	1.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
158	0.37	0.43	1.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
159	0.36	0.42	1.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
160	0.36	0.41	1.02	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
161	0.36	0.41	1.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
162	0.36	0.41	1.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
163	0.35	0.41	1.01	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
164	0.35	0.40	1.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
165	0.35	0.40	1.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
166	0.35	0.40	1.00	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
167	0.35	0.39	0.99	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
168	0.34	0.39	0.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
169	0.34	0.39	0.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
170	0.34	0.38	0.97	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
171	0.34	0.38	0.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
172	0.34	0.38	0.96	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
173	0.33	0.38	0.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
174	0.33	0.37	0.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
175	0.33	0.37	0.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
176	0.33	0.37	0.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
177	0.33	0.37	0.95	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
178	0.32	0.37	0.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
179	0.32	0.36	0.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
180	0.32	0.35	0.93	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
181	0.32	0.35	0.92	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
182	0.32	0.34	0.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
183	0.32	0.34	0.91	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
184	0.31	0.34	0.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
185	0.31	0.33	0.90	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
186	0.31	0.33	0.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
187	0.31	0.33	0.89	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
188	0.31	0.33	0.88	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
189	0.31	0.32	0.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
190	0.30	0.31	0.87	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
191	0.30	0.31	0.86	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
192	0.30	0.31	0.85	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
193	0.30	0.29	0.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
194	0.30	0.29	0.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
195	0.30	0.29	0.84	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
196	0.29	0.28	0.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
197	0.29	0.28	0.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
198	0.29	0.28	0.82	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
199	0.29	0.28	0.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
200	0.29	0.27	0.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
201	0.29	0.27	0.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
202	0.29	0.27	0.78	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
203	0.28	0.27	0.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
204	0.28	0.27	0.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
205	0.28	0.27	0.75	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
206	0.28	0.26	0.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
207	0.28	0.26	0.74	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
208	0.28	0.26	0.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
209	0.28	0.26	0.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
210	0.28	0.25	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
211	0.27	0.25	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
212	0.27	0.25	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
213	0.27	0.25	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
214	0.27	0.25	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
215	0.27	0.24	0.72	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
216	0.27	0.24	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
217	0.27	0.24	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
218	0.27	0.24	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
219	0.26	0.24	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
220	0.26	0.23	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
221	0.26	0.23	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
222	0.26	0.23	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
223	0.26	0.22	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
224	0.26	0.22	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
225	0.26	0.22	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
226	0.26	0.22	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
227	0.25	0.22	0.69	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
228	0.25	0.21	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
229	0.25	0.21	0.68	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
230	0.25	0.21	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
231	0.25	0.21	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
232	0.25	0.21	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
233	0.25	0.21	0.66	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
234	0.25	0.20	0.65	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
235	0.25	0.20	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
236	0.25	0.20	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
237	0.24	0.20	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
238	0.24	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
239	0.24	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
240	0.24	0.19	0.64	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
241	0.24	0.19	0.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
242	0.24	0.18	0.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
243	0.24	0.18	0.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
244	0.24	0.18	0.63	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
245	0.24	0.18	0.62	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
246	0.24	0.16	0.61	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
247	0.23	0.15	0.61	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
248	0.23	0.15	0.60	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
249	0.23	0.15	0.60	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
250	0.23	0.15	0.59	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
251	0.23	0.15	0.59	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
252	0.23	0.15	0.58	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
253	0.23	0.14	0.58	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
254	0.23	0.14	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
255	0.23	0.13	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
256	0.23	0.13	0.57	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
257	0.23	0.12	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
258	0.22	0.11	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
259	0.22	0.11	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
260	0.22	0.11	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
261	0.22	0.11	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
262	0.22	0.10	0.56	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
263	0.22	0.10	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
264	0.22	0.10	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
265	0.22	0.10	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
266	0.22	0.10	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
267	0.22	0.09	0.55	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
268	0.22	0.09	0.54	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
269	0.21	0.09	0.53	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
270	0.21	0.09	0.52	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
271	0.21	0.09	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
272	0.21	0.08	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
273	0.21	0.08	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
274	0.21	0.08	0.51	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
275	0.21	0.08	0.50	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
276	0.21	0.07	0.50	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
277	0.21	0.07	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
278	0.21	0.07	0.49	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
279	0.21	0.07	0.48	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
280	0.21	0.06	0.48	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
281	0.21	0.06	0.48	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
282	0.20	0.06	0.48	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
283	0.20	0.06	0.47	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
284	0.20	0.05	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
285	0.20	0.05	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
286	0.20	0.05	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
287	0.20	0.05	0.46	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
288	0.20	0.05	0.44	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
289	0.20	0.05	0.44	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
290	0.20	0.05	0.43	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
291	0.20	0.05	0.42	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
292	0.19	0.05	0.42	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
293	0.19	0.05	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
294	0.19	0.05	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
295	0.19	0.05	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
296	0.19	0.05	0.41	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
297	0.19	0.05	0.39	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
298	0.19	0.05	0.39	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
299	0.19	0.05	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
300	0.19	0.05	0.37	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
301	0.19	0.05	0.35	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
302	0.18	0.04	0.34	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
303	0.18	0.04	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
304	0.18	0.04	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
305	0.18	0.04	0.33	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
306	0.18	0.04	0.32	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
307	0.18	0.04	0.31	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
308	0.18	0.04	0.31	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
309	0.18	0.04	0.30	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
310	0.18	0.04	0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
311	0.18	0.04	0.29	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
312	0.17	0.04	0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
313	0.17	0.04	0.27	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
314	0.17	0.04	0.26	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
315	0.17	0.04	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
316	0.17	0.04	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
317	0.17	0.04	0.25	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
318	0.17	0.04	0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
319	0.17	0.04	0.23	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
320	0.17	0.04	0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
321	0.17	0.04	0.22	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
322	0.16	0.03	0.21	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
323	0.16	0.03	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
324	0.16	0.03	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
325	0.16	0.03	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
326	0.16	0.03	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
327	0.16	0.03	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
328	0.16	0.03	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
329	0.16	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
330	0.16	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
331	0.16	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
332	0.15	0.03	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
333	0.15	0.03	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
334	0.15	0.03	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
335	0.15	0.03	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
336	0.15	0.03	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
337	0.15	0.03	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
338	0.15	0.03	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
339	0.15	0.03	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
340	0.15	0.03	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
341	0.15	0.03	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
342	0.14	0.03	0.05	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
343	0.14	0.03	0.04	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
344	0.14	0.03	0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
345	0.14	0.03	0.03	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
346	0.14	0.03	0.02	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
347	0.14	0.03	0.01	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
348	0.14	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
349	0.14	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
350	0.14	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
351	0.14	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
352	0.13	0.03	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
353	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
354	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
355	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
356	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
357	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
358	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
359	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
360	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
361	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
362	0.13	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
363	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
364	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
365	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
366	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
367	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
368	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
369	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
370	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
371	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
372	0.12	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
373	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
374	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
375	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
376	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
377	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
378	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
379	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
380	0.11	0.02	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
381	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
382	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
383	0.11	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
384	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
385	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
386	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
387	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
388	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
389	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
390	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
391	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
392	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
393	0.10	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
394	0.09	0.01	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
395	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
396	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
397	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
398	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
399	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))
400	0.09	0.00	0.00	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.230 (cfs))

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM.out time stamp: 3/12/2021 3:55:33 PM

Q10: 3.000 (cfs)
Q5: 2.830 (cfs)
Q2: 2.300 (cfs)

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/04 15:00:00	1995/01/04 22:00:00	8	3.94	0.24%	58
2	2003/02/25 14:00:00	2003/02/26 00:00:00	11	3.32	0.47%	29
3	1958/02/03 04:00:00	1958/02/04 14:00:00	35	3.18	0.71%	19.33
4	1969/02/23 23:00:00	1969/02/25 20:00:00	46	3.12	0.94%	14.5
5	2000/10/29 22:00:00	2000/10/30 00:00:00	3	3.02	1.18%	11.6
6	2004/10/27 02:00:00	2004/10/27 11:00:00	10	2.99	1.42%	9.67
7	1993/01/12 19:00:00	1993/01/14 06:00:00	36	2.98	1.65%	8.29
8	2005/02/18 05:00:00	2005/02/19 00:00:00	20	2.93	1.89%	7.25
9	1980/02/17 21:00:00	1980/02/21 07:00:00	83	2.87	2.12%	6.44
10	1952/01/16 07:00:00	1952/01/16 16:00:00	10	2.86	2.36%	5.8
11	1978/01/03 20:00:00	1978/01/04 18:00:00	23	2.84	2.59%	5.27
12	1978/02/27 23:00:00	1978/03/01 09:00:00	35	2.83	2.83%	4.83
13	1979/01/15 13:00:00	1979/01/15 19:00:00	7	2.8	3.07%	4.46
14	1958/04/01 12:00:00	1958/04/01 21:00:00	10	2.76	3.30%	4.14
15	1982/03/17 03:00:00	1982/03/18 03:00:00	25	2.74	3.54%	3.87
16	1980/03/02 20:00:00	1980/03/03 11:00:00	16	2.62	3.77%	3.63
17	1970/12/19 02:00:00	1970/12/19 22:00:00	21	2.49	4.01%	3.41
18	1978/02/07 17:00:00	1978/02/10 06:00:00	62	2.46	4.25%	3.22
19	1983/01/29 00:00:00	1983/01/29 04:00:00	5	2.44	4.48%	3.05
20	1998/02/03 14:00:00	1998/02/04 01:00:00	12	2.44	4.72%	2.9
21	1985/11/11 09:00:00	1985/11/11 13:00:00	5	2.43	4.95%	2.76
22	1965/11/22 08:00:00	1965/11/23 05:00:00	22	2.42	5.19%	2.64
23	2008/01/27 00:00:00	2008/01/27 22:00:00	23	2.41	5.42%	2.52
24	1993/02/18 12:00:00	1993/02/18 12:00:00	1	2.39	5.66%	2.42
25	1980/02/16 18:00:00	1980/02/16 20:00:00	3	2.38	5.90%	2.32
26	1991/12/29 15:00:00	1991/12/30 03:00:00	13	2.37	6.13%	2.23
27	1952/11/15 13:00:00	1952/11/15 14:00:00	2	2.34	6.37%	2.15
28	1983/02/27 16:00:00	1983/02/27 17:00:00	2	2.33	6.60%	2.07
29	1998/02/22 15:00:00	1998/02/24 01:00:00	35	2.3	6.84%	2
30	2004/10/20 09:00:00	2004/10/20 15:00:00	7	2.29	7.08%	1.93
31	1994/02/03 23:00:00	1994/02/04 11:00:00	13	2.19	7.31%	1.87
32	1998/02/16 17:00:00	1998/02/18 00:00:00	32	2.15	7.55%	1.81
33	1993/01/15 12:00:00	1993/01/18 16:00:00	77	2.1	7.78%	1.76
34	1961/12/02 01:00:00	1961/12/02 14:00:00	14	2.08	8.02%	1.71
35	1963/03/16 23:00:00	1963/03/17 03:00:00	5	2.05	8.25%	1.66
36	1978/01/16 17:00:00	1978/01/17 03:00:00	11	2.03	8.49%	1.61
37	1995/03/11 01:00:00	1995/03/12 00:00:00	24	2.03	8.73%	1.57
38	1982/12/22 23:00:00	1982/12/22 23:00:00	1	2.02	8.96%	1.53
39	2008/01/05 04:00:00	2008/01/07 01:00:00	46	2.02	9.20%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1986/03/15 21:00:00	1986/03/16 20:00:00	24	2.01	9.43%	1.45
41	1992/02/12 17:00:00	1992/02/13 07:00:00	15	1.99	9.67%	1.42
42	1980/01/28 19:00:00	1980/01/30 16:00:00	46	1.97	9.91%	1.38
43	1991/02/27 18:00:00	1991/03/01 11:00:00	42	1.97	10.14%	1.35
44	1986/02/14 23:00:00	1986/02/15 06:00:00	8	1.96	10.38%	1.32
45	2005/04/28 08:00:00	2005/04/28 09:00:00	2	1.9	10.61%	1.29
46	1972/01/16 20:00:00	1972/01/16 23:00:00	4	1.88	10.85%	1.26
47	1981/03/19 19:00:00	1981/03/19 21:00:00	3	1.86	11.08%	1.23
48	2008/02/22 02:00:00	2008/02/22 09:00:00	8	1.85	11.32%	1.21
49	1998/02/14 16:00:00	1998/02/14 21:00:00	6	1.84	11.56%	1.18
50	1993/02/08 00:00:00	1993/02/08 11:00:00	12	1.82	11.79%	1.16
51	2001/01/26 16:00:00	2001/01/27 01:00:00	10	1.8	12.03%	1.14
52	1960/04/27 07:00:00	1960/04/27 11:00:00	5	1.79	12.26%	1.12
53	1968/12/25 18:00:00	1968/12/25 22:00:00	5	1.79	12.50%	1.09
54	1969/02/06 08:00:00	1969/02/06 17:00:00	10	1.74	12.74%	1.07
55	2007/01/30 23:00:00	2007/01/30 23:00:00	1	1.74	12.97%	1.06
56	1983/10/01 01:00:00	1983/10/01 03:00:00	3	1.73	13.21%	1.04
57	1983/12/24 18:00:00	1983/12/25 11:00:00	18	1.73	13.44%	1.02
58	1977/08/17 01:00:00	1977/08/17 10:00:00	10	1.72	13.68%	1
59	2004/12/31 14:00:00	2004/12/31 15:00:00	2	1.67	13.92%	0.98
60	1979/11/07 18:00:00	1979/11/07 19:00:00	2	1.62	14.15%	0.97
61	1952/03/15 20:00:00	1952/03/16 19:00:00	24	1.61	14.39%	0.95
62	1980/01/10 23:00:00	1980/01/12 13:00:00	39	1.6	14.62%	0.94
63	1992/02/15 12:00:00	1992/02/15 17:00:00	6	1.6	14.86%	0.92
64	2003/02/11 17:00:00	2003/02/12 19:00:00	27	1.6	15.09%	0.91
65	2005/02/21 03:00:00	2005/02/23 07:00:00	53	1.6	15.33%	0.89
66	2005/01/11 00:00:00	2005/01/11 08:00:00	9	1.59	15.57%	0.88
67	1978/01/14 16:00:00	1978/01/15 06:00:00	15	1.58	15.80%	0.87
68	1991/03/25 06:00:00	1991/03/27 06:00:00	49	1.58	16.04%	0.85
69	1983/01/27 07:00:00	1983/01/27 14:00:00	8	1.57	16.27%	0.84
70	1977/12/28 19:00:00	1977/12/30 03:00:00	33	1.55	16.51%	0.83
71	1988/12/24 20:00:00	1988/12/25 00:00:00	5	1.55	16.75%	0.82
72	1958/02/19 12:00:00	1958/02/19 15:00:00	4	1.54	16.98%	0.81
73	1980/01/09 04:00:00	1980/01/09 18:00:00	15	1.54	17.22%	0.8
74	1997/01/12 16:00:00	1997/01/13 07:00:00	16	1.54	17.45%	0.78
75	1963/09/18 18:00:00	1963/09/18 22:00:00	5	1.53	17.69%	0.77
76	1978/09/05 18:00:00	1978/09/05 19:00:00	2	1.53	17.92%	0.76
77	1967/12/18 17:00:00	1967/12/19 12:00:00	20	1.52	18.16%	0.75
78	1983/03/01 13:00:00	1983/03/04 05:00:00	65	1.52	18.40%	0.74
79	1979/01/05 07:00:00	1979/01/06 07:00:00	25	1.51	18.63%	0.73
80	1983/11/24 22:00:00	1983/11/25 01:00:00	4	1.51	18.87%	0.73
81	2001/02/13 17:00:00	2001/02/14 20:00:00	28	1.5	19.10%	0.72
82	1971/12/24 07:00:00	1971/12/24 23:00:00	17	1.48	19.34%	0.71
83	1965/12/10 06:00:00	1965/12/10 10:00:00	5	1.46	19.58%	0.7
84	1988/11/25 07:00:00	1988/11/25 10:00:00	4	1.45	19.81%	0.69
85	1962/01/20 13:00:00	1962/01/20 20:00:00	8	1.44	20.05%	0.68
86	2004/02/22 07:00:00	2004/02/23 07:00:00	25	1.44	20.28%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1968/03/08 04:00:00	1968/03/08 12:00:00	9	1.43	20.52%	0.67
88	1993/02/19 19:00:00	1993/02/19 23:00:00	5	1.42	20.75%	0.66
89	2005/01/09 04:00:00	2005/01/09 22:00:00	19	1.41	20.99%	0.65
90	1990/02/17 16:00:00	1990/02/17 19:00:00	4	1.37	21.23%	0.64
91	1999/01/26 22:00:00	1999/01/26 23:00:00	2	1.35	21.46%	0.64
92	2002/11/08 17:00:00	2002/11/08 18:00:00	2	1.35	21.70%	0.63
93	1995/01/10 14:00:00	1995/01/12 15:00:00	50	1.34	21.93%	0.62
94	1973/11/22 23:00:00	1973/11/23 01:00:00	3	1.33	22.17%	0.62
95	2001/01/11 04:00:00	2001/01/12 12:00:00	33	1.33	22.41%	0.61
96	2006/10/14 01:00:00	2006/10/14 01:00:00	1	1.33	22.64%	0.6
97	1988/01/17 10:00:00	1988/01/17 12:00:00	3	1.31	22.88%	0.6
98	1994/03/24 22:00:00	1994/03/25 01:00:00	4	1.31	23.11%	0.59
99	1952/12/02 01:00:00	1952/12/02 02:00:00	2	1.29	23.35%	0.59
100	1959/12/24 10:00:00	1959/12/24 14:00:00	5	1.29	23.58%	0.58
101	1960/01/12 03:00:00	1960/01/12 07:00:00	5	1.29	23.82%	0.57
102	1975/04/08 08:00:00	1975/04/09 00:00:00	17	1.29	24.06%	0.57
103	1992/03/20 22:00:00	1992/03/20 23:00:00	2	1.29	24.29%	0.56
104	2003/03/15 17:00:00	2003/03/16 17:00:00	25	1.29	24.53%	0.56
105	1986/11/18 03:00:00	1986/11/18 07:00:00	5	1.28	24.76%	0.55
106	1954/02/13 19:00:00	1954/02/13 22:00:00	4	1.27	25.00%	0.55
107	2004/12/28 09:00:00	2004/12/29 09:00:00	25	1.26	25.24%	0.54
108	1957/01/13 04:00:00	1957/01/13 09:00:00	6	1.25	25.47%	0.54
109	1976/09/10 05:00:00	1976/09/10 23:00:00	19	1.24	25.71%	0.53
110	1981/11/28 03:00:00	1981/11/28 21:00:00	19	1.24	25.94%	0.53
111	1960/02/01 22:00:00	1960/02/02 01:00:00	4	1.23	26.18%	0.52
112	1967/11/30 16:00:00	1967/11/30 17:00:00	2	1.23	26.42%	0.52
113	2004/02/26 03:00:00	2004/02/26 09:00:00	7	1.23	26.65%	0.51
114	2007/11/30 08:00:00	2007/11/30 21:00:00	14	1.23	26.89%	0.51
115	1991/03/19 00:00:00	1991/03/19 04:00:00	5	1.22	27.12%	0.5
116	1959/02/11 09:00:00	1959/02/11 12:00:00	4	1.21	27.36%	0.5
117	1958/03/15 19:00:00	1958/03/16 12:00:00	18	1.2	27.59%	0.5
118	1967/01/22 17:00:00	1967/01/23 00:00:00	8	1.19	27.83%	0.49
119	1978/03/30 15:00:00	1978/03/31 05:00:00	15	1.19	28.07%	0.49
120	2005/01/03 06:00:00	2005/01/04 11:00:00	30	1.19	28.30%	0.48
121	1963/11/20 03:00:00	1963/11/21 07:00:00	29	1.16	28.54%	0.48
122	1995/03/05 07:00:00	1995/03/05 23:00:00	17	1.16	28.77%	0.48
123	1954/01/18 23:00:00	1954/01/19 22:00:00	24	1.15	29.01%	0.47
124	1966/12/05 02:00:00	1966/12/05 13:00:00	12	1.15	29.25%	0.47
125	1995/01/25 08:00:00	1995/01/26 10:00:00	27	1.15	29.48%	0.46
126	1977/01/02 23:00:00	1977/01/03 05:00:00	7	1.14	29.72%	0.46
127	2001/02/25 16:00:00	2001/02/27 19:00:00	52	1.14	29.95%	0.46
128	2002/12/20 16:00:00	2002/12/20 22:00:00	7	1.14	30.19%	0.45
129	1964/11/17 16:00:00	1964/11/17 19:00:00	4	1.13	30.42%	0.45
130	1966/02/07 22:00:00	1966/02/08 00:00:00	3	1.13	30.66%	0.45
131	1988/04/20 07:00:00	1988/04/21 07:00:00	25	1.13	30.90%	0.44
132	1997/01/15 15:00:00	1997/01/15 19:00:00	5	1.13	31.13%	0.44
133	2003/04/14 14:00:00	2003/04/15 00:00:00	11	1.12	31.37%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1967/03/13 11:00:00	1967/03/13 21:00:00	11	1.11	31.60%	0.43
135	1978/02/12 17:00:00	1978/02/14 00:00:00	32	1.11	31.84%	0.43
136	1983/03/24 03:00:00	1983/03/24 06:00:00	4	1.11	32.08%	0.43
137	1983/04/20 03:00:00	1983/04/20 06:00:00	4	1.11	32.31%	0.42
138	1957/05/11 01:00:00	1957/05/11 03:00:00	3	1.1	32.55%	0.42
139	1958/03/20 22:00:00	1958/03/22 07:00:00	34	1.1	32.78%	0.42
140	1972/11/16 11:00:00	1972/11/17 07:00:00	21	1.1	33.02%	0.41
141	1973/03/20 08:00:00	1973/03/20 11:00:00	4	1.1	33.25%	0.41
142	1985/11/29 06:00:00	1985/11/29 14:00:00	9	1.1	33.49%	0.41
143	1987/12/16 15:00:00	1987/12/17 10:00:00	20	1.1	33.73%	0.41
144	1993/11/30 04:00:00	1993/11/30 04:00:00	1	1.1	33.96%	0.4
145	1956/01/25 17:00:00	1956/01/27 09:00:00	41	1.09	34.20%	0.4
146	1988/12/21 03:00:00	1988/12/21 07:00:00	5	1.09	34.43%	0.4
147	1996/11/21 16:00:00	1996/11/22 03:00:00	12	1.09	34.67%	0.4
148	1958/01/25 04:00:00	1958/01/25 05:00:00	2	1.07	34.91%	0.39
149	1967/11/19 08:00:00	1967/11/19 18:00:00	11	1.07	35.14%	0.39
150	1980/03/05 23:00:00	1980/03/06 12:00:00	14	1.06	35.38%	0.39
151	2006/03/11 07:00:00	2006/03/11 08:00:00	2	1.06	35.61%	0.38
152	1972/11/14 14:00:00	1972/11/14 16:00:00	3	1.04	35.85%	0.38
153	1978/01/09 16:00:00	1978/01/11 00:00:00	33	1.04	36.08%	0.38
154	1980/02/14 00:00:00	1980/02/15 02:00:00	27	1.04	36.32%	0.38
155	1982/01/01 07:00:00	1982/01/02 09:00:00	27	1.04	36.56%	0.37
156	2005/01/07 13:00:00	2005/01/07 20:00:00	8	1.04	36.79%	0.37
157	2004/10/18 07:00:00	2004/10/18 07:00:00	1	1.03	37.03%	0.37
158	1965/04/08 14:00:00	1965/04/10 00:00:00	35	1.02	37.26%	0.37
159	1965/11/16 13:00:00	1965/11/16 18:00:00	6	1.02	37.50%	0.37
160	1985/11/25 01:00:00	1985/11/25 05:00:00	5	1.02	37.74%	0.36
161	1992/12/07 10:00:00	1992/12/07 16:00:00	7	1.02	37.97%	0.36
162	1960/02/29 06:00:00	1960/03/01 06:00:00	25	1.01	38.21%	0.36
163	1979/03/17 05:00:00	1979/03/17 05:00:00	1	1.01	38.44%	0.36
164	1998/01/29 17:00:00	1998/01/29 20:00:00	4	1.01	38.68%	0.35
165	1955/01/18 15:00:00	1955/01/18 19:00:00	5	1	38.92%	0.35
166	1991/03/20 07:00:00	1991/03/21 10:00:00	28	1	39.15%	0.35
167	1998/02/07 17:00:00	1998/02/08 22:00:00	30	1	39.39%	0.35
168	1952/11/30 01:00:00	1952/11/30 04:00:00	4	0.99	39.62%	0.35
169	1969/01/24 07:00:00	1969/01/26 20:00:00	62	0.97	39.86%	0.34
170	1981/01/29 18:00:00	1981/01/29 19:00:00	2	0.97	40.09%	0.34
171	1982/12/07 22:00:00	1982/12/08 00:00:00	3	0.97	40.33%	0.34
172	1957/02/28 23:00:00	1957/03/01 11:00:00	13	0.96	40.57%	0.34
173	1990/01/17 00:00:00	1990/01/17 03:00:00	4	0.96	40.80%	0.34
174	1955/01/10 10:00:00	1955/01/10 11:00:00	2	0.95	41.04%	0.33
175	1957/01/28 03:00:00	1957/01/29 19:00:00	41	0.95	41.27%	0.33
176	1967/04/11 08:00:00	1967/04/11 10:00:00	3	0.95	41.51%	0.33
177	1973/02/15 11:00:00	1973/02/15 13:00:00	3	0.95	41.75%	0.33
178	1987/10/12 10:00:00	1987/10/12 15:00:00	6	0.95	41.98%	0.33
179	1956/04/12 23:00:00	1956/04/13 17:00:00	19	0.93	42.22%	0.32
180	1958/04/03 09:00:00	1958/04/03 12:00:00	4	0.93	42.45%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1960/01/14 17:00:00	1960/01/14 21:00:00	5	0.93	42.69%	0.32
182	1964/01/21 07:00:00	1964/01/22 09:00:00	27	0.92	42.92%	0.32
183	1985/12/11 04:00:00	1985/12/11 06:00:00	3	0.91	43.16%	0.32
184	2001/12/09 17:00:00	2001/12/09 20:00:00	4	0.91	43.40%	0.32
185	1970/02/28 13:00:00	1970/03/02 04:00:00	40	0.9	43.63%	0.31
186	2000/03/05 17:00:00	2000/03/05 21:00:00	5	0.9	43.87%	0.31
187	1986/09/25 02:00:00	1986/09/25 05:00:00	4	0.89	44.10%	0.31
188	1993/01/06 03:00:00	1993/01/08 01:00:00	47	0.89	44.34%	0.31
189	1954/11/11 02:00:00	1954/11/11 10:00:00	9	0.88	44.58%	0.31
190	1958/04/06 17:00:00	1958/04/07 15:00:00	23	0.87	44.81%	0.31
191	1965/04/03 05:00:00	1965/04/03 06:00:00	2	0.87	45.05%	0.3
192	1973/02/13 00:00:00	1973/02/13 04:00:00	5	0.86	45.28%	0.3
193	1979/03/19 03:00:00	1979/03/20 03:00:00	25	0.85	45.52%	0.3
194	1952/01/17 21:00:00	1952/01/18 08:00:00	12	0.84	45.75%	0.3
195	1975/03/08 09:00:00	1975/03/08 09:00:00	1	0.84	45.99%	0.3
196	2003/12/25 18:00:00	2003/12/25 19:00:00	2	0.84	46.23%	0.3
197	1951/12/29 23:00:00	1951/12/30 14:00:00	16	0.83	46.46%	0.29
198	1976/07/22 11:00:00	1976/07/22 13:00:00	3	0.83	46.70%	0.29
199	1970/12/21 08:00:00	1970/12/21 09:00:00	2	0.82	46.93%	0.29
200	1952/03/07 14:00:00	1952/03/08 10:00:00	21	0.79	47.17%	0.29
201	1951/11/23 05:00:00	1951/11/23 06:00:00	2	0.78	47.41%	0.29
202	1958/01/26 09:00:00	1958/01/26 10:00:00	2	0.78	47.64%	0.29
203	1991/01/09 14:00:00	1991/01/09 15:00:00	2	0.78	47.88%	0.29
204	1960/11/05 20:00:00	1960/11/06 12:00:00	17	0.77	48.11%	0.28
205	1967/11/21 12:00:00	1967/11/21 14:00:00	3	0.77	48.35%	0.28
206	1974/12/04 09:00:00	1974/12/04 09:00:00	1	0.75	48.58%	0.28
207	1977/01/05 19:00:00	1977/01/07 07:00:00	37	0.74	48.82%	0.28
208	1992/01/07 19:00:00	1992/01/07 23:00:00	5	0.74	49.06%	0.28
209	1976/02/06 04:00:00	1976/02/06 06:00:00	3	0.73	49.29%	0.28
210	1976/07/08 13:00:00	1976/07/08 14:00:00	2	0.73	49.53%	0.28
211	1962/03/19 00:00:00	1962/03/19 03:00:00	4	0.72	49.76%	0.28
212	1981/03/01 11:00:00	1981/03/02 13:00:00	27	0.72	50.00%	0.27
213	1992/01/05 09:00:00	1992/01/06 04:00:00	20	0.72	50.24%	0.27
214	1993/01/31 00:00:00	1993/01/31 00:00:00	1	0.72	50.47%	0.27
215	1994/02/17 11:00:00	1994/02/17 12:00:00	2	0.72	50.71%	0.27
216	2001/11/24 17:00:00	2001/11/24 20:00:00	4	0.72	50.94%	0.27
217	1973/03/11 12:00:00	1973/03/12 09:00:00	22	0.71	51.18%	0.27
218	1998/05/12 17:00:00	1998/05/12 20:00:00	4	0.71	51.42%	0.27
219	2007/04/20 15:00:00	2007/04/20 15:00:00	1	0.71	51.65%	0.27
220	1965/12/29 19:00:00	1965/12/29 20:00:00	2	0.7	51.89%	0.26
221	1973/03/08 12:00:00	1973/03/08 15:00:00	4	0.7	52.12%	0.26
222	1995/01/07 15:00:00	1995/01/08 06:00:00	16	0.7	52.36%	0.26
223	1997/01/25 20:00:00	1997/01/26 07:00:00	12	0.7	52.59%	0.26
224	1966/12/06 19:00:00	1966/12/06 21:00:00	3	0.69	52.83%	0.26
225	1978/03/11 21:00:00	1978/03/12 11:00:00	15	0.69	53.07%	0.26
226	1982/01/05 07:00:00	1982/01/05 16:00:00	10	0.69	53.30%	0.26
227	1982/01/20 06:00:00	1982/01/21 01:00:00	20	0.69	53.54%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1984/12/27 02:00:00	1984/12/27 20:00:00	19	0.69	53.77%	0.25
229	1981/03/05 02:00:00	1981/03/05 09:00:00	8	0.68	54.01%	0.25
230	1987/02/25 01:00:00	1987/02/25 02:00:00	2	0.68	54.25%	0.25
231	1957/10/14 04:00:00	1957/10/14 06:00:00	3	0.66	54.48%	0.25
232	1984/12/18 22:00:00	1984/12/20 04:00:00	31	0.66	54.72%	0.25
233	1986/03/10 06:00:00	1986/03/10 20:00:00	15	0.66	54.95%	0.25
234	1987/12/04 21:00:00	1987/12/04 21:00:00	1	0.66	55.19%	0.25
235	1970/03/04 22:00:00	1970/03/05 01:00:00	4	0.65	55.42%	0.25
236	1966/01/30 07:00:00	1966/01/30 20:00:00	14	0.64	55.66%	0.25
237	1969/02/20 04:00:00	1969/02/20 05:00:00	2	0.64	55.90%	0.25
238	1979/03/28 00:00:00	1979/03/28 10:00:00	11	0.64	56.13%	0.24
239	1985/02/09 10:00:00	1985/02/09 12:00:00	3	0.64	56.37%	0.24
240	1995/04/18 10:00:00	1995/04/18 12:00:00	3	0.64	56.60%	0.24
241	2005/02/11 11:00:00	2005/02/12 10:00:00	24	0.64	56.84%	0.24
242	1958/02/25 08:00:00	1958/02/25 09:00:00	2	0.63	57.08%	0.24
243	1983/03/21 04:00:00	1983/03/21 05:00:00	2	0.63	57.31%	0.24
244	1984/11/24 17:00:00	1984/11/24 21:00:00	5	0.63	57.55%	0.24
245	2000/02/20 17:00:00	2000/02/21 20:00:00	28	0.63	57.78%	0.24
246	1966/12/03 07:00:00	1966/12/03 17:00:00	11	0.62	58.02%	0.24
247	1952/01/13 04:00:00	1952/01/13 13:00:00	10	0.61	58.25%	0.24
248	1982/04/01 09:00:00	1982/04/01 12:00:00	4	0.61	58.49%	0.23
249	1976/07/15 13:00:00	1976/07/15 16:00:00	4	0.6	58.73%	0.23
250	1988/11/14 06:00:00	1988/11/14 08:00:00	3	0.6	58.96%	0.23
251	1957/01/07 13:00:00	1957/01/07 20:00:00	8	0.59	59.20%	0.23
252	1978/02/05 11:00:00	1978/02/06 11:00:00	25	0.59	59.43%	0.23
253	1970/11/30 14:00:00	1970/11/30 23:00:00	10	0.58	59.67%	0.23
254	1972/01/18 22:00:00	1972/01/19 03:00:00	6	0.58	59.91%	0.23
255	1965/02/06 21:00:00	1965/02/06 22:00:00	2	0.57	60.14%	0.23
256	1978/01/19 08:00:00	1978/01/19 12:00:00	5	0.57	60.38%	0.23
257	1998/01/09 17:00:00	1998/01/10 18:00:00	26	0.57	60.61%	0.23
258	1954/03/16 22:00:00	1954/03/16 22:00:00	1	0.56	60.85%	0.23
259	1957/04/20 15:00:00	1957/04/20 18:00:00	4	0.56	61.08%	0.22
260	1969/02/18 07:00:00	1969/02/18 15:00:00	9	0.56	61.32%	0.22
261	1973/02/11 07:00:00	1973/02/11 15:00:00	9	0.56	61.56%	0.22
262	1974/03/08 00:00:00	1974/03/08 11:00:00	12	0.56	61.79%	0.22
263	1977/03/24 21:00:00	1977/03/25 03:00:00	7	0.56	62.03%	0.22
264	1978/03/04 14:00:00	1978/03/04 16:00:00	3	0.56	62.26%	0.22
265	1955/02/27 20:00:00	1955/02/27 20:00:00	1	0.55	62.50%	0.22
266	1959/02/21 10:00:00	1959/02/21 17:00:00	8	0.55	62.74%	0.22
267	1981/02/09 00:00:00	1981/02/09 06:00:00	7	0.55	62.97%	0.22
268	1998/11/08 08:00:00	1998/11/08 08:00:00	1	0.55	63.21%	0.22
269	1963/02/09 19:00:00	1963/02/11 00:00:00	30	0.54	63.44%	0.22
270	1996/12/11 08:00:00	1996/12/11 18:00:00	11	0.54	63.68%	0.22
271	1969/02/22 02:00:00	1969/02/22 11:00:00	10	0.53	63.92%	0.21
272	1983/11/12 17:00:00	1983/11/12 19:00:00	3	0.52	64.15%	0.21
273	1954/03/22 12:00:00	1954/03/23 11:00:00	24	0.51	64.39%	0.21
274	1962/02/08 10:00:00	1962/02/08 18:00:00	9	0.51	64.62%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1982/02/10 14:00:00	1982/02/10 19:00:00	6	0.51	64.86%	0.21
276	1996/02/27 21:00:00	1996/02/27 22:00:00	2	0.51	65.09%	0.21
277	2006/02/28 06:00:00	2006/02/28 07:00:00	2	0.5	65.33%	0.21
278	1971/04/14 11:00:00	1971/04/14 11:00:00	1	0.49	65.57%	0.21
279	1995/01/24 00:00:00	1995/01/24 01:00:00	2	0.49	65.80%	0.21
280	2006/04/04 18:00:00	2006/04/04 23:00:00	6	0.49	66.04%	0.21
281	1966/02/06 13:00:00	1966/02/06 16:00:00	4	0.48	66.27%	0.21
282	1966/11/07 15:00:00	1966/11/07 16:00:00	2	0.48	66.51%	0.21
283	1976/03/01 16:00:00	1976/03/01 18:00:00	3	0.48	66.75%	0.21
284	1993/03/28 02:00:00	1993/03/28 04:00:00	3	0.48	66.98%	0.2
285	1953/03/01 22:00:00	1953/03/01 22:00:00	1	0.47	67.22%	0.2
286	1982/03/14 22:00:00	1982/03/14 23:00:00	2	0.47	67.45%	0.2
287	1959/02/16 03:00:00	1959/02/16 20:00:00	18	0.46	67.69%	0.2
288	1974/01/07 17:00:00	1974/01/08 05:00:00	13	0.46	67.92%	0.2
289	1980/01/18 03:00:00	1980/01/18 04:00:00	2	0.46	68.16%	0.2
290	1994/03/07 01:00:00	1994/03/07 06:00:00	6	0.46	68.40%	0.2
291	1998/03/25 17:00:00	1998/03/26 18:00:00	26	0.46	68.63%	0.2
292	1998/03/31 17:00:00	1998/03/31 19:00:00	3	0.46	68.87%	0.2
293	1969/03/21 13:00:00	1969/03/21 13:00:00	1	0.44	69.10%	0.2
294	1977/05/08 19:00:00	1977/05/09 04:00:00	10	0.44	69.34%	0.2
295	1983/02/08 06:00:00	1983/02/08 07:00:00	2	0.43	69.58%	0.2
296	1988/12/16 10:00:00	1988/12/16 14:00:00	5	0.43	69.81%	0.2
297	1954/03/30 04:00:00	1954/03/30 04:00:00	1	0.42	70.05%	0.2
298	1980/03/25 23:00:00	1980/03/26 00:00:00	2	0.42	70.28%	0.2
299	1984/12/08 00:00:00	1984/12/08 01:00:00	2	0.42	70.52%	0.19
300	1978/03/09 16:00:00	1978/03/09 17:00:00	2	0.41	70.75%	0.19
301	1978/12/17 01:00:00	1978/12/17 01:00:00	1	0.41	70.99%	0.19
302	1980/03/10 16:00:00	1980/03/10 16:00:00	1	0.41	71.23%	0.19
303	1983/03/06 05:00:00	1983/03/06 06:00:00	2	0.41	71.46%	0.19
304	1994/02/07 14:00:00	1994/02/07 16:00:00	3	0.41	71.70%	0.19
305	2001/04/07 17:00:00	2001/04/07 17:00:00	1	0.41	71.93%	0.19
306	1987/04/04 15:00:00	1987/04/04 16:00:00	2	0.4	72.17%	0.19
307	1965/12/16 03:00:00	1965/12/16 08:00:00	6	0.39	72.41%	0.19
308	1994/03/19 04:00:00	1994/03/20 06:00:00	27	0.39	72.64%	0.19
309	1996/02/26 13:00:00	1996/02/26 14:00:00	2	0.39	72.88%	0.19
310	1958/03/06 10:00:00	1958/03/06 15:00:00	6	0.37	73.11%	0.19
311	1976/02/10 07:00:00	1976/02/10 08:00:00	2	0.37	73.35%	0.19
312	1969/11/07 09:00:00	1969/11/07 09:00:00	1	0.36	73.58%	0.19
313	1957/03/16 09:00:00	1957/03/16 10:00:00	2	0.35	73.82%	0.19
314	2008/02/24 08:00:00	2008/02/24 10:00:00	3	0.35	74.06%	0.19
315	1993/06/05 13:00:00	1993/06/05 13:00:00	1	0.34	74.29%	0.18
316	1954/03/24 19:00:00	1954/03/25 04:00:00	10	0.33	74.53%	0.18
317	1954/12/09 23:00:00	1954/12/09 23:00:00	1	0.33	74.76%	0.18
318	1963/09/17 08:00:00	1963/09/17 17:00:00	10	0.33	75.00%	0.18
319	1965/03/31 14:00:00	1965/03/31 17:00:00	4	0.33	75.24%	0.18
320	1975/03/10 11:00:00	1975/03/11 00:00:00	14	0.33	75.47%	0.18
321	1956/01/31 09:00:00	1956/01/31 11:00:00	3	0.32	75.71%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1998/12/06 06:00:00	1998/12/06 07:00:00	2	0.32	75.94%	0.18
323	1999/04/12 01:00:00	1999/04/12 03:00:00	3	0.32	76.18%	0.18
324	1979/01/31 08:00:00	1979/01/31 09:00:00	2	0.31	76.42%	0.18
325	1983/03/18 06:00:00	1983/03/18 18:00:00	13	0.31	76.65%	0.18
326	1965/01/24 07:00:00	1965/01/24 08:00:00	2	0.3	76.89%	0.18
327	1969/04/05 21:00:00	1969/04/05 21:00:00	1	0.3	77.12%	0.18
328	1976/02/08 18:00:00	1976/02/08 23:00:00	6	0.29	77.36%	0.18
329	1983/04/18 08:00:00	1983/04/18 08:00:00	1	0.29	77.59%	0.18
330	1992/03/22 16:00:00	1992/03/23 03:00:00	12	0.29	77.83%	0.18
331	2004/04/01 21:00:00	2004/04/01 22:00:00	2	0.29	78.07%	0.18
332	1970/01/16 17:00:00	1970/01/16 20:00:00	4	0.27	78.30%	0.18
333	1973/02/07 04:00:00	1973/02/07 05:00:00	2	0.27	78.54%	0.17
334	1988/04/14 19:00:00	1988/04/15 00:00:00	6	0.27	78.77%	0.17
335	2002/12/16 17:00:00	2002/12/16 17:00:00	1	0.27	79.01%	0.17
336	1962/02/21 05:00:00	1962/02/21 07:00:00	3	0.26	79.25%	0.17
337	1967/01/24 18:00:00	1967/01/24 23:00:00	6	0.26	79.48%	0.17
338	1977/12/26 05:00:00	1977/12/26 12:00:00	8	0.26	79.72%	0.17
339	1951/12/11 23:00:00	1951/12/12 04:00:00	6	0.25	79.95%	0.17
340	1952/12/20 11:00:00	1952/12/20 14:00:00	4	0.25	80.19%	0.17
341	1952/12/30 19:00:00	1952/12/30 23:00:00	5	0.25	80.42%	0.17
342	1955/04/30 20:00:00	1955/05/01 02:00:00	7	0.25	80.66%	0.17
343	1984/12/16 03:00:00	1984/12/16 03:00:00	1	0.25	80.90%	0.17
344	1996/01/31 06:00:00	1996/02/01 08:00:00	27	0.24	81.13%	0.17
345	1952/01/25 08:00:00	1952/01/25 11:00:00	4	0.23	81.37%	0.17
346	1954/01/24 11:00:00	1954/01/24 14:00:00	4	0.23	81.60%	0.17
347	1999/02/04 17:00:00	1999/02/04 18:00:00	2	0.23	81.84%	0.17
348	1965/12/14 16:00:00	1965/12/14 17:00:00	2	0.22	82.08%	0.17
349	1976/04/15 18:00:00	1976/04/15 18:00:00	1	0.22	82.31%	0.17
350	1980/12/07 11:00:00	1980/12/07 12:00:00	2	0.22	82.55%	0.17
351	1983/02/26 13:00:00	1983/02/26 13:00:00	1	0.22	82.78%	0.17
352	1983/04/29 08:00:00	1983/04/29 09:00:00	2	0.22	83.02%	0.17
353	1957/01/10 01:00:00	1957/01/10 07:00:00	7	0.21	83.25%	0.16
354	1963/04/17 05:00:00	1963/04/17 07:00:00	3	0.21	83.49%	0.16
355	1978/12/18 12:00:00	1978/12/18 13:00:00	2	0.2	83.73%	0.16
356	1979/03/01 09:00:00	1979/03/01 12:00:00	4	0.19	83.96%	0.16
357	1988/02/02 13:00:00	1988/02/02 16:00:00	4	0.19	84.20%	0.16
358	1998/04/11 17:00:00	1998/04/11 18:00:00	2	0.19	84.43%	0.16
359	1952/04/10 16:00:00	1952/04/10 19:00:00	4	0.18	84.67%	0.16
360	1962/03/06 20:00:00	1962/03/06 20:00:00	1	0.18	84.91%	0.16
361	1971/02/17 09:00:00	1971/02/17 10:00:00	2	0.18	85.14%	0.16
362	1986/04/06 10:00:00	1986/04/06 10:00:00	1	0.18	85.38%	0.16
363	1997/12/06 17:00:00	1997/12/06 17:00:00	1	0.18	85.61%	0.16
364	1995/01/16 10:00:00	1995/01/16 11:00:00	2	0.17	85.85%	0.16
365	2006/03/28 21:00:00	2006/03/28 22:00:00	2	0.17	86.08%	0.16
366	1957/12/17 05:00:00	1957/12/17 05:00:00	1	0.16	86.32%	0.16
367	1978/03/02 11:00:00	1978/03/02 13:00:00	3	0.16	86.56%	0.16
368	1957/01/26 07:00:00	1957/01/26 07:00:00	1	0.15	86.79%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1961/01/26 11:00:00	1961/01/26 11:00:00	1	0.15	87.03%	0.16
370	1985/12/02 23:00:00	1985/12/02 23:00:00	1	0.15	87.26%	0.16
371	1998/02/19 17:00:00	1998/02/19 18:00:00	2	0.15	87.50%	0.16
372	2001/03/06 17:00:00	2001/03/06 18:00:00	2	0.15	87.74%	0.16
373	1986/03/13 22:00:00	1986/03/13 22:00:00	1	0.14	87.97%	0.16
374	1973/03/05 08:00:00	1973/03/05 08:00:00	1	0.12	88.21%	0.16
375	1979/02/21 05:00:00	1979/02/21 06:00:00	2	0.12	88.44%	0.16
376	1960/02/10 06:00:00	1960/02/10 07:00:00	2	0.11	88.68%	0.15
377	1971/12/27 17:00:00	1971/12/28 14:00:00	22	0.11	88.92%	0.15
378	1983/12/03 16:00:00	1983/12/03 17:00:00	2	0.11	89.15%	0.15
379	1993/01/10 13:00:00	1993/01/10 13:00:00	1	0.11	89.39%	0.15
380	1996/02/21 09:00:00	1996/02/21 09:00:00	1	0.11	89.62%	0.15
381	1962/02/19 11:00:00	1962/02/19 11:00:00	1	0.1	89.86%	0.15
382	1963/04/26 02:00:00	1963/04/26 02:00:00	1	0.1	90.09%	0.15
383	1969/01/28 02:00:00	1969/01/28 19:00:00	18	0.1	90.33%	0.15
384	1982/01/29 00:00:00	1982/01/29 00:00:00	1	0.1	90.57%	0.15
385	1994/01/27 14:00:00	1994/01/27 14:00:00	1	0.1	90.80%	0.15
386	1959/12/10 03:00:00	1959/12/10 03:00:00	1	0.09	91.04%	0.15
387	1983/02/07 05:00:00	1983/02/07 05:00:00	1	0.09	91.27%	0.15
388	1993/02/23 20:00:00	1993/02/23 21:00:00	2	0.09	91.51%	0.15
389	1959/12/21 07:00:00	1959/12/21 08:00:00	2	0.08	91.75%	0.15
390	1975/04/17 08:00:00	1975/04/17 08:00:00	1	0.08	91.98%	0.15
391	1983/02/02 17:00:00	1983/02/02 17:00:00	1	0.08	92.22%	0.15
392	1987/01/07 05:00:00	1987/01/07 05:00:00	1	0.08	92.45%	0.15
393	2000/02/13 17:00:00	2000/02/13 17:00:00	1	0.08	92.69%	0.15
394	1965/11/14 23:00:00	1965/11/15 01:00:00	3	0.07	92.92%	0.15
395	1983/03/17 05:00:00	1983/03/17 05:00:00	1	0.07	93.16%	0.15
396	1988/12/22 23:00:00	1988/12/22 23:00:00	1	0.07	93.40%	0.15
397	1996/01/22 06:00:00	1996/01/22 07:00:00	2	0.07	93.63%	0.15
398	1992/02/06 18:00:00	1992/02/06 19:00:00	2	0.06	93.87%	0.15
399	1996/12/09 18:00:00	1996/12/09 18:00:00	1	0.06	94.10%	0.15
400	1961/11/25 18:00:00	1961/11/25 20:00:00	3	0.05	94.34%	0.15
401	1969/01/20 06:00:00	1969/01/20 09:00:00	4	0.05	94.58%	0.15
402	1996/10/30 14:00:00	1996/10/30 14:00:00	1	0.05	94.81%	0.14
403	2004/02/02 23:00:00	2004/02/02 23:00:00	1	0.05	95.05%	0.14
404	1967/04/19 18:00:00	1967/04/19 18:00:00	1	0.04	95.28%	0.14
405	1988/04/23 10:00:00	1988/04/23 10:00:00	1	0.04	95.52%	0.14
406	1962/02/16 11:00:00	1962/02/16 11:00:00	1	0.03	95.75%	0.14
407	1967/04/21 23:00:00	1967/04/21 23:00:00	1	0.03	95.99%	0.14
408	1968/04/01 20:00:00	1968/04/01 20:00:00	1	0.03	96.23%	0.14
409	1986/01/31 18:00:00	1986/01/31 18:00:00	1	0.03	96.46%	0.14
410	1997/01/03 06:00:00	1997/01/03 06:00:00	1	0.03	96.70%	0.14
411	1952/11/23 00:00:00	1952/11/23 00:00:00	1	0.02	96.93%	0.14
412	1964/03/23 00:00:00	1964/03/23 22:00:00	23	0.02	97.17%	0.14
413	1999/01/25 08:00:00	1999/01/25 09:00:00	2	0.02	97.41%	0.14
414	1955/01/16 15:00:00	1955/01/16 15:00:00	1	0.01	97.64%	0.14
415	1960/01/25 20:00:00	1960/01/25 20:00:00	1	0.01	97.88%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1983/12/27 08:00:00	1983/12/27 08:00:00	1	0.01	98.11%	0.14
417	1990/04/04 08:00:00	1990/04/04 08:00:00	1	0.01	98.35%	0.14
418	2001/03/10 17:00:00	2001/03/10 18:00:00	2	0.01	98.58%	0.14
419	1973/03/06 23:00:00	1973/03/07 00:00:00	2	0	98.82%	0.14
420	1979/01/09 13:00:00	1979/01/09 13:00:00	1	0	99.06%	0.14
421	1981/01/28 06:00:00	1981/01/28 06:00:00	1	0	99.29%	0.14
422	1983/03/22 20:00:00	1983/03/22 20:00:00	1	0	99.53%	0.14
423	1983/09/29 23:00:00	1983/09/29 23:00:00	1	0	99.76%	0.14
--End of Data-----------------						

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM.out time stamp: 3/16/2021 1:46:28 PM

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/03 08:00:00	1995/01/06 10:00:00	75	3.43	0.15%	58
2	2003/02/25 06:00:00	2003/02/28 16:00:00	83	2.89	0.31%	29
3	1958/02/03 04:00:00	1958/02/06 02:00:00	71	2.77	0.46%	19.33
4	1969/02/18 08:00:00	1969/02/27 08:00:00	217	2.71	0.61%	14.5
5	2004/10/27 02:00:00	2004/10/29 10:00:00	57	2.63	0.76%	11.6
6	1993/01/12 18:00:00	1993/01/20 04:00:00	179	2.52	0.92%	9.67
7	1980/02/13 13:00:00	1980/02/22 18:00:00	222	2.5	1.07%	8.29
8	1978/02/27 10:00:00	1978/03/06 06:00:00	165	2.48	1.22%	7.25
9	2005/02/18 05:00:00	2005/02/24 18:00:00	158	2.48	1.37%	6.44
10	1952/01/16 08:00:00	1952/01/19 20:00:00	85	2.46	1.53%	5.8
11	1982/03/14 13:00:00	1982/03/19 20:00:00	128	2.39	1.68%	5.27
12	2000/10/29 22:00:00	2000/10/31 16:00:00	43	2.27	1.83%	4.83
13	1958/04/01 08:00:00	1958/04/05 05:00:00	94	2.21	1.98%	4.46
14	1978/01/03 18:00:00	1978/01/07 08:00:00	87	2.21	2.14%	4.14
15	1979/01/14 19:00:00	1979/01/19 16:00:00	118	2.18	2.29%	3.87
16	1978/02/05 11:00:00	1978/02/15 11:00:00	241	2.13	2.44%	3.63
17	1991/12/28 02:00:00	1991/12/31 15:00:00	86	2.13	2.60%	3.41
18	1998/02/03 06:00:00	1998/02/05 14:00:00	57	2.12	2.75%	3.22
19	1965/11/22 04:00:00	1965/11/25 22:00:00	91	2.11	2.90%	3.05
20	1980/03/02 20:00:00	1980/03/08 00:00:00	125	2.09	3.05%	2.9
21	1998/02/22 08:00:00	1998/02/25 23:00:00	88	2	3.21%	2.76
22	1970/12/16 23:00:00	1970/12/22 21:00:00	143	1.99	3.36%	2.64
23	1985/11/11 05:00:00	1985/11/13 18:00:00	62	1.91	3.51%	2.52
24	1998/02/14 08:00:00	1998/02/20 19:00:00	156	1.88	3.66%	2.42
25	1983/02/24 09:00:00	1983/03/07 06:00:00	262	1.83	3.82%	2.32
26	1952/11/14 15:00:00	1952/11/17 18:00:00	76	1.82	3.97%	2.23
27	1994/02/03 21:00:00	1994/02/05 22:00:00	50	1.8	4.12%	2.15
28	1961/12/01 19:00:00	1961/12/04 06:00:00	60	1.77	4.27%	2.07
29	2008/01/27 00:00:00	2008/01/29 12:00:00	61	1.77	4.43%	2
30	1978/01/14 15:00:00	1978/01/20 11:00:00	141	1.76	4.58%	1.93
31	1983/01/27 08:00:00	1983/01/30 18:00:00	83	1.74	4.73%	1.87
32	2004/10/17 06:00:00	2004/10/22 03:00:00	118	1.74	4.89%	1.81
33	1980/01/28 06:00:00	1980/01/31 19:00:00	86	1.73	5.04%	1.76
34	1993/02/18 12:00:00	1993/02/21 19:00:00	80	1.73	5.19%	1.71
35	1972/01/16 19:00:00	1972/01/20 15:00:00	93	1.66	5.34%	1.66
36	2008/01/05 03:00:00	2008/01/08 18:00:00	88	1.66	5.50%	1.61
37	1991/02/27 18:00:00	1991/03/02 22:00:00	77	1.65	5.65%	1.57
38	2008/02/22 02:00:00	2008/02/25 10:00:00	81	1.63	5.80%	1.53
39	1995/03/11 02:00:00	1995/03/13 12:00:00	59	1.6	5.95%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1993/02/07 21:00:00	1993/02/10 05:00:00	57	1.59	6.11%	1.45
41	1960/04/27 05:00:00	1960/04/28 23:00:00	43	1.57	6.26%	1.42
42	1977/08/16 20:00:00	1977/08/19 08:00:00	61	1.57	6.41%	1.38
43	1963/03/16 23:00:00	1963/03/18 17:00:00	43	1.54	6.56%	1.35
44	1969/02/06 08:00:00	1969/02/08 05:00:00	46	1.53	6.72%	1.32
45	1982/12/22 19:00:00	1982/12/24 11:00:00	41	1.51	6.87%	1.29
46	1986/02/13 09:00:00	1986/02/17 12:00:00	100	1.51	7.02%	1.26
47	1980/01/09 02:00:00	1980/01/14 09:00:00	128	1.4	7.18%	1.23
48	1958/02/19 09:00:00	1958/02/21 03:00:00	43	1.38	7.33%	1.21
49	2005/04/28 08:00:00	2005/04/29 18:00:00	35	1.38	7.48%	1.18
50	1988/12/24 20:00:00	1988/12/26 11:00:00	40	1.37	7.63%	1.16
51	1992/02/12 12:00:00	1992/02/17 07:00:00	116	1.37	7.79%	1.14
52	1983/12/24 09:00:00	1983/12/28 02:00:00	90	1.36	7.94%	1.12
53	1997/01/12 14:00:00	1997/01/17 07:00:00	114	1.36	8.09%	1.09
54	2005/01/07 07:00:00	2005/01/12 20:00:00	134	1.36	8.24%	1.07
55	1963/09/17 07:00:00	1963/09/20 09:00:00	75	1.35	8.40%	1.06
56	2003/02/11 12:00:00	2003/02/14 22:00:00	83	1.34	8.55%	1.04
57	1979/01/05 08:00:00	1979/01/07 22:00:00	63	1.33	8.70%	1.02
58	1986/03/08 16:00:00	1986/03/18 03:00:00	228	1.31	8.85%	1
59	1968/03/07 23:00:00	1968/03/10 00:00:00	50	1.3	9.01%	0.98
60	1962/01/20 12:00:00	1962/01/23 19:00:00	80	1.29	9.16%	0.97
61	1971/12/22 07:00:00	1971/12/29 13:00:00	175	1.27	9.31%	0.95
62	1981/03/19 20:00:00	1981/03/21 11:00:00	40	1.27	9.47%	0.94
63	1988/11/24 05:00:00	1988/11/26 22:00:00	66	1.27	9.62%	0.92
64	2007/01/30 14:00:00	2007/02/01 09:00:00	44	1.26	9.77%	0.91
65	1990/02/17 15:00:00	1990/02/19 17:00:00	51	1.23	9.92%	0.89
66	1991/03/25 03:00:00	1991/03/28 17:00:00	87	1.19	10.08%	0.88
67	1986/11/17 18:00:00	1986/11/19 19:00:00	50	1.18	10.23%	0.87
68	2001/02/13 11:00:00	2001/02/16 10:00:00	72	1.17	10.38%	0.85
69	2004/12/28 09:00:00	2005/01/02 05:00:00	117	1.17	10.53%	0.84
70	1965/12/09 08:00:00	1965/12/17 20:00:00	205	1.14	10.69%	0.83
71	2007/11/30 07:00:00	2007/12/02 11:00:00	53	1.14	10.84%	0.82
72	1960/02/01 20:00:00	1960/02/03 13:00:00	42	1.11	10.99%	0.81
73	1983/11/24 20:00:00	1983/11/26 13:00:00	42	1.09	11.15%	0.8
74	1994/03/24 22:00:00	1994/03/26 18:00:00	45	1.09	11.30%	0.78
75	2004/02/26 01:00:00	2004/02/27 21:00:00	45	1.08	11.45%	0.77
76	2005/01/03 06:00:00	2005/01/06 02:00:00	69	1.07	11.60%	0.76
77	1960/01/10 11:00:00	1960/01/16 14:00:00	148	1.05	11.76%	0.75
78	1966/12/03 05:00:00	1966/12/08 10:00:00	126	1.04	11.91%	0.74
79	1995/03/03 12:00:00	1995/03/07 15:00:00	100	1.04	12.06%	0.73
80	1957/01/13 04:00:00	1957/01/14 21:00:00	42	1.03	12.21%	0.73
81	1975/04/08 08:00:00	1975/04/10 17:00:00	58	1.03	12.37%	0.72
82	1963/11/20 02:00:00	1963/11/22 18:00:00	65	1.02	12.52%	0.71
83	1983/09/29 11:00:00	1983/10/02 17:00:00	79	1.02	12.67%	0.7
84	2003/04/14 05:00:00	2003/04/16 13:00:00	57	1.02	12.82%	0.69
85	1996/11/21 16:00:00	1996/11/23 16:00:00	49	1	12.98%	0.68
86	1954/01/18 18:00:00	1954/01/21 15:00:00	70	0.99	13.13%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1967/12/18 16:00:00	1967/12/21 02:00:00	59	0.99	13.28%	0.67
88	1968/12/25 18:00:00	1968/12/27 13:00:00	44	0.99	13.44%	0.66
89	1987/12/16 12:00:00	1987/12/20 00:00:00	85	0.99	13.59%	0.65
90	1985/11/29 06:00:00	1985/12/01 01:00:00	44	0.98	13.74%	0.64
91	2001/01/26 12:00:00	2001/01/28 20:00:00	57	0.96	13.89%	0.64
92	1965/11/14 18:00:00	1965/11/19 03:00:00	106	0.95	14.05%	0.63
93	1957/05/10 23:00:00	1957/05/12 17:00:00	43	0.94	14.20%	0.62
94	1978/09/05 17:00:00	1978/09/07 16:00:00	48	0.93	14.35%	0.62
95	1988/01/17 10:00:00	1988/01/19 09:00:00	48	0.93	14.50%	0.61
96	1988/12/20 23:00:00	1988/12/23 15:00:00	65	0.93	14.66%	0.6
97	2002/11/08 10:00:00	2002/11/10 12:00:00	51	0.92	14.81%	0.6
98	1958/03/15 16:00:00	1958/03/17 23:00:00	56	0.91	14.96%	0.59
99	1958/03/20 19:00:00	1958/03/23 19:00:00	73	0.9	15.11%	0.59
100	1967/03/13 10:00:00	1967/03/15 09:00:00	48	0.9	15.27%	0.58
101	1992/03/20 23:00:00	1992/03/24 12:00:00	86	0.9	15.42%	0.57
102	1954/02/13 16:00:00	1954/02/15 14:00:00	47	0.89	15.57%	0.57
103	1969/01/24 07:00:00	1969/01/29 15:00:00	129	0.86	15.73%	0.56
104	1988/04/20 01:00:00	1988/04/24 00:00:00	96	0.86	15.88%	0.56
105	1992/12/07 08:00:00	1992/12/09 05:00:00	46	0.86	16.03%	0.55
106	1957/01/26 05:00:00	1957/01/31 05:00:00	121	0.85	16.18%	0.55
107	1952/03/15 20:00:00	1952/03/18 03:00:00	56	0.84	16.34%	0.54
108	1965/04/07 04:00:00	1965/04/11 00:00:00	93	0.82	16.49%	0.54
109	1987/10/11 16:00:00	1987/10/14 08:00:00	65	0.82	16.64%	0.53
110	1967/01/22 15:00:00	1967/01/26 10:00:00	92	0.81	16.79%	0.53
111	1978/01/09 15:00:00	1978/01/12 11:00:00	69	0.81	16.95%	0.52
112	1985/11/24 22:00:00	1985/11/26 19:00:00	46	0.81	17.10%	0.52
113	2004/02/22 07:00:00	2004/02/24 19:00:00	61	0.81	17.25%	0.51
114	1956/01/25 17:00:00	1956/01/28 20:00:00	76	0.79	17.40%	0.51
115	1967/11/19 08:00:00	1967/11/22 23:00:00	88	0.79	17.56%	0.5
116	1986/09/24 01:00:00	1986/09/26 17:00:00	65	0.74	17.71%	0.5
117	2001/01/10 20:00:00	2001/01/13 23:00:00	76	0.74	17.86%	0.5
118	1993/01/06 03:00:00	1993/01/11 04:00:00	122	0.71	18.02%	0.49
119	2003/03/15 11:00:00	2003/03/18 01:00:00	63	0.71	18.17%	0.49
120	1956/04/12 20:00:00	1956/04/15 05:00:00	58	0.67	18.32%	0.48
121	1958/04/06 18:00:00	1958/04/09 03:00:00	58	0.67	18.47%	0.48
122	1952/11/30 01:00:00	1952/12/03 12:00:00	84	0.66	18.63%	0.48
123	1977/01/02 22:00:00	1977/01/08 18:00:00	141	0.66	18.78%	0.47
124	2006/10/14 00:00:00	2006/10/15 09:00:00	34	0.66	18.93%	0.47
125	1959/02/11 09:00:00	1959/02/13 07:00:00	47	0.64	19.08%	0.46
126	1998/02/06 16:00:00	1998/02/10 09:00:00	90	0.64	19.24%	0.46
127	1994/02/17 11:00:00	1994/02/19 02:00:00	40	0.63	19.39%	0.46
128	1970/02/28 14:00:00	1970/03/03 13:00:00	72	0.62	19.54%	0.45
129	1951/12/29 05:00:00	1952/01/01 02:00:00	70	0.61	19.69%	0.45
130	1952/03/07 08:00:00	1952/03/11 19:00:00	108	0.61	19.85%	0.45
131	1977/12/25 17:00:00	1977/12/31 08:00:00	136	0.61	20.00%	0.44
132	1992/01/03 09:00:00	1992/01/09 13:00:00	149	0.61	20.15%	0.44
133	1997/01/25 19:00:00	1997/01/28 00:00:00	54	0.61	20.31%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1995/01/07 13:00:00	1995/01/17 11:00:00	239	0.6	20.46%	0.43
135	1983/04/18 03:00:00	1983/04/22 04:00:00	98	0.58	20.61%	0.43
136	1981/02/28 12:00:00	1981/03/06 22:00:00	155	0.57	20.76%	0.43
137	1991/03/19 00:00:00	1991/03/22 21:00:00	94	0.57	20.92%	0.42
138	1982/12/07 22:00:00	1982/12/09 12:00:00	39	0.56	21.07%	0.42
139	1984/12/26 21:00:00	1984/12/29 08:00:00	60	0.56	21.22%	0.42
140	1976/07/22 11:00:00	1976/07/24 01:00:00	39	0.55	21.37%	0.41
141	1981/12/30 07:00:00	1982/01/03 11:00:00	101	0.54	21.53%	0.41
142	1973/11/22 23:00:00	1973/11/24 13:00:00	39	0.53	21.68%	0.41
143	1981/11/26 22:00:00	1981/11/30 12:00:00	87	0.51	21.83%	0.41
144	1999/01/25 05:00:00	1999/01/28 12:00:00	80	0.51	21.98%	0.4
145	1974/12/04 07:00:00	1974/12/05 22:00:00	40	0.5	22.14%	0.4
146	1976/07/15 13:00:00	1976/07/17 04:00:00	40	0.5	22.29%	0.4
147	1985/12/11 03:00:00	1985/12/12 21:00:00	43	0.5	22.44%	0.4
148	1979/11/07 18:00:00	1979/11/09 09:00:00	40	0.49	22.60%	0.39
149	1962/02/07 20:00:00	1962/02/11 12:00:00	89	0.46	22.75%	0.39
150	1967/11/30 16:00:00	1967/12/02 01:00:00	34	0.46	22.90%	0.39
151	1959/12/24 09:00:00	1959/12/26 03:00:00	43	0.45	23.05%	0.38
152	1964/11/17 13:00:00	1964/11/19 06:00:00	42	0.45	23.21%	0.38
153	1976/07/08 13:00:00	1976/07/10 02:00:00	38	0.44	23.36%	0.38
154	1995/01/23 23:00:00	1995/01/27 19:00:00	93	0.44	23.51%	0.38
155	1972/11/14 14:00:00	1972/11/18 21:00:00	104	0.43	23.66%	0.37
156	1976/09/10 01:00:00	1976/09/12 13:00:00	61	0.43	23.82%	0.37
157	2001/02/25 09:00:00	2001/03/01 10:00:00	98	0.43	23.97%	0.37
158	2002/12/20 10:00:00	2002/12/22 20:00:00	59	0.43	24.12%	0.37
159	2005/02/11 02:00:00	2005/02/14 01:00:00	72	0.43	24.27%	0.37
160	1970/11/28 21:00:00	1970/12/02 11:00:00	87	0.42	24.43%	0.36
161	1966/02/06 11:00:00	1966/02/09 11:00:00	73	0.41	24.58%	0.36
162	1983/03/17 02:00:00	1983/03/25 23:00:00	214	0.41	24.73%	0.36
163	1998/01/29 11:00:00	1998/01/31 09:00:00	47	0.41	24.89%	0.36
164	2006/04/04 17:00:00	2006/04/06 14:00:00	46	0.41	25.04%	0.35
165	1967/04/11 07:00:00	1967/04/13 00:00:00	42	0.4	25.19%	0.35
166	1974/01/07 15:00:00	1974/01/10 00:00:00	58	0.4	25.34%	0.35
167	2006/03/10 16:00:00	2006/03/12 19:00:00	52	0.4	25.50%	0.35
168	1957/01/07 12:00:00	1957/01/11 07:00:00	92	0.39	25.65%	0.35
169	1957/02/28 19:00:00	1957/03/02 22:00:00	52	0.39	25.80%	0.34
170	1978/03/30 15:00:00	1978/04/02 22:00:00	80	0.39	25.95%	0.34
171	1958/01/25 03:00:00	1958/01/28 03:00:00	73	0.38	26.11%	0.34
172	1960/02/28 20:00:00	1960/03/02 16:00:00	69	0.38	26.26%	0.34
173	1965/12/29 18:00:00	1966/01/01 10:00:00	65	0.38	26.41%	0.34
174	1977/05/07 22:00:00	1977/05/10 18:00:00	69	0.38	26.56%	0.33
175	1954/11/11 00:00:00	1954/11/13 01:00:00	50	0.37	26.72%	0.33
176	1965/03/31 14:00:00	1965/04/05 11:00:00	118	0.37	26.87%	0.33
177	1973/03/20 08:00:00	1973/03/21 23:00:00	40	0.37	27.02%	0.33
178	1974/03/08 00:00:00	1974/03/09 23:00:00	48	0.37	27.18%	0.33
179	1993/11/30 04:00:00	1993/12/01 12:00:00	33	0.37	27.33%	0.32
180	1955/01/16 09:00:00	1955/01/20 11:00:00	99	0.36	27.48%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1955/01/10 04:00:00	1955/01/12 00:00:00	45	0.35	27.63%	0.32
182	1979/03/17 05:00:00	1979/03/21 18:00:00	110	0.35	27.79%	0.32
183	1966/11/07 14:00:00	1966/11/09 08:00:00	43	0.34	27.94%	0.32
184	2000/03/04 18:00:00	2000/03/07 09:00:00	64	0.34	28.09%	0.32
185	2001/12/09 12:00:00	2001/12/11 08:00:00	45	0.34	28.24%	0.31
186	1952/01/13 04:00:00	1952/01/15 01:00:00	46	0.33	28.40%	0.31
187	1973/02/11 07:00:00	1973/02/16 12:00:00	126	0.33	28.55%	0.31
188	1981/01/28 06:00:00	1981/01/31 14:00:00	81	0.33	28.70%	0.31
189	2001/04/07 15:00:00	2001/04/09 01:00:00	35	0.33	28.85%	0.31
190	1990/01/17 00:00:00	1990/01/18 23:00:00	48	0.32	29.01%	0.31
191	1954/03/30 04:00:00	1954/03/31 05:00:00	26	0.31	29.16%	0.3
192	1995/04/16 06:00:00	1995/04/20 04:00:00	95	0.31	29.31%	0.3
193	2001/11/24 13:00:00	2001/11/26 03:00:00	39	0.31	29.47%	0.3
194	1951/11/23 04:00:00	1951/11/24 10:00:00	31	0.29	29.62%	0.3
195	1973/03/11 10:00:00	1973/03/13 11:00:00	50	0.29	29.77%	0.3
196	1993/06/05 13:00:00	1993/06/07 04:00:00	40	0.29	29.92%	0.3
197	1964/01/21 07:00:00	1964/01/23 21:00:00	63	0.28	30.08%	0.29
198	1966/01/30 07:00:00	1966/02/01 05:00:00	47	0.28	30.23%	0.29
199	1976/02/04 09:00:00	1976/02/11 17:00:00	177	0.28	30.38%	0.29
200	1982/02/09 19:00:00	1982/02/12 07:00:00	61	0.28	30.53%	0.29
201	1960/11/05 20:00:00	1960/11/07 13:00:00	42	0.27	30.69%	0.29
202	1963/02/09 17:00:00	1963/02/12 14:00:00	70	0.27	30.84%	0.29
203	1975/03/08 08:00:00	1975/03/12 16:00:00	105	0.27	30.99%	0.29
204	1978/03/09 16:00:00	1978/03/13 22:00:00	103	0.27	31.15%	0.28
205	1998/05/12 16:00:00	1998/05/13 23:00:00	32	0.27	31.30%	0.28
206	2002/12/16 14:00:00	2002/12/18 03:00:00	38	0.27	31.45%	0.28
207	1977/03/24 22:00:00	1977/03/26 17:00:00	44	0.26	31.60%	0.28
208	1982/01/05 05:00:00	1982/01/07 04:00:00	48	0.26	31.76%	0.28
209	1984/11/24 16:00:00	1984/11/26 07:00:00	40	0.26	31.91%	0.28
210	2000/02/20 13:00:00	2000/02/24 09:00:00	93	0.26	32.06%	0.28
211	1979/03/27 04:00:00	1979/03/29 19:00:00	64	0.25	32.21%	0.28
212	1987/02/23 20:00:00	1987/02/26 12:00:00	65	0.25	32.37%	0.27
213	1994/03/07 01:00:00	1994/03/08 19:00:00	43	0.25	32.52%	0.27
214	1997/12/06 14:00:00	1997/12/08 11:00:00	46	0.25	32.67%	0.27
215	2003/12/25 01:00:00	2003/12/27 03:00:00	51	0.25	32.82%	0.27
216	1957/10/14 00:00:00	1957/10/15 16:00:00	41	0.24	32.98%	0.27
217	1962/03/18 18:00:00	1962/03/20 15:00:00	46	0.24	33.13%	0.27
218	1970/03/04 22:00:00	1970/03/06 12:00:00	39	0.24	33.28%	0.27
219	1973/03/05 09:00:00	1973/03/09 22:00:00	110	0.24	33.44%	0.27
220	1980/03/25 22:00:00	1980/03/27 05:00:00	32	0.24	33.59%	0.26
221	1984/12/18 07:00:00	1984/12/21 13:00:00	79	0.23	33.74%	0.26
222	1985/02/09 05:00:00	1985/02/11 00:00:00	44	0.23	33.89%	0.26
223	1998/01/09 13:00:00	1998/01/11 19:00:00	55	0.23	34.05%	0.26
224	1954/03/20 11:00:00	1954/03/26 05:00:00	139	0.22	34.20%	0.26
225	1976/08/30 10:00:00	1976/09/01 00:00:00	39	0.22	34.35%	0.26
226	1981/02/08 19:00:00	1981/02/10 18:00:00	48	0.22	34.50%	0.26
227	1993/01/31 00:00:00	1993/02/01 11:00:00	36	0.22	34.66%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	2007/04/20 15:00:00	2007/04/21 23:00:00	33	0.22	34.81%	0.25
229	1957/04/20 15:00:00	1957/04/22 22:00:00	56	0.21	34.96%	0.25
230	1959/02/21 10:00:00	1959/02/23 07:00:00	46	0.21	35.11%	0.25
231	1982/01/20 05:00:00	1982/01/22 21:00:00	65	0.21	35.27%	0.25
232	1988/11/14 06:00:00	1988/11/15 20:00:00	39	0.21	35.42%	0.25
233	1988/12/15 14:00:00	1988/12/19 13:00:00	96	0.21	35.57%	0.25
234	1996/12/09 17:00:00	1996/12/13 06:00:00	86	0.21	35.73%	0.25
235	1958/02/25 07:00:00	1958/02/26 17:00:00	35	0.2	35.88%	0.25
236	1965/02/06 01:00:00	1965/02/08 10:00:00	58	0.2	36.03%	0.25
237	1982/04/01 09:00:00	1982/04/03 01:00:00	41	0.2	36.18%	0.25
238	1983/11/11 21:00:00	1983/11/14 10:00:00	62	0.2	36.34%	0.24
239	1955/02/27 03:00:00	1955/03/01 02:00:00	48	0.19	36.49%	0.24
240	1959/02/16 04:00:00	1959/02/18 04:00:00	49	0.19	36.64%	0.24
241	1998/03/25 16:00:00	1998/03/29 22:00:00	103	0.19	36.79%	0.24
242	1998/03/31 14:00:00	1998/04/02 00:00:00	35	0.19	36.95%	0.24
243	1991/01/09 14:00:00	1991/01/11 00:00:00	35	0.18	37.10%	0.24
244	1993/03/26 00:00:00	1993/03/29 11:00:00	84	0.18	37.25%	0.24
245	1994/03/19 03:00:00	1994/03/21 14:00:00	60	0.18	37.40%	0.24
246	1996/02/25 10:00:00	1996/02/28 22:00:00	85	0.18	37.56%	0.24
247	1994/02/07 06:00:00	1994/02/09 06:00:00	49	0.16	37.71%	0.24
248	1954/01/24 09:00:00	1954/01/26 08:00:00	48	0.15	37.86%	0.23
249	1976/03/01 15:00:00	1976/03/03 17:00:00	51	0.15	38.02%	0.23
250	1983/02/06 12:00:00	1983/02/09 01:00:00	62	0.15	38.17%	0.23
251	1988/02/02 02:00:00	1988/02/04 04:00:00	51	0.15	38.32%	0.23
252	1998/11/08 08:00:00	1998/11/09 20:00:00	37	0.15	38.47%	0.23
253	2006/02/27 20:00:00	2006/03/01 20:00:00	49	0.15	38.63%	0.23
254	1954/03/16 22:00:00	1954/03/18 09:00:00	36	0.14	38.78%	0.23
255	1988/04/14 19:00:00	1988/04/16 12:00:00	42	0.14	38.93%	0.23
256	1971/04/14 11:00:00	1971/04/15 21:00:00	35	0.13	39.08%	0.23
257	1979/01/30 18:00:00	1979/02/03 11:00:00	90	0.13	39.24%	0.23
258	1953/03/01 22:00:00	1953/03/02 23:00:00	26	0.12	39.39%	0.23
259	1957/03/16 10:00:00	1957/03/17 15:00:00	30	0.11	39.54%	0.22
260	1962/02/19 11:00:00	1962/02/22 09:00:00	71	0.11	39.69%	0.22
261	1978/12/16 23:00:00	1978/12/20 11:00:00	85	0.11	39.85%	0.22
262	1987/12/04 21:00:00	1987/12/06 06:00:00	34	0.11	40.00%	0.22
263	1992/02/06 10:00:00	1992/02/08 18:00:00	57	0.11	40.15%	0.22
264	1952/12/20 11:00:00	1952/12/21 21:00:00	35	0.1	40.31%	0.22
265	1958/03/06 10:00:00	1958/03/08 02:00:00	41	0.1	40.46%	0.22
266	1969/11/06 20:00:00	1969/11/08 15:00:00	44	0.1	40.61%	0.22
267	1970/01/16 17:00:00	1970/01/17 23:00:00	31	0.1	40.76%	0.22
268	1984/12/08 00:00:00	1984/12/09 07:00:00	32	0.1	40.92%	0.22
269	1956/01/31 10:00:00	1956/02/01 11:00:00	26	0.09	41.07%	0.22
270	1969/03/21 12:00:00	1969/03/23 00:00:00	37	0.09	41.22%	0.22
271	1980/01/17 19:00:00	1980/01/20 02:00:00	56	0.09	41.37%	0.21
272	1980/12/07 11:00:00	1980/12/08 15:00:00	29	0.09	41.53%	0.21
273	1999/04/11 21:00:00	1999/04/13 12:00:00	40	0.09	41.68%	0.21
274	1952/04/10 12:00:00	1952/04/12 00:00:00	37	0.08	41.83%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1973/02/06 04:00:00	1973/02/07 20:00:00	41	0.08	41.98%	0.21
276	1983/12/09 16:00:00	1983/12/10 05:00:00	14	0.08	42.14%	0.21
277	1996/01/31 04:00:00	1996/02/02 09:00:00	54	0.08	42.29%	0.21
278	1961/01/26 09:00:00	1961/01/28 03:00:00	43	0.07	42.44%	0.21
279	1963/04/17 05:00:00	1963/04/18 09:00:00	29	0.07	42.60%	0.21
280	1969/04/05 21:00:00	1969/04/06 17:00:00	21	0.07	42.75%	0.21
281	1995/03/21 12:00:00	1995/03/24 12:00:00	73	0.07	42.90%	0.21
282	1958/03/27 13:00:00	1958/03/28 10:00:00	22	0.06	43.05%	0.21
283	1976/04/15 15:00:00	1976/04/16 20:00:00	30	0.06	43.21%	0.21
284	1979/02/14 03:00:00	1979/02/15 03:00:00	25	0.06	43.36%	0.2
285	1980/03/10 15:00:00	1980/03/11 22:00:00	32	0.06	43.51%	0.2
286	1998/04/11 17:00:00	1998/04/12 13:00:00	21	0.06	43.66%	0.2
287	1951/08/28 08:00:00	1951/08/29 17:00:00	34	0.05	43.82%	0.2
288	1951/12/11 23:00:00	1951/12/13 14:00:00	40	0.05	43.97%	0.2
289	1952/01/25 04:00:00	1952/01/26 18:00:00	39	0.05	44.12%	0.2
290	1952/12/30 19:00:00	1953/01/01 04:00:00	34	0.05	44.27%	0.2
291	1957/12/05 03:00:00	1957/12/06 15:00:00	37	0.05	44.43%	0.2
292	1959/04/26 05:00:00	1959/04/27 11:00:00	31	0.05	44.58%	0.2
293	1959/12/21 00:00:00	1959/12/22 14:00:00	39	0.05	44.73%	0.2
294	1960/09/11 03:00:00	1960/09/12 11:00:00	33	0.05	44.89%	0.2
295	1969/01/14 00:00:00	1969/01/15 18:00:00	43	0.05	45.04%	0.2
296	1970/02/10 03:00:00	1970/02/12 10:00:00	56	0.05	45.19%	0.2
297	1971/02/17 05:00:00	1971/02/18 18:00:00	38	0.05	45.34%	0.2
298	1974/10/28 10:00:00	1974/10/30 15:00:00	54	0.05	45.50%	0.2
299	1976/12/30 15:00:00	1977/01/01 09:00:00	43	0.05	45.65%	0.19
300	1979/03/01 09:00:00	1979/03/02 21:00:00	37	0.05	45.80%	0.19
301	1980/10/16 05:00:00	1980/10/17 13:00:00	33	0.05	45.95%	0.19
302	1981/02/25 20:00:00	1981/02/27 03:00:00	32	0.05	46.11%	0.19
303	1982/11/09 16:00:00	1982/11/11 15:00:00	48	0.05	46.26%	0.19
304	1983/04/29 07:00:00	1983/05/02 13:00:00	79	0.05	46.41%	0.19
305	1983/12/03 15:00:00	1983/12/05 00:00:00	34	0.05	46.56%	0.19
306	1986/01/30 04:00:00	1986/02/01 17:00:00	62	0.05	46.72%	0.19
307	1987/01/06 19:00:00	1987/01/08 14:00:00	44	0.05	46.87%	0.19
308	1989/03/25 12:00:00	1989/03/27 04:00:00	41	0.05	47.02%	0.19
309	1990/04/04 08:00:00	1990/04/05 19:00:00	36	0.05	47.18%	0.19
310	1992/03/02 08:00:00	1992/03/04 04:00:00	45	0.05	47.33%	0.19
311	1992/12/27 20:00:00	1992/12/30 05:00:00	58	0.05	47.48%	0.19
312	1994/01/24 23:00:00	1994/01/28 06:00:00	80	0.05	47.63%	0.19
313	1996/10/30 14:00:00	1996/11/01 00:00:00	35	0.05	47.79%	0.19
314	2004/04/01 22:00:00	2004/04/03 03:00:00	30	0.05	47.94%	0.19
315	1952/02/29 22:00:00	1952/03/02 10:00:00	37	0.04	48.09%	0.18
316	1954/12/09 23:00:00	1954/12/11 05:00:00	31	0.04	48.24%	0.18
317	1955/02/16 21:00:00	1955/02/18 11:00:00	39	0.04	48.40%	0.18
318	1955/04/30 20:00:00	1955/05/02 15:00:00	44	0.04	48.55%	0.18
319	1959/12/10 00:00:00	1959/12/11 06:00:00	31	0.04	48.70%	0.18
320	1960/01/25 21:00:00	1960/01/27 01:00:00	29	0.04	48.85%	0.18
321	1960/11/26 18:00:00	1960/11/27 21:00:00	28	0.04	49.01%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1961/11/25 03:00:00	1961/11/26 21:00:00	43	0.04	49.16%	0.18
323	1963/11/15 17:00:00	1963/11/16 20:00:00	28	0.04	49.31%	0.18
324	1964/12/27 08:00:00	1964/12/29 05:00:00	46	0.04	49.47%	0.18
325	1965/01/24 06:00:00	1965/01/25 10:00:00	29	0.04	49.62%	0.18
326	1972/12/04 14:00:00	1972/12/05 20:00:00	31	0.04	49.77%	0.18
327	1974/12/28 08:00:00	1974/12/30 09:00:00	50	0.04	49.92%	0.18
328	1979/02/21 01:00:00	1979/02/23 18:00:00	66	0.04	50.08%	0.18
329	1979/10/20 03:00:00	1979/10/21 19:00:00	41	0.04	50.23%	0.18
330	1980/04/23 03:00:00	1980/04/24 04:00:00	26	0.04	50.38%	0.18
331	1980/12/04 13:00:00	1980/12/06 07:00:00	43	0.04	50.53%	0.18
332	1982/11/29 12:00:00	1982/12/01 14:00:00	51	0.04	50.69%	0.18
333	1984/10/17 07:00:00	1984/10/18 08:00:00	26	0.04	50.84%	0.17
334	1985/12/02 11:00:00	1985/12/03 23:00:00	37	0.04	50.99%	0.17
335	1986/02/07 22:00:00	1986/02/09 16:00:00	43	0.04	51.15%	0.17
336	1986/04/06 04:00:00	1986/04/07 14:00:00	35	0.04	51.30%	0.17
337	1986/10/09 20:00:00	1986/10/11 15:00:00	44	0.04	51.45%	0.17
338	1986/12/06 08:00:00	1986/12/08 04:00:00	45	0.04	51.60%	0.17
339	1987/04/04 15:00:00	1987/04/05 18:00:00	28	0.04	51.76%	0.17
340	1990/05/28 08:00:00	1990/05/29 13:00:00	30	0.04	51.91%	0.17
341	1995/02/14 03:00:00	1995/02/15 18:00:00	40	0.04	52.06%	0.17
342	1998/12/06 06:00:00	1998/12/07 02:00:00	21	0.04	52.21%	0.17
343	1999/02/04 15:00:00	1999/02/06 01:00:00	35	0.04	52.37%	0.17
344	1999/03/25 14:00:00	1999/03/26 19:00:00	30	0.04	52.52%	0.17
345	2000/04/17 18:00:00	2000/04/19 03:00:00	34	0.04	52.67%	0.17
346	2000/10/26 09:00:00	2000/10/28 09:00:00	49	0.04	52.82%	0.17
347	2001/03/06 16:00:00	2001/03/08 09:00:00	42	0.04	52.98%	0.17
348	2004/02/03 00:00:00	2004/02/04 11:00:00	36	0.04	53.13%	0.17
349	2004/12/05 12:00:00	2004/12/06 18:00:00	31	0.04	53.28%	0.17
350	2006/03/28 22:00:00	2006/03/30 05:00:00	32	0.04	53.44%	0.17
351	2006/05/22 05:00:00	2006/05/23 06:00:00	26	0.04	53.59%	0.17
352	2007/12/07 06:00:00	2007/12/09 15:00:00	58	0.04	53.74%	0.17
353	1952/03/12 22:00:00	1952/03/14 03:00:00	30	0.03	53.89%	0.16
354	1952/11/23 01:00:00	1952/11/24 03:00:00	27	0.03	54.05%	0.16
355	1953/01/06 17:00:00	1953/01/09 00:00:00	56	0.03	54.20%	0.16
356	1953/04/27 21:00:00	1953/04/28 18:00:00	22	0.03	54.35%	0.16
357	1953/11/14 17:00:00	1953/11/16 01:00:00	33	0.03	54.50%	0.16
358	1954/01/12 10:00:00	1954/01/13 18:00:00	33	0.03	54.66%	0.16
359	1955/03/11 02:00:00	1955/03/11 22:00:00	21	0.03	54.81%	0.16
360	1955/04/22 05:00:00	1955/04/23 04:00:00	24	0.03	54.96%	0.16
361	1955/11/14 07:00:00	1955/11/15 03:00:00	21	0.03	55.11%	0.16
362	1957/01/05 10:00:00	1957/01/06 11:00:00	26	0.03	55.27%	0.16
363	1957/02/23 06:00:00	1957/02/24 04:00:00	23	0.03	55.42%	0.16
364	1957/06/10 03:00:00	1957/06/10 22:00:00	20	0.03	55.57%	0.16
365	1957/10/31 01:00:00	1957/10/31 23:00:00	23	0.03	55.73%	0.16
366	1957/12/15 10:00:00	1957/12/18 01:00:00	64	0.03	55.88%	0.16
367	1958/09/24 05:00:00	1958/09/25 02:00:00	22	0.03	56.03%	0.16
368	1959/01/06 08:00:00	1959/01/07 06:00:00	23	0.03	56.18%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1959/02/08 04:00:00	1959/02/09 17:00:00	38	0.03	56.34%	0.16
370	1960/02/08 23:00:00	1960/02/11 01:00:00	51	0.03	56.49%	0.16
371	1961/11/20 16:00:00	1961/11/21 16:00:00	25	0.03	56.64%	0.16
372	1962/02/15 19:00:00	1962/02/17 11:00:00	41	0.03	56.79%	0.16
373	1962/03/06 07:00:00	1962/03/07 19:00:00	37	0.03	56.95%	0.16
374	1963/04/26 03:00:00	1963/04/26 22:00:00	20	0.03	57.10%	0.16
375	1963/09/04 08:00:00	1963/09/05 08:00:00	25	0.03	57.25%	0.16
376	1964/03/23 00:00:00	1964/03/24 16:00:00	41	0.03	57.40%	0.15
377	1965/03/12 18:00:00	1965/03/14 10:00:00	41	0.03	57.56%	0.15
378	1966/10/10 13:00:00	1966/10/11 08:00:00	20	0.03	57.71%	0.15
379	1967/03/31 11:00:00	1967/04/01 05:00:00	19	0.03	57.86%	0.15
380	1967/04/18 21:00:00	1967/04/20 17:00:00	45	0.03	58.02%	0.15
381	1967/04/21 21:00:00	1967/04/22 19:00:00	23	0.03	58.17%	0.15
382	1968/02/13 04:00:00	1968/02/14 06:00:00	27	0.03	58.32%	0.15
383	1968/04/01 21:00:00	1968/04/02 18:00:00	22	0.03	58.47%	0.15
384	1969/01/18 22:00:00	1969/01/22 15:00:00	90	0.03	58.63%	0.15
385	1972/11/11 09:00:00	1972/11/12 07:00:00	23	0.03	58.78%	0.15
386	1973/02/28 02:00:00	1973/03/01 03:00:00	26	0.03	58.93%	0.15
387	1973/11/17 07:00:00	1973/11/19 18:00:00	60	0.03	59.08%	0.15
388	1974/03/02 10:00:00	1974/03/03 17:00:00	32	0.03	59.24%	0.15
389	1975/02/03 08:00:00	1975/02/05 03:00:00	44	0.03	59.39%	0.15
390	1975/02/09 09:00:00	1975/02/10 21:00:00	37	0.03	59.54%	0.15
391	1975/04/17 08:00:00	1975/04/18 05:00:00	22	0.03	59.69%	0.15
392	1975/11/27 18:00:00	1975/11/29 16:00:00	47	0.03	59.85%	0.15
393	1977/12/18 06:00:00	1977/12/19 02:00:00	21	0.03	60.00%	0.15
394	1978/01/30 17:00:00	1978/01/31 17:00:00	25	0.03	60.15%	0.15
395	1978/11/21 17:00:00	1978/11/22 18:00:00	26	0.03	60.31%	0.15
396	1978/11/24 09:00:00	1978/11/25 06:00:00	22	0.03	60.46%	0.15
397	1979/01/09 11:00:00	1979/01/10 09:00:00	23	0.03	60.61%	0.15
398	1982/01/28 23:00:00	1982/01/29 23:00:00	25	0.03	60.76%	0.15
399	1982/03/26 01:00:00	1982/03/27 00:00:00	24	0.03	60.92%	0.15
400	1982/09/26 05:00:00	1982/09/27 12:00:00	32	0.03	61.07%	0.15
401	1982/11/19 01:00:00	1982/11/20 17:00:00	41	0.03	61.22%	0.15
402	1982/12/29 19:00:00	1982/12/30 14:00:00	20	0.03	61.37%	0.14
403	1983/02/02 15:00:00	1983/02/04 00:00:00	34	0.03	61.53%	0.14
404	1983/04/12 10:00:00	1983/04/13 23:00:00	38	0.03	61.68%	0.14
405	1983/11/20 08:00:00	1983/11/21 11:00:00	28	0.03	61.83%	0.14
406	1984/12/10 20:00:00	1984/12/13 02:00:00	55	0.03	61.98%	0.14
407	1984/12/16 03:00:00	1984/12/17 03:00:00	25	0.03	62.14%	0.14
408	1985/01/08 01:00:00	1985/01/08 23:00:00	23	0.03	62.29%	0.14
409	1987/02/13 21:00:00	1987/02/14 16:00:00	20	0.03	62.44%	0.14
410	1987/03/22 02:00:00	1987/03/22 19:00:00	18	0.03	62.60%	0.14
411	1988/01/05 15:00:00	1988/01/06 16:00:00	26	0.03	62.75%	0.14
412	1990/01/31 01:00:00	1990/01/31 20:00:00	20	0.03	62.90%	0.14
413	1990/02/04 11:00:00	1990/02/05 06:00:00	20	0.03	63.05%	0.14
414	1990/04/17 08:00:00	1990/04/18 07:00:00	24	0.03	63.21%	0.14
415	1990/06/09 15:00:00	1990/06/11 08:00:00	42	0.03	63.36%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1993/02/23 19:00:00	1993/02/24 23:00:00	29	0.03	63.51%	0.14
417	1995/01/21 03:00:00	1995/01/21 22:00:00	20	0.03	63.66%	0.14
418	1996/01/21 19:00:00	1996/01/23 03:00:00	33	0.03	63.82%	0.14
419	1996/02/21 03:00:00	1996/02/22 18:00:00	40	0.03	63.97%	0.14
420	1996/03/12 20:00:00	1996/03/14 07:00:00	36	0.03	64.12%	0.14
421	1996/12/27 16:00:00	1996/12/29 04:00:00	37	0.03	64.27%	0.14
422	1997/01/23 07:00:00	1997/01/24 14:00:00	32	0.03	64.43%	0.14
423	1998/12/01 17:00:00	1998/12/02 11:00:00	19	0.03	64.58%	0.14
424	2000/02/11 17:00:00	2000/02/15 03:00:00	83	0.03	64.73%	0.14
425	2005/03/22 21:00:00	2005/03/23 16:00:00	20	0.03	64.89%	0.14
426	2005/10/16 18:00:00	2005/10/19 03:00:00	58	0.03	65.04%	0.14
427	2005/12/31 17:00:00	2006/01/03 21:00:00	77	0.03	65.19%	0.14
428	2006/02/19 04:00:00	2006/02/20 07:00:00	28	0.03	65.34%	0.14
429	2006/12/10 01:00:00	2006/12/11 07:00:00	31	0.03	65.50%	0.14
430	2007/08/26 11:00:00	2007/08/27 10:00:00	24	0.03	65.65%	0.14
431	2007/12/19 00:00:00	2007/12/20 08:00:00	33	0.03	65.80%	0.14
432	2008/02/03 08:00:00	2008/02/04 15:00:00	32	0.03	65.95%	0.13
433	1951/12/05 01:00:00	1951/12/05 21:00:00	21	0.02	66.11%	0.13
434	1951/12/19 09:00:00	1951/12/20 03:00:00	19	0.02	66.26%	0.13
435	1952/12/17 12:00:00	1952/12/18 00:00:00	13	0.02	66.41%	0.13
436	1952/12/28 09:00:00	1952/12/29 03:00:00	19	0.02	66.56%	0.13
437	1953/02/23 10:00:00	1953/02/24 10:00:00	25	0.02	66.72%	0.13
438	1953/10/22 07:00:00	1953/10/22 20:00:00	14	0.02	66.87%	0.13
439	1955/01/01 23:00:00	1955/01/02 16:00:00	18	0.02	67.02%	0.13
440	1955/01/30 23:00:00	1955/01/31 22:00:00	24	0.02	67.18%	0.13
441	1955/11/17 13:00:00	1955/11/18 07:00:00	19	0.02	67.33%	0.13
442	1956/02/24 10:00:00	1956/02/25 00:00:00	15	0.02	67.48%	0.13
443	1956/12/06 04:00:00	1956/12/06 15:00:00	12	0.02	67.63%	0.13
444	1957/05/19 09:00:00	1957/05/19 18:00:00	10	0.02	67.79%	0.13
445	1957/05/21 05:00:00	1957/05/21 22:00:00	18	0.02	67.94%	0.13
446	1957/10/21 04:00:00	1957/10/21 19:00:00	16	0.02	68.09%	0.13
447	1958/02/13 06:00:00	1958/02/13 16:00:00	11	0.02	68.24%	0.13
448	1958/03/11 02:00:00	1958/03/12 13:00:00	36	0.02	68.40%	0.13
449	1960/11/03 20:00:00	1960/11/04 08:00:00	13	0.02	68.55%	0.13
450	1960/11/13 00:00:00	1960/11/13 15:00:00	16	0.02	68.70%	0.13
451	1962/01/13 01:00:00	1962/01/13 12:00:00	12	0.02	68.85%	0.13
452	1963/02/14 11:00:00	1963/02/14 22:00:00	12	0.02	69.01%	0.13
453	1963/03/28 11:00:00	1963/03/29 03:00:00	17	0.02	69.16%	0.13
454	1964/10/15 12:00:00	1964/10/15 22:00:00	11	0.02	69.31%	0.13
455	1964/11/09 14:00:00	1964/11/11 08:00:00	43	0.02	69.47%	0.13
456	1964/12/31 22:00:00	1965/01/01 11:00:00	14	0.02	69.62%	0.13
457	1968/11/14 18:00:00	1968/11/15 17:00:00	24	0.02	69.77%	0.13
458	1969/11/10 03:00:00	1969/11/10 19:00:00	17	0.02	69.92%	0.13
459	1970/01/10 00:00:00	1970/01/12 12:00:00	61	0.02	70.08%	0.13
460	1971/01/12 20:00:00	1971/01/13 17:00:00	22	0.02	70.23%	0.13
461	1971/02/23 05:00:00	1971/02/23 20:00:00	16	0.02	70.38%	0.13
462	1971/10/16 20:00:00	1971/10/17 20:00:00	25	0.02	70.53%	0.13

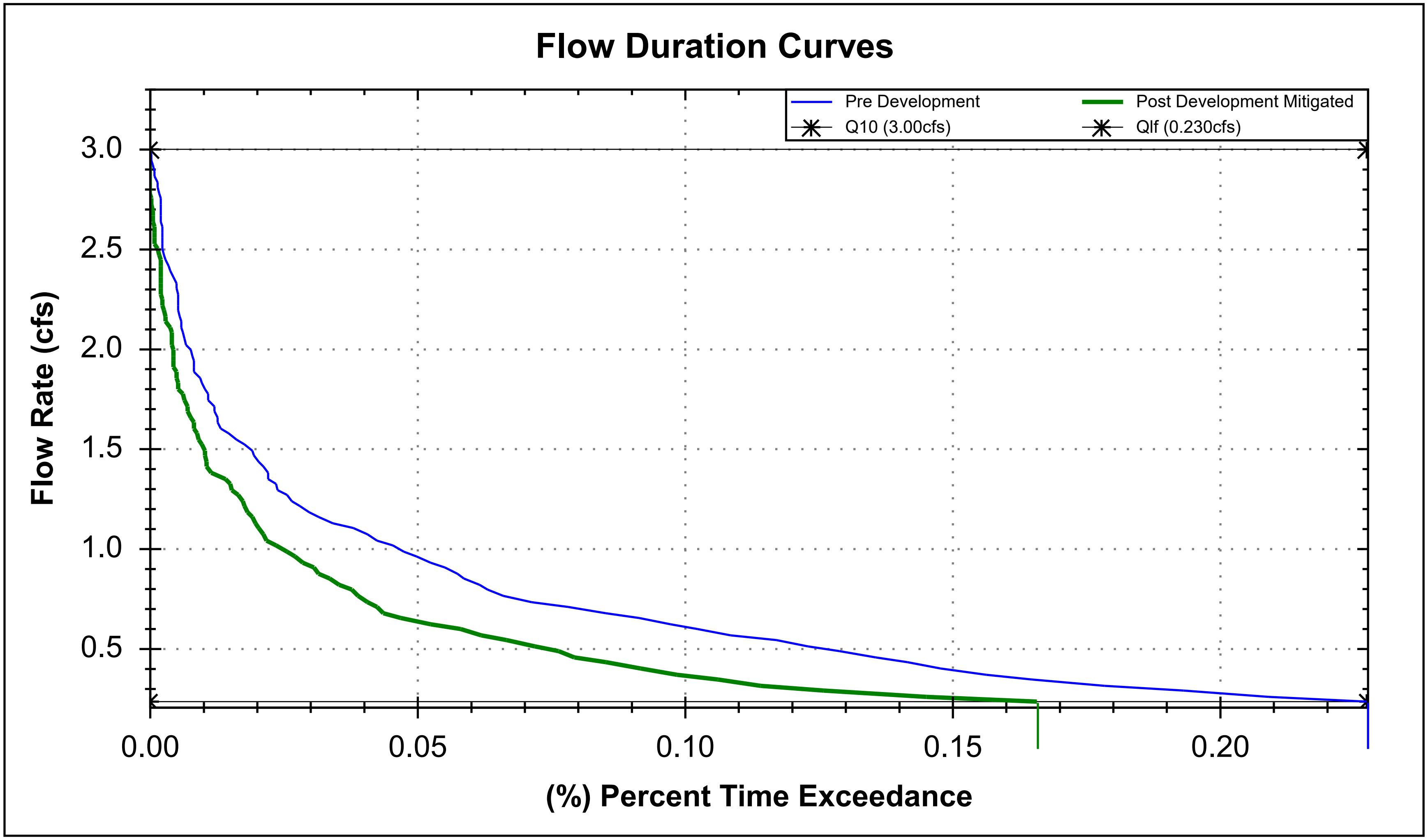
Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
463	1972/10/20 01:00:00	1972/10/20 11:00:00	11	0.02	70.69%	0.13
464	1972/12/07 08:00:00	1972/12/09 01:00:00	42	0.02	70.84%	0.13
465	1974/03/27 08:00:00	1974/03/27 22:00:00	15	0.02	70.99%	0.13
466	1975/03/22 10:00:00	1975/03/22 20:00:00	11	0.02	71.15%	0.12
467	1975/12/12 18:00:00	1975/12/13 02:00:00	9	0.02	71.30%	0.12
468	1975/12/20 15:00:00	1975/12/21 11:00:00	21	0.02	71.45%	0.12
469	1976/04/13 05:00:00	1976/04/14 04:00:00	24	0.02	71.60%	0.12
470	1976/07/27 01:00:00	1976/07/27 10:00:00	10	0.02	71.76%	0.12
471	1976/11/12 03:00:00	1976/11/12 18:00:00	16	0.02	71.91%	0.12
472	1977/01/29 02:00:00	1977/01/29 15:00:00	14	0.02	72.06%	0.12
473	1977/02/24 15:00:00	1977/02/25 08:00:00	18	0.02	72.21%	0.12
474	1977/03/16 14:00:00	1977/03/22 18:00:00	149	0.02	72.37%	0.12
475	1977/05/24 05:00:00	1977/05/24 20:00:00	16	0.02	72.52%	0.12
476	1978/04/08 12:00:00	1978/04/09 01:00:00	14	0.02	72.67%	0.12
477	1978/04/15 21:00:00	1978/04/16 05:00:00	9	0.02	72.82%	0.12
478	1978/11/11 12:00:00	1978/11/14 01:00:00	62	0.02	72.98%	0.12
479	1979/12/21 07:00:00	1979/12/22 00:00:00	18	0.02	73.13%	0.12
480	1980/03/21 21:00:00	1980/03/22 12:00:00	16	0.02	73.28%	0.12
481	1981/04/19 03:00:00	1981/04/19 15:00:00	13	0.02	73.44%	0.12
482	1982/01/10 20:00:00	1982/01/11 23:00:00	28	0.02	73.59%	0.12
483	1982/03/29 01:00:00	1982/03/29 11:00:00	11	0.02	73.74%	0.12
484	1982/09/16 11:00:00	1982/09/17 23:00:00	37	0.02	73.89%	0.12
485	1983/01/22 15:00:00	1983/01/25 23:00:00	81	0.02	74.05%	0.12
486	1984/04/27 22:00:00	1984/04/28 12:00:00	15	0.02	74.20%	0.12
487	1984/11/13 09:00:00	1984/11/13 17:00:00	9	0.02	74.35%	0.12
488	1984/12/03 09:00:00	1984/12/03 20:00:00	12	0.02	74.50%	0.12
489	1985/01/28 18:00:00	1985/01/29 17:00:00	24	0.02	74.66%	0.12
490	1985/02/02 03:00:00	1985/02/04 03:00:00	49	0.02	74.81%	0.12
491	1985/03/27 09:00:00	1985/03/28 18:00:00	34	0.02	74.96%	0.12
492	1987/03/06 02:00:00	1987/03/07 02:00:00	25	0.02	75.11%	0.12
493	1987/03/15 10:00:00	1987/03/15 19:00:00	10	0.02	75.27%	0.12
494	1987/03/25 06:00:00	1987/03/26 04:00:00	23	0.02	75.42%	0.12
495	1987/10/31 06:00:00	1987/11/02 11:00:00	54	0.02	75.57%	0.12
496	1987/11/04 19:00:00	1987/11/06 01:00:00	31	0.02	75.73%	0.12
497	1988/08/24 05:00:00	1988/08/25 01:00:00	21	0.02	75.88%	0.12
498	1988/12/27 23:00:00	1988/12/28 20:00:00	22	0.02	76.03%	0.12
499	1989/01/07 16:00:00	1989/01/08 05:00:00	14	0.02	76.18%	0.12
500	1989/01/23 21:00:00	1989/01/24 06:00:00	10	0.02	76.34%	0.12
501	1989/02/02 08:00:00	1989/02/02 19:00:00	12	0.02	76.49%	0.12
502	1989/02/03 22:00:00	1989/02/05 07:00:00	34	0.02	76.64%	0.12
503	1989/02/09 16:00:00	1989/02/10 20:00:00	29	0.02	76.79%	0.12
504	1989/03/02 16:00:00	1989/03/03 07:00:00	16	0.02	76.95%	0.12
505	1989/05/14 10:00:00	1989/05/15 20:00:00	35	0.02	77.10%	0.12
506	1990/01/14 04:00:00	1990/01/15 02:00:00	23	0.02	77.25%	0.12
507	1991/03/15 14:00:00	1991/03/16 02:00:00	13	0.02	77.40%	0.11
508	1991/10/27 00:00:00	1991/10/27 22:00:00	23	0.02	77.56%	0.11
509	1992/02/10 01:00:00	1992/02/10 17:00:00	17	0.02	77.71%	0.11

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
510	1992/03/08 02:00:00	1992/03/08 21:00:00	20	0.02	77.86%	0.11
511	1992/03/27 06:00:00	1992/03/27 18:00:00	13	0.02	78.02%	0.11
512	1993/01/02 08:00:00	1993/01/03 05:00:00	22	0.02	78.17%	0.11
513	1993/12/11 17:00:00	1993/12/12 18:00:00	26	0.02	78.32%	0.11
514	1994/11/10 12:00:00	1994/11/11 00:00:00	13	0.02	78.47%	0.11
515	1994/12/25 04:00:00	1994/12/25 14:00:00	11	0.02	78.63%	0.11
516	1995/12/13 05:00:00	1995/12/13 19:00:00	15	0.02	78.78%	0.11
517	1996/01/16 20:00:00	1996/01/17 11:00:00	16	0.02	78.93%	0.11
518	1996/03/04 22:00:00	1996/03/05 10:00:00	13	0.02	79.08%	0.11
519	1996/12/06 01:00:00	1996/12/07 01:00:00	25	0.02	79.24%	0.11
520	1997/01/03 06:00:00	1997/01/04 03:00:00	22	0.02	79.39%	0.11
521	1997/12/18 17:00:00	1997/12/19 12:00:00	20	0.02	79.54%	0.11
522	1998/01/03 17:00:00	1998/01/05 02:00:00	34	0.02	79.69%	0.11
523	1998/03/13 18:00:00	1998/03/15 10:00:00	41	0.02	79.85%	0.11
524	1998/11/28 18:00:00	1998/11/29 10:00:00	17	0.02	80.00%	0.11
525	2001/02/20 17:00:00	2001/02/21 10:00:00	18	0.02	80.15%	0.11
526	2001/02/23 17:00:00	2001/02/24 08:00:00	16	0.02	80.31%	0.11
527	2001/03/10 16:00:00	2001/03/11 13:00:00	22	0.02	80.46%	0.11
528	2001/11/29 17:00:00	2001/11/30 07:00:00	15	0.02	80.61%	0.11
529	2001/12/04 17:00:00	2001/12/05 06:00:00	14	0.02	80.76%	0.11
530	2004/03/02 01:00:00	2004/03/02 20:00:00	20	0.02	80.92%	0.11
531	2004/11/21 07:00:00	2004/11/21 17:00:00	11	0.02	81.07%	0.11
532	2005/03/04 11:00:00	2005/03/05 12:00:00	26	0.02	81.22%	0.11
533	2006/03/21 02:00:00	2006/03/21 16:00:00	15	0.02	81.37%	0.11
534	2006/12/17 01:00:00	2006/12/17 13:00:00	13	0.02	81.53%	0.11
535	2006/12/27 08:00:00	2006/12/27 17:00:00	10	0.02	81.68%	0.11
536	2007/02/11 12:00:00	2007/02/12 04:00:00	17	0.02	81.83%	0.11
537	2007/02/19 07:00:00	2007/02/19 20:00:00	14	0.02	81.98%	0.11
538	2007/02/22 22:00:00	2007/02/23 06:00:00	9	0.02	82.14%	0.11
539	2007/02/28 06:00:00	2007/03/01 05:00:00	24	0.02	82.29%	0.11
540	2008/01/23 20:00:00	2008/01/25 00:00:00	29	0.02	82.44%	0.11
541	2008/02/20 10:00:00	2008/02/21 01:00:00	16	0.02	82.60%	0.11
542	1951/11/20 21:00:00	1951/11/21 00:00:00	4	0.01	82.75%	0.11
543	1952/12/06 05:00:00	1952/12/06 09:00:00	5	0.01	82.90%	0.11
544	1953/11/05 10:00:00	1953/11/05 14:00:00	5	0.01	83.05%	0.11
545	1953/12/04 10:00:00	1953/12/04 14:00:00	5	0.01	83.21%	0.11
546	1954/12/04 00:00:00	1954/12/04 03:00:00	4	0.01	83.36%	0.11
547	1955/04/26 12:00:00	1955/04/26 14:00:00	3	0.01	83.51%	0.11
548	1957/01/20 18:00:00	1957/01/21 02:00:00	9	0.01	83.66%	0.11
549	1957/04/18 03:00:00	1957/04/18 12:00:00	10	0.01	83.82%	0.11
550	1957/11/14 19:00:00	1957/11/14 21:00:00	3	0.01	83.97%	0.11
551	1958/05/11 10:00:00	1958/05/11 19:00:00	10	0.01	84.12%	0.11
552	1959/10/01 06:00:00	1959/10/01 09:00:00	4	0.01	84.27%	0.11
553	1960/03/28 05:00:00	1960/03/28 13:00:00	9	0.01	84.43%	0.11
554	1961/03/28 07:00:00	1961/03/28 22:00:00	16	0.01	84.58%	0.11
555	1962/02/24 22:00:00	1962/02/25 07:00:00	10	0.01	84.73%	0.11
556	1962/03/23 00:00:00	1962/03/23 06:00:00	7	0.01	84.89%	0.1

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
557	1964/02/29 06:00:00	1964/02/29 08:00:00	3	0.01	85.04%	0.1
558	1964/03/02 13:00:00	1964/03/02 19:00:00	7	0.01	85.19%	0.1
559	1965/09/17 02:00:00	1965/09/17 17:00:00	16	0.01	85.34%	0.1
560	1965/12/22 02:00:00	1965/12/22 17:00:00	16	0.01	85.50%	0.1
561	1966/01/27 07:00:00	1966/01/27 18:00:00	12	0.01	85.65%	0.1
562	1967/01/31 03:00:00	1967/01/31 08:00:00	6	0.01	85.80%	0.1
563	1967/11/26 19:00:00	1967/11/27 02:00:00	8	0.01	85.95%	0.1
564	1967/12/08 01:00:00	1967/12/08 16:00:00	16	0.01	86.11%	0.1
565	1969/03/10 18:00:00	1969/03/11 00:00:00	7	0.01	86.26%	0.1
566	1969/03/13 02:00:00	1969/03/13 09:00:00	8	0.01	86.41%	0.1
567	1969/04/03 06:00:00	1969/04/03 12:00:00	7	0.01	86.56%	0.1
568	1969/12/09 01:00:00	1969/12/09 07:00:00	7	0.01	86.72%	0.1
569	1971/03/13 08:00:00	1971/03/13 10:00:00	3	0.01	86.87%	0.1
570	1971/12/04 03:00:00	1971/12/04 08:00:00	6	0.01	87.02%	0.1
571	1973/01/10 01:00:00	1973/01/10 06:00:00	6	0.01	87.18%	0.1
572	1973/02/03 22:00:00	1973/02/04 03:00:00	6	0.01	87.33%	0.1
573	1974/01/01 07:00:00	1974/01/01 12:00:00	6	0.01	87.48%	0.1
574	1975/01/30 16:00:00	1975/01/30 20:00:00	5	0.01	87.63%	0.1
575	1975/03/14 03:00:00	1975/03/14 08:00:00	6	0.01	87.79%	0.1
576	1975/04/25 09:00:00	1975/04/25 11:00:00	3	0.01	87.94%	0.1
577	1977/02/22 05:00:00	1977/02/22 09:00:00	5	0.01	88.09%	0.1
578	1978/03/22 23:00:00	1978/03/23 20:00:00	22	0.01	88.24%	0.1
579	1978/11/15 10:00:00	1978/11/15 13:00:00	4	0.01	88.40%	0.1
580	1980/05/09 13:00:00	1980/05/10 15:00:00	27	0.01	88.55%	0.1
581	1981/04/02 10:00:00	1981/04/02 13:00:00	4	0.01	88.70%	0.1
582	1983/01/18 11:00:00	1983/01/19 15:00:00	29	0.01	88.85%	0.1
583	1983/08/18 11:00:00	1983/08/18 14:00:00	4	0.01	89.01%	0.1
584	1983/10/08 03:00:00	1983/10/08 05:00:00	3	0.01	89.16%	0.1
585	1984/01/16 08:00:00	1984/01/16 13:00:00	6	0.01	89.31%	0.1
586	1985/09/18 13:00:00	1985/09/18 16:00:00	4	0.01	89.47%	0.1
587	1985/10/22 00:00:00	1985/10/22 07:00:00	8	0.01	89.62%	0.1
588	1987/07/17 12:00:00	1987/07/17 15:00:00	4	0.01	89.77%	0.1
589	1987/12/30 05:00:00	1987/12/30 10:00:00	6	0.01	89.92%	0.1
590	1990/01/02 10:00:00	1990/01/02 14:00:00	5	0.01	90.08%	0.1
591	1992/12/18 02:00:00	1992/12/18 10:00:00	9	0.01	90.23%	0.1
592	1993/02/26 22:00:00	1993/02/27 00:00:00	3	0.01	90.38%	0.1
593	1993/12/14 19:00:00	1993/12/15 10:00:00	16	0.01	90.53%	0.1
594	1995/06/15 22:00:00	1995/06/17 03:00:00	30	0.01	90.69%	0.1
595	1995/12/23 10:00:00	1995/12/23 17:00:00	8	0.01	90.84%	0.1
596	1996/01/25 14:00:00	1996/01/25 22:00:00	9	0.01	90.99%	0.1
597	1996/01/28 07:00:00	1996/01/28 09:00:00	3	0.01	91.15%	0.1
598	1996/02/03 12:00:00	1996/02/03 19:00:00	8	0.01	91.30%	0.1
599	1997/01/22 03:00:00	1997/01/22 04:00:00	2	0.01	91.45%	0.1
600	1997/02/10 21:00:00	1997/02/11 06:00:00	10	0.01	91.60%	0.1
601	1999/01/20 15:00:00	1999/01/21 07:00:00	17	0.01	91.76%	0.1
602	1999/01/31 11:00:00	1999/01/31 14:00:00	4	0.01	91.91%	0.1
603	1999/06/02 04:00:00	1999/06/02 09:00:00	6	0.01	92.06%	0.1

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
604	1999/06/04 00:00:00	1999/06/04 08:00:00	9	0.01	92.21%	0.1
605	2000/03/08 18:00:00	2000/03/09 00:00:00	7	0.01	92.37%	0.1
606	2000/11/11 02:00:00	2000/11/11 04:00:00	3	0.01	92.52%	0.1
607	2000/11/30 09:00:00	2000/11/30 12:00:00	4	0.01	92.67%	0.1
608	2001/04/10 18:00:00	2001/04/11 02:00:00	9	0.01	92.82%	0.1
609	2002/02/17 18:00:00	2002/02/18 00:00:00	7	0.01	92.98%	0.1
610	2002/03/18 00:00:00	2002/03/18 08:00:00	9	0.01	93.13%	0.1
611	2003/11/12 07:00:00	2003/11/13 05:00:00	23	0.01	93.28%	0.1
612	2004/12/08 09:00:00	2004/12/08 12:00:00	4	0.01	93.44%	0.1
613	2005/09/20 05:00:00	2005/09/20 09:00:00	5	0.01	93.59%	0.1
614	2006/03/03 16:00:00	2006/03/03 18:00:00	3	0.01	93.74%	0.09
615	2007/04/23 00:00:00	2007/04/23 09:00:00	10	0.01	93.89%	0.09
616	2007/10/13 09:00:00	2007/10/13 12:00:00	4	0.01	94.05%	0.09
617	1951/10/08 08:00:00	1951/10/08 08:00:00	1	0	94.20%	0.09
618	1951/10/11 00:00:00	1951/10/11 01:00:00	2	0	94.35%	0.09
619	1952/04/08 02:00:00	1952/04/08 07:00:00	6	0	94.50%	0.09
620	1953/01/13 23:00:00	1953/01/13 23:00:00	1	0	94.66%	0.09
621	1953/04/20 11:00:00	1953/04/20 13:00:00	3	0	94.81%	0.09
622	1955/12/04 11:00:00	1955/12/04 12:00:00	2	0	94.96%	0.09
623	1960/03/13 05:00:00	1960/03/13 05:00:00	1	0	95.11%	0.09
624	1962/05/14 20:00:00	1962/05/15 05:00:00	10	0	95.27%	0.09
625	1963/10/16 13:00:00	1963/10/16 13:00:00	1	0	95.42%	0.09
626	1965/01/07 11:00:00	1965/01/07 12:00:00	2	0	95.57%	0.09
627	1974/05/19 09:00:00	1974/05/19 10:00:00	2	0	95.73%	0.09
628	1975/04/06 18:00:00	1975/04/06 18:00:00	1	0	95.88%	0.09
629	1976/04/04 04:00:00	1976/04/04 05:00:00	2	0	96.03%	0.09
630	1977/12/23 04:00:00	1977/12/23 04:00:00	1	0	96.18%	0.09
631	1979/12/25 10:00:00	1979/12/25 10:00:00	1	0	96.34%	0.09
632	1980/04/29 09:00:00	1980/04/29 10:00:00	2	0	96.49%	0.09
633	1983/12/19 15:00:00	1983/12/19 15:00:00	1	0	96.64%	0.09
634	1984/11/16 15:00:00	1984/11/16 15:00:00	1	0	96.79%	0.09
635	1987/02/05 12:00:00	1987/02/05 13:00:00	2	0	96.95%	0.09
636	1990/01/22 11:00:00	1990/01/22 11:00:00	1	0	97.10%	0.09
637	1991/12/19 11:00:00	1991/12/19 12:00:00	2	0	97.25%	0.09
638	1992/03/29 13:00:00	1992/03/29 13:00:00	1	0	97.40%	0.09
639	1992/03/31 15:00:00	1992/03/31 15:00:00	1	0	97.56%	0.09
640	1993/11/23 04:00:00	1993/11/23 04:00:00	1	0	97.71%	0.09
641	1996/02/12 14:00:00	1996/02/12 14:00:00	1	0	97.86%	0.09
642	1996/04/18 05:00:00	1996/04/18 07:00:00	3	0	98.02%	0.09
643	1997/01/02 05:00:00	1997/01/02 05:00:00	1	0	98.17%	0.09
644	1998/12/19 20:00:00	1998/12/19 20:00:00	1	0	98.32%	0.09
645	1999/04/01 20:00:00	1999/04/01 21:00:00	2	0	98.47%	0.09
646	1999/09/18 17:00:00	1999/09/18 19:00:00	3	0	98.63%	0.09
647	2001/11/12 18:00:00	2001/11/12 21:00:00	4	0	98.78%	0.09
648	2001/12/21 19:00:00	2001/12/21 20:00:00	2	0	98.93%	0.09
649	2003/05/03 19:00:00	2003/05/03 23:00:00	5	0	99.08%	0.09
650	2004/01/02 22:00:00	2004/01/02 22:00:00	1	0	99.24%	0.09

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
651	2005/03/19 17:00:00	2005/03/19 18:00:00	2	0	99.39%	0.09
652	2006/03/07 02:00:00	2006/03/07 03:00:00	2	0	99.54%	0.09
653	2006/04/14 15:00:00	2006/04/15 11:00:00	21	0	99.69%	0.09
654	2008/01/22 06:00:00	2008/01/22 06:00:00	1	0	99.85%	0.09
--End of Data-----------------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (3.00cfs)
Qlf (0.230cfs)
Flow Rate (cfs)
3.0
2.5
2.0
1.5
1.0
0.5
0.00
0.05
0.10
0.15
0.20
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve							
Flow Control Upper Limit: 3.00 (cfs)							
Flow Control Lower Limit: 0.230 (cfs)							
post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out							
post-development time stamp: 3/16/2021 1:46:28 PM							
Compared to:							
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out							
pre-development time stamp: 3/12/2021 3:55:33 PM							
Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	0.23	0.17	0.23	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
1	0.26	0.15	0.21	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
2	0.29	0.13	0.19	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
3	0.31	0.11	0.18	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
4	0.34	0.11	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
5	0.37	0.10	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
6	0.40	0.09	0.15	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
7	0.43	0.09	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
8	0.45	0.08	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
9	0.48	0.08	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
10	0.51	0.07	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
11	0.54	0.07	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
12	0.57	0.06	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
13	0.59	0.06	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
14	0.62	0.05	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
15	0.65	0.05	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
16	0.68	0.04	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
17	0.71	0.04	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
18	0.73	0.04	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
19	0.76	0.04	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
20	0.79	0.04	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
21	0.82	0.04	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
22	0.85	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
23	0.87	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
24	0.90	0.03	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
25	0.93	0.03	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
26	0.96	0.03	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
27	0.99	0.03	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
28	1.01	0.02	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
29	1.04	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
30	1.07	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
31	1.10	0.02	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
32	1.13	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
33	1.15	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
34	1.18	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
35	1.21	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
36	1.24	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
37	1.27	0.02	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
38	1.29	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
39	1.32	0.02	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
40	1.35	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
41	1.38	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
42	1.41	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
43	1.43	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
44	1.46	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
45	1.49	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
46	1.52	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
47	1.55	0.01	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
48	1.57	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
49	1.60	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
50	1.63	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
51	1.66	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
52	1.68	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
53	1.71	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
54	1.74	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
55	1.77	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
56	1.80	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
57	1.82	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
58	1.85	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
59	1.88	0.01	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
60	1.91	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
61	1.94	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
62	1.96	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
63	1.99	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
64	2.02	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
65	2.05	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
66	2.08	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
67	2.10	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
68	2.13	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
69	2.16	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
70	2.19	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
71	2.22	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
72	2.24	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
73	2.27	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
74	2.30	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
75	2.33	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
76	2.36	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
77	2.38	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
78	2.41	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
79	2.44	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
80	2.47	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
81	2.50	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
82	2.52	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
83	2.55	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
84	2.58	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
85	2.61	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
86	2.64	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
87	2.66	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
88	2.69	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
89	2.72	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
90	2.75	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
91	2.78	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
92	2.80	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
93	2.83	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
94	2.86	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
95	2.89	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
96	2.92	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
97	2.94	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
98	2.97	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
99	3.00	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out				
time stamp: 3/12/2021 3:55:33 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.23	91	1132	0.228
2	0.26	80	1041	0.209
3	0.29	73	961	0.193
4	0.31	68	888	0.179
5	0.34	42	820	0.165
6	0.37	42	778	0.156
7	0.40	32	736	0.148
8	0.43	29	704	0.142
9	0.45	33	675	0.136
10	0.48	30	642	0.129
11	0.51	29	612	0.123
12	0.54	42	583	0.117
13	0.57	31	541	0.109
14	0.59	25	510	0.103
15	0.62	30	485	0.098
16	0.65	31	455	0.091
17	0.68	35	424	0.085
18	0.71	34	389	0.078
19	0.73	26	355	0.071
20	0.76	15	329	0.066
21	0.79	7	314	0.063
22	0.82	14	307	0.062
23	0.85	7	293	0.059
24	0.87	12	286	0.058
25	0.90	12	274	0.055
26	0.93	13	262	0.053
27	0.96	12	249	0.050
28	0.99	11	237	0.048
29	1.01	14	226	0.045
30	1.04	9	212	0.043
31	1.07	14	203	0.041
32	1.10	19	189	0.038
33	1.13	13	170	0.034
34	1.15	9	157	0.032
35	1.18	9	148	0.030
36	1.21	7	139	0.028
37	1.24	4	132	0.027
38	1.27	9	128	0.026
39	1.29	2	119	0.024
40	1.32	6	117	0.024
41	1.35	1	111	0.022
42	1.38	4	110	0.022
43	1.41	5	106	0.021
44	1.43	4	101	0.020
45	1.46	2	97	0.020
46	1.49	6	95	0.019
47	1.52	8	89	0.018
48	1.55	7	81	0.016
49	1.57	7	74	0.015
50	1.60	4	67	0.013
51	1.63	0	63	0.013

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	1.66	2	63	0.013
53	1.68	1	61	0.012
54	1.71	6	60	0.012
55	1.74	0	54	0.011
56	1.77	2	54	0.011
57	1.80	3	52	0.010
58	1.82	2	49	0.010
59	1.85	5	47	0.009
60	1.88	1	42	0.008
61	1.91	0	41	0.008
62	1.94	1	41	0.008
63	1.96	2	40	0.008
64	1.99	4	38	0.008
65	2.02	2	34	0.007
66	2.05	1	32	0.006
67	2.08	2	31	0.006
68	2.10	0	29	0.006
69	2.13	1	29	0.006
70	2.16	1	28	0.006
71	2.19	0	27	0.005
72	2.22	0	27	0.005
73	2.24	0	27	0.005
74	2.27	2	27	0.005
75	2.30	0	25	0.005
76	2.33	3	25	0.005
77	2.36	2	22	0.004
78	2.38	2	20	0.004
79	2.41	3	18	0.004
80	2.44	2	15	0.003
81	2.47	1	13	0.003
82	2.50	0	12	0.002
83	2.52	0	12	0.002
84	2.55	0	12	0.002
85	2.58	0	12	0.002
86	2.61	1	12	0.002
87	2.64	0	11	0.002
88	2.66	0	11	0.002
89	2.69	0	11	0.002
90	2.72	1	11	0.002
91	2.75	1	10	0.002
92	2.78	1	9	0.002
93	2.80	1	8	0.002
94	2.83	2	7	0.001
95	2.86	1	5	0.001
96	2.89	1	4	0.001
97	2.92	1	3	0.001
98	2.94	0	2	0.000
99	2.97	2	2	0.000
100	3.00	0	0	0.000
---------End of Data-----------------				

Duration Table Summary at Project Discharge Point

file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
time stamp: 3/16/2021 1:46:28 PM

DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.23	103	825	0.166
2	0.26	95	722	0.145
3	0.29	59	627	0.126
4	0.31	40	568	0.114
5	0.34	38	528	0.106
6	0.37	33	490	0.099
7	0.40	33	457	0.092
8	0.43	29	424	0.085
9	0.45	15	395	0.079
10	0.48	22	380	0.076
11	0.51	26	358	0.072
12	0.54	24	332	0.067
13	0.57	18	308	0.062
14	0.59	28	290	0.058
15	0.62	28	262	0.053
16	0.65	17	234	0.047
17	0.68	5	217	0.044
18	0.71	9	212	0.043
19	0.73	9	203	0.041
20	0.76	6	194	0.039
21	0.79	12	188	0.038
22	0.82	8	176	0.035
23	0.85	10	168	0.034
24	0.87	5	158	0.032
25	0.90	10	153	0.031
26	0.93	8	143	0.029
27	0.96	7	135	0.027
28	0.99	10	128	0.026
29	1.01	9	118	0.024
30	1.04	3	109	0.022
31	1.07	5	106	0.021
32	1.10	3	101	0.020
33	1.13	3	98	0.020
34	1.15	4	95	0.019
35	1.18	3	91	0.018
36	1.21	1	88	0.018
37	1.24	5	87	0.017
38	1.27	5	82	0.016
39	1.29	2	77	0.015
40	1.32	5	75	0.015
41	1.35	13	70	0.014
42	1.38	4	57	0.011
43	1.41	0	53	0.011
44	1.43	1	53	0.011
45	1.46	0	52	0.010
46	1.49	3	52	0.010
47	1.52	3	49	0.010
48	1.55	1	46	0.009
49	1.57	3	45	0.009
50	1.60	0	42	0.008
51	1.63	4	42	0.008

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	1.66	2	38	0.008
53	1.68	0	36	0.007
54	1.71	3	36	0.007
55	1.74	2	33	0.007
56	1.77	4	31	0.006
57	1.80	1	27	0.005
58	1.82	1	26	0.005
59	1.85	0	25	0.005
60	1.88	2	25	0.005
61	1.91	0	23	0.005
62	1.94	0	23	0.005
63	1.96	1	23	0.005
64	1.99	1	22	0.004
65	2.02	0	21	0.004
66	2.05	0	21	0.004
67	2.08	1	21	0.004
68	2.10	5	20	0.004
69	2.13	0	15	0.003
70	2.16	1	15	0.003
71	2.19	2	14	0.003
72	2.22	0	12	0.002
73	2.24	1	12	0.002
74	2.27	0	11	0.002
75	2.30	0	11	0.002
76	2.33	0	11	0.002
77	2.36	0	11	0.002
78	2.38	1	11	0.002
79	2.41	0	10	0.002
80	2.44	1	10	0.002
81	2.47	2	9	0.002
82	2.50	2	7	0.001
83	2.52	1	5	0.001
84	2.55	0	4	0.001
85	2.58	0	4	0.001
86	2.61	1	4	0.001
87	2.64	0	3	0.001
88	2.66	0	3	0.001
89	2.69	1	3	0.001
90	2.72	0	2	0.000
91	2.75	1	2	0.000
92	2.78	0	1	0.000
93	2.80	0	1	0.000
94	2.83	0	1	0.000
95	2.86	0	1	0.000
96	2.89	1	1	0.000
97	2.92	0	0	0.000
98	2.94	0	0	0.000
99	2.97	0	0	0.000
100	3.00	0	0	0.000
---------End of Data-----------------				

END OF STATISTICS ANALYSIS

STATISTICS ANALYSIS OF THE SWMM FILES FOR:

DISCHARGE NODE: POC-4

ANALYSIS DETAILS

Stream Susceptibility to Channel Erosion: High
Low Flow Threshold = (0.1)Q2 = (0.1)0.590 = Qlf = 0.0590 (cfs)
Flow Control Upper Limit = Q10 = 0.760 (cfs)
Assumed time between storms (hours): 24

PRE-DEVELOPMENT SWMM FILE

SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM file time stamp: 3/12/2021 3:55:33 PM
Selected Node to Analyze: POC-4

POST-DEVELOPMENT MITIGATED SWMM FILE

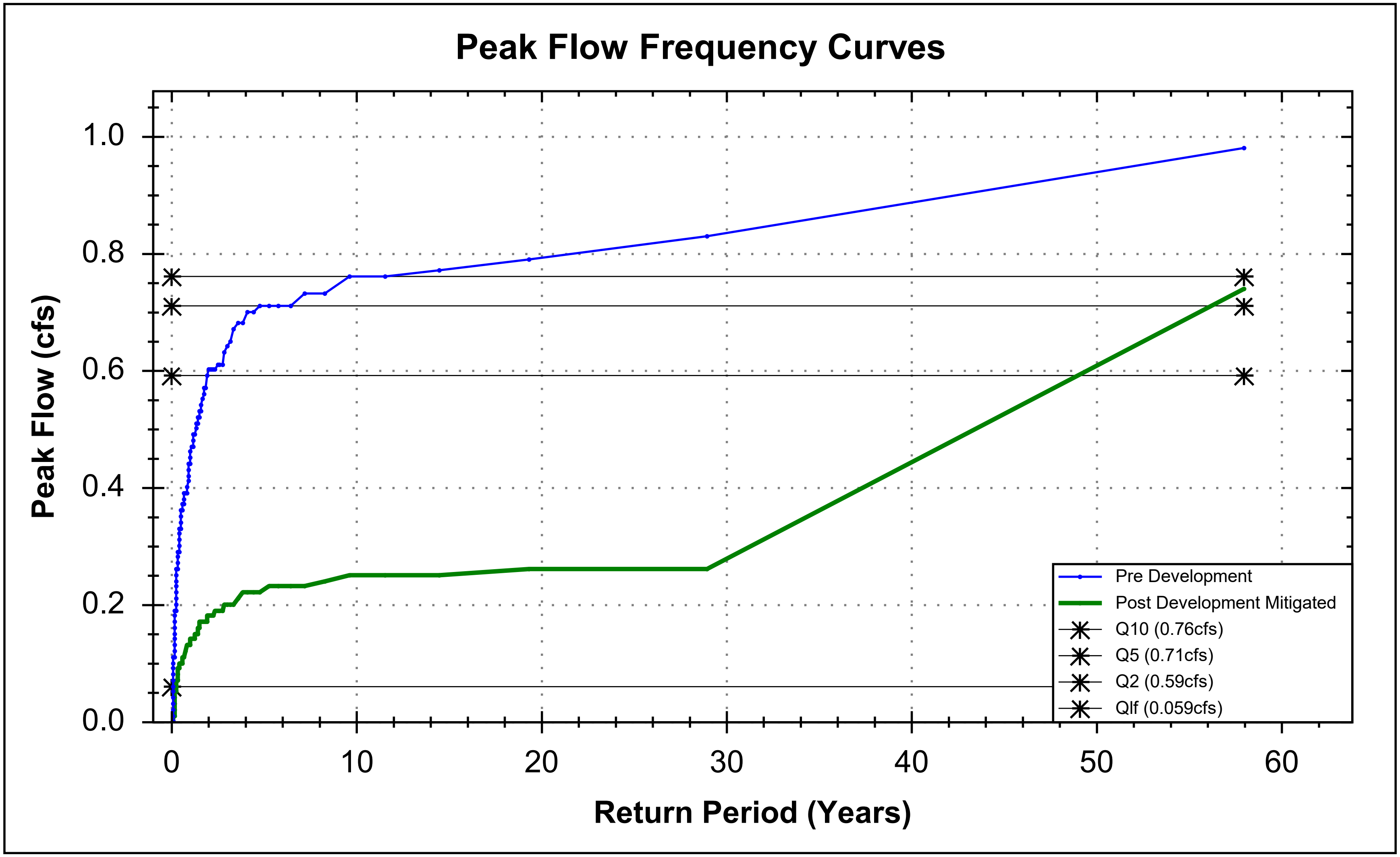
SWMM file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM file time stamp: 3/16/2021 1:46:28 PM
Selected Node to Analyze: POC-4

MITIGATED CONDITIONS RESULTS

For the Mitigated Conditions:
Peak Flow Conditions PASS
Flow Duration Conditions PASS

The Mitigated Conditions peak flow frequency curve is composed of 343 points. Of the points, 0 point(s) are above the flow control upper limit (Q10 = 0.76 (cfs)), 115 point(s) are below the low flow threshold value (Qlf = 0.059 (cfs)). Of the points within the flow control range (Qlf to Q10), 228 point(s) have a lower peak flow rate than pre-development conditions. These points all pass. There are no points that failed, therefore the peak flow requirements have been met.

The Mitigated Conditions flow duration curve is composed of 100 flow bins (points). Each point represents the number of hours where the discharge was equal to or greater than the discharge value, but less than the next greater discharge value. Within the flow control range, comparing the post-development flow duration curve to the pre-development flow duration curve, 100 post-development curve point(s) have a lower flow duration than pre-development conditions. These points all pass. There are no points that failed, therefore the flow duration requirements have been met.



Peak Flow Frequency Curves
Peak Flow (cfs)
1.0
0.8
0.6
0.4
0.2
0.0
0
10
20
30
40
50
60
Return Period (Years)
Pre Development
Post Development Mitigated
Q10 (0.76cfs)
Q5 (0.71cfs)
Q2 (0.59cfs)
Qlf (0.059cfs)

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 0.76 (cfs)
Flow Control Lower Limit: 0.059 (cfs)

post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
post-development time stamp: 3/16/2021 1:46:28 PM
Compared to:
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
pre-development time stamp: 3/12/2021 3:55:33 PM

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
0	58.00	0.74	0.98	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
1	29.00	0.26	0.83	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
2	19.33	0.26	0.79	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
3	14.50	0.25	0.77	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
4	11.60	0.25	0.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
5	9.67	0.25	0.76	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
6	8.29	0.24	0.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
7	7.25	0.23	0.73	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
8	6.44	0.23	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
9	5.80	0.23	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
10	5.27	0.23	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
11	4.83	0.22	0.71	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
12	4.46	0.22	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
13	4.14	0.22	0.70	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
14	3.87	0.22	0.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
15	3.63	0.21	0.68	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
16	3.41	0.20	0.67	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
17	3.22	0.20	0.65	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
18	3.05	0.20	0.64	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
19	2.90	0.20	0.63	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
20	2.76	0.19	0.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
21	2.64	0.19	0.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
22	2.52	0.19	0.61	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
23	2.42	0.19	0.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
24	2.32	0.18	0.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
25	2.23	0.18	0.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
26	2.15	0.18	0.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
27	2.07	0.18	0.60	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
28	2.00	0.18	0.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
29	1.93	0.17	0.59	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
30	1.87	0.17	0.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
31	1.81	0.17	0.57	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
32	1.76	0.17	0.56	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
33	1.71	0.17	0.55	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
34	1.66	0.17	0.54	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
35	1.61	0.17	0.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
36	1.57	0.17	0.53	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
37	1.53	0.16	0.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
38	1.49	0.16	0.52	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
39	1.45	0.15	0.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
40	1.42	0.15	0.51	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
41	1.38	0.15	0.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
42	1.35	0.15	0.50	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
43	1.32	0.15	0.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
44	1.29	0.15	0.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
45	1.26	0.14	0.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
46	1.23	0.14	0.49	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
47	1.21	0.14	0.48	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
48	1.18	0.14	0.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
49	1.16	0.14	0.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
50	1.14	0.14	0.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
51	1.12	0.14	0.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
52	1.09	0.14	0.47	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
53	1.07	0.14	0.46	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
54	1.06	0.14	0.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
55	1.04	0.14	0.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
56	1.02	0.13	0.45	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
57	1.00	0.13	0.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
58	0.98	0.13	0.44	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
59	0.97	0.13	0.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
60	0.95	0.13	0.43	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
61	0.94	0.13	0.42	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
62	0.92	0.13	0.41	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
63	0.91	0.13	0.40	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
64	0.89	0.13	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
65	0.88	0.13	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
66	0.87	0.13	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
67	0.85	0.13	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
68	0.84	0.13	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
69	0.83	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
70	0.82	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
71	0.81	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
72	0.80	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
73	0.78	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
74	0.77	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
75	0.76	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
76	0.75	0.12	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
77	0.74	0.11	0.39	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
78	0.73	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
79	0.73	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
80	0.72	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
81	0.71	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
82	0.70	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
83	0.69	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
84	0.68	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
85	0.67	0.11	0.38	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
86	0.67	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
87	0.66	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
88	0.65	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
89	0.64	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
90	0.64	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
91	0.63	0.11	0.37	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
92	0.62	0.11	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
93	0.62	0.11	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
94	0.61	0.11	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
95	0.60	0.11	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
96	0.60	0.10	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
97	0.59	0.10	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
98	0.59	0.10	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
99	0.58	0.10	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
100	0.57	0.10	0.36	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
101	0.57	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
102	0.56	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
103	0.56	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
104	0.55	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
105	0.55	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
106	0.54	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
107	0.54	0.10	0.35	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
108	0.53	0.10	0.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
109	0.53	0.10	0.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
110	0.52	0.10	0.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
111	0.52	0.10	0.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
112	0.51	0.10	0.34	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
113	0.51	0.10	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
114	0.50	0.10	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
115	0.50	0.10	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
116	0.50	0.10	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
117	0.49	0.10	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
118	0.49	0.09	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
119	0.48	0.09	0.33	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
120	0.48	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
121	0.48	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
122	0.47	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
123	0.47	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
124	0.46	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
125	0.46	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
126	0.46	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
127	0.45	0.09	0.32	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
128	0.45	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
129	0.45	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
130	0.44	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
131	0.44	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
132	0.44	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
133	0.43	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
134	0.43	0.09	0.31	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
135	0.43	0.09	0.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
136	0.42	0.09	0.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
137	0.42	0.09	0.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
138	0.42	0.09	0.30	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
139	0.41	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
140	0.41	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
141	0.41	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
142	0.41	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
143	0.40	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
144	0.40	0.09	0.29	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
145	0.40	0.09	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
146	0.40	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
147	0.39	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
148	0.39	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
149	0.39	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
150	0.38	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
151	0.38	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
152	0.38	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
153	0.38	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
154	0.37	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
155	0.37	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
156	0.37	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
157	0.37	0.08	0.28	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
158	0.37	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
159	0.36	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
160	0.36	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
161	0.36	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
162	0.36	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
163	0.35	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
164	0.35	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
165	0.35	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
166	0.35	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
167	0.35	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
168	0.34	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
169	0.34	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
170	0.34	0.08	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
171	0.34	0.07	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
172	0.34	0.07	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
173	0.33	0.07	0.27	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
174	0.33	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
175	0.33	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
176	0.33	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
177	0.33	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
178	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
179	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
180	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
181	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
182	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
183	0.32	0.07	0.26	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
184	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
185	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
186	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
187	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
188	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
189	0.31	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
190	0.30	0.07	0.25	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
191	0.30	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
192	0.30	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
193	0.30	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
194	0.30	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
195	0.30	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
196	0.29	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
197	0.29	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
198	0.29	0.07	0.24	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
199	0.29	0.07	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
200	0.29	0.07	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
201	0.29	0.07	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
202	0.29	0.06	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
203	0.28	0.06	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
204	0.28	0.06	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
205	0.28	0.06	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
206	0.28	0.06	0.23	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
207	0.28	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
208	0.28	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
209	0.28	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
210	0.28	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
211	0.27	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
212	0.27	0.06	0.22	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
213	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
214	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
215	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
216	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
217	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
218	0.27	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
219	0.26	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
220	0.26	0.06	0.21	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
221	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
222	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
223	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
224	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
225	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
226	0.26	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
227	0.25	0.06	0.20	TRUE	FALSE	FALSE	Pass- Qpost < Qpre
228	0.25	0.05	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
229	0.25	0.05	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
230	0.25	0.05	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
231	0.25	0.05	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
232	0.25	0.05	0.20	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
233	0.25	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
234	0.25	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
235	0.25	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
236	0.25	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
237	0.24	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
238	0.24	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
239	0.24	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
240	0.24	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
241	0.24	0.05	0.19	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
242	0.24	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
243	0.24	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
244	0.24	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
245	0.24	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
246	0.24	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
247	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
248	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
249	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
250	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
251	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
252	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
253	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
254	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
255	0.23	0.05	0.18	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
256	0.23	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
257	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
258	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
259	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
260	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
261	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
262	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
263	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
264	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
265	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
266	0.22	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
267	0.21	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
268	0.21	0.05	0.17	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
269	0.21	0.05	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
270	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
271	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
272	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
273	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
274	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
275	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
276	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
277	0.21	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
278	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
279	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
280	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
281	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
282	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
283	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
284	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
285	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
286	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
287	0.20	0.04	0.16	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
288	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
289	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
290	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
291	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
292	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
293	0.19	0.04	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
294	0.19	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
295	0.19	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
296	0.19	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
297	0.19	0.03	0.15	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
298	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
299	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
300	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
301	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
302	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
303	0.18	0.03	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
304	0.18	0.02	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
305	0.18	0.02	0.14	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
306	0.18	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
307	0.18	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
308	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
309	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
310	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
311	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
312	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
313	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
314	0.17	0.02	0.13	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
315	0.17	0.02	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
316	0.17	0.02	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
317	0.17	0.02	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
318	0.16	0.01	0.12	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
319	0.16	0.01	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
320	0.16	0.01	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
321	0.16	0.01	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
322	0.16	0.01	0.11	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
323	0.16	0.01	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
324	0.16	0.01	0.10	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
325	0.16	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))

Post PT #	Rtn Prd (yrs)	Post Dev Q (cfs)	Pre Dev Q (cfs)	Qpost < Qpre	Qpost > Qpre	Qpost > 110% Qpre	Pass/Fail
326	0.16	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
327	0.16	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
328	0.15	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
329	0.15	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
330	0.15	0.01	0.09	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
331	0.15	0.01	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
332	0.15	0.01	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
333	0.15	0.01	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
334	0.15	0.00	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
335	0.15	0.00	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
336	0.15	0.00	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
337	0.15	0.00	0.08	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
338	0.15	0.00	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
339	0.14	0.00	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
340	0.14	0.00	0.07	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
341	0.14	0.00	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))
342	0.14	0.00	0.06	FALSE	FALSE	FALSE	Pass- Qpost Below Qlf (0.059 (cfs))

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
SWMM.out time stamp: 3/12/2021 3:55:33 PM

Q10: 0.760 (cfs)
Q5: 0.710 (cfs)
Q2: 0.590 (cfs)

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/04 14:00:00	1995/01/04 22:00:00	9	0.98	0.20%	58
2	2003/02/25 13:00:00	2003/02/26 01:00:00	13	0.83	0.39%	29
3	1958/02/03 04:00:00	1958/02/04 14:00:00	35	0.79	0.59%	19.33
4	1969/02/23 23:00:00	1969/02/25 20:00:00	46	0.77	0.78%	14.5
5	2000/10/29 22:00:00	2000/10/30 00:00:00	3	0.76	0.98%	11.6
6	2004/10/27 02:00:00	2004/10/27 15:00:00	14	0.76	1.17%	9.67
7	1993/01/12 19:00:00	1993/01/14 05:00:00	35	0.73	1.37%	8.29
8	2005/02/18 05:00:00	2005/02/19 00:00:00	20	0.73	1.57%	7.25
9	1978/01/03 19:00:00	1978/01/04 17:00:00	23	0.71	1.76%	6.44
10	1978/02/27 23:00:00	1978/03/01 09:00:00	35	0.71	1.96%	5.8
11	1979/01/15 13:00:00	1979/01/15 19:00:00	7	0.71	2.15%	5.27
12	1980/02/17 21:00:00	1980/02/21 07:00:00	83	0.71	2.35%	4.83
13	1952/01/16 07:00:00	1952/01/16 16:00:00	10	0.7	2.54%	4.46
14	1982/03/17 03:00:00	1982/03/18 03:00:00	25	0.7	2.74%	4.14
15	1958/04/01 08:00:00	1958/04/01 21:00:00	14	0.68	2.94%	3.87
16	1980/03/02 20:00:00	1980/03/03 11:00:00	16	0.68	3.13%	3.63
17	1985/11/11 09:00:00	1985/11/12 05:00:00	21	0.67	3.33%	3.41
18	1993/02/18 12:00:00	1993/02/18 13:00:00	2	0.65	3.52%	3.22
19	1970/12/19 02:00:00	1970/12/19 22:00:00	21	0.64	3.72%	3.05
20	1952/11/15 13:00:00	1952/11/16 03:00:00	15	0.63	3.91%	2.9
21	1978/02/10 02:00:00	1978/02/10 06:00:00	5	0.61	4.11%	2.76
22	1983/01/29 00:00:00	1983/01/29 03:00:00	4	0.61	4.31%	2.64
23	1991/02/27 18:00:00	1991/03/01 11:00:00	42	0.61	4.50%	2.52
24	1965/11/22 04:00:00	1965/11/23 04:00:00	25	0.6	4.70%	2.42
25	1980/02/16 18:00:00	1980/02/16 20:00:00	3	0.6	4.89%	2.32
26	1991/12/29 15:00:00	1991/12/30 03:00:00	13	0.6	5.09%	2.23
27	1998/02/03 14:00:00	1998/02/04 01:00:00	12	0.6	5.28%	2.15
28	2008/01/27 00:00:00	2008/01/27 22:00:00	23	0.6	5.48%	2.07
29	1983/02/27 16:00:00	1983/02/27 19:00:00	4	0.59	5.68%	2
30	2004/10/19 14:00:00	2004/10/20 15:00:00	26	0.59	5.87%	1.93
31	1998/02/22 15:00:00	1998/02/24 00:00:00	34	0.57	6.07%	1.87
32	2005/04/28 08:00:00	2005/04/28 09:00:00	2	0.57	6.26%	1.81
33	1982/12/22 23:00:00	1982/12/23 00:00:00	2	0.56	6.46%	1.76
34	1994/02/03 23:00:00	1994/02/04 10:00:00	12	0.55	6.65%	1.71
35	2007/01/30 23:00:00	2007/01/31 00:00:00	2	0.54	6.85%	1.66
36	1961/12/01 19:00:00	1961/12/02 15:00:00	21	0.53	7.05%	1.61
37	1998/02/16 17:00:00	1998/02/17 23:00:00	31	0.53	7.24%	1.57
38	1963/03/16 23:00:00	1963/03/17 02:00:00	4	0.52	7.44%	1.53
39	1993/01/15 12:00:00	1993/01/18 15:00:00	76	0.52	7.63%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1995/03/11 01:00:00	1995/03/12 00:00:00	24	0.51	7.83%	1.45
41	2008/01/05 04:00:00	2008/01/07 01:00:00	46	0.51	8.02%	1.42
42	1978/01/16 17:00:00	1978/01/17 02:00:00	10	0.5	8.22%	1.38
43	1986/03/15 21:00:00	1986/03/16 19:00:00	23	0.5	8.41%	1.35
44	1980/01/28 18:00:00	1980/01/30 16:00:00	47	0.49	8.61%	1.32
45	1981/03/19 19:00:00	1981/03/19 21:00:00	3	0.49	8.81%	1.29
46	1986/02/14 23:00:00	1986/02/15 06:00:00	8	0.49	9.00%	1.26
47	1992/02/12 17:00:00	1992/02/13 07:00:00	15	0.49	9.20%	1.23
48	1972/01/16 20:00:00	1972/01/16 23:00:00	4	0.48	9.39%	1.21
49	1977/08/17 01:00:00	1977/08/17 10:00:00	10	0.47	9.59%	1.18
50	1983/10/01 01:00:00	1983/10/01 03:00:00	3	0.47	9.78%	1.16
51	1983/12/24 18:00:00	1983/12/25 11:00:00	18	0.47	9.98%	1.14
52	1998/02/14 15:00:00	1998/02/14 22:00:00	8	0.47	10.18%	1.12
53	2008/02/22 02:00:00	2008/02/22 09:00:00	8	0.47	10.37%	1.09
54	1993/02/07 21:00:00	1993/02/08 12:00:00	16	0.46	10.57%	1.07
55	1960/04/27 05:00:00	1960/04/27 11:00:00	7	0.45	10.76%	1.06
56	1978/09/05 17:00:00	1978/09/05 19:00:00	3	0.45	10.96%	1.04
57	2006/10/14 01:00:00	2006/10/14 01:00:00	1	0.45	11.15%	1.02
58	1969/02/06 08:00:00	1969/02/06 17:00:00	10	0.44	11.35%	1
59	2001/01/26 16:00:00	2001/01/27 00:00:00	9	0.44	11.55%	0.98
60	1979/11/07 18:00:00	1979/11/07 19:00:00	2	0.43	11.74%	0.97
61	2004/12/31 14:00:00	2004/12/31 15:00:00	2	0.43	11.94%	0.95
62	2003/02/11 17:00:00	2003/02/12 21:00:00	29	0.42	12.13%	0.94
63	2002/11/08 16:00:00	2002/11/08 19:00:00	4	0.41	12.33%	0.92
64	1968/12/25 19:00:00	1968/12/25 20:00:00	2	0.4	12.52%	0.91
65	1952/03/15 20:00:00	1952/03/16 18:00:00	23	0.39	12.72%	0.89
66	1958/02/19 09:00:00	1958/02/19 15:00:00	7	0.39	12.92%	0.88
67	1963/09/17 06:00:00	1963/09/18 21:00:00	40	0.39	13.11%	0.87
68	1967/12/18 16:00:00	1967/12/19 12:00:00	21	0.39	13.31%	0.85
69	1978/01/14 16:00:00	1978/01/15 05:00:00	14	0.39	13.50%	0.84
70	1980/01/10 23:00:00	1980/01/12 12:00:00	38	0.39	13.70%	0.83
71	1983/01/27 07:00:00	1983/01/27 13:00:00	7	0.39	13.89%	0.82
72	1983/03/01 13:00:00	1983/03/04 05:00:00	65	0.39	14.09%	0.81
73	1988/12/24 20:00:00	1988/12/25 00:00:00	5	0.39	14.29%	0.8
74	1991/03/25 02:00:00	1991/03/27 05:00:00	52	0.39	14.48%	0.78
75	1992/02/15 12:00:00	1992/02/15 16:00:00	5	0.39	14.68%	0.77
76	1997/01/12 14:00:00	1997/01/13 07:00:00	18	0.39	14.87%	0.76
77	2005/01/11 00:00:00	2005/01/11 08:00:00	9	0.39	15.07%	0.75
78	2005/02/21 03:00:00	2005/02/23 07:00:00	53	0.39	15.26%	0.74
79	1965/12/10 06:00:00	1965/12/10 10:00:00	5	0.38	15.46%	0.73
80	1968/03/08 01:00:00	1968/03/08 12:00:00	12	0.38	15.66%	0.73
81	1977/12/28 19:00:00	1977/12/30 02:00:00	32	0.38	15.85%	0.72
82	1979/01/05 07:00:00	1979/01/06 07:00:00	25	0.38	16.05%	0.71
83	1983/11/24 22:00:00	1983/11/25 01:00:00	4	0.38	16.24%	0.7
84	1988/11/25 06:00:00	1988/11/25 10:00:00	5	0.38	16.44%	0.69
85	2001/02/13 17:00:00	2001/02/14 20:00:00	28	0.38	16.63%	0.68
86	2003/03/15 16:00:00	2003/03/16 19:00:00	28	0.38	16.83%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1962/01/20 12:00:00	1962/01/20 20:00:00	9	0.37	17.03%	0.67
88	1971/12/24 07:00:00	1971/12/24 23:00:00	17	0.37	17.22%	0.66
89	1980/01/09 04:00:00	1980/01/09 18:00:00	15	0.37	17.42%	0.65
90	1990/02/17 16:00:00	1990/02/17 19:00:00	4	0.37	17.61%	0.64
91	1993/02/19 19:00:00	1993/02/19 23:00:00	5	0.37	17.81%	0.64
92	2004/10/18 07:00:00	2004/10/18 08:00:00	2	0.37	18.00%	0.63
93	1954/02/13 18:00:00	1954/02/14 02:00:00	9	0.36	18.20%	0.62
94	1967/01/22 16:00:00	1967/01/23 02:00:00	11	0.36	18.40%	0.62
95	1973/11/22 23:00:00	1973/11/23 01:00:00	3	0.36	18.59%	0.61
96	1976/09/10 05:00:00	1976/09/10 23:00:00	19	0.36	18.79%	0.6
97	1981/11/27 18:00:00	1981/11/28 21:00:00	28	0.36	18.98%	0.6
98	1986/11/18 03:00:00	1986/11/18 07:00:00	5	0.36	19.18%	0.59
99	1988/01/17 10:00:00	1988/01/17 21:00:00	12	0.36	19.37%	0.59
100	1992/03/20 22:00:00	1992/03/20 23:00:00	2	0.36	19.57%	0.58
101	2004/02/22 07:00:00	2004/02/23 07:00:00	25	0.36	19.77%	0.57
102	1957/05/11 01:00:00	1957/05/11 03:00:00	3	0.35	19.96%	0.57
103	1958/01/25 03:00:00	1958/01/25 05:00:00	3	0.35	20.16%	0.56
104	1960/01/12 02:00:00	1960/01/12 08:00:00	7	0.35	20.35%	0.56
105	1967/11/30 16:00:00	1967/11/30 17:00:00	2	0.35	20.55%	0.55
106	1978/03/30 15:00:00	1978/03/31 05:00:00	15	0.35	20.74%	0.55
107	2004/12/28 08:00:00	2004/12/29 09:00:00	26	0.35	20.94%	0.54
108	2005/01/09 04:00:00	2005/01/09 22:00:00	19	0.35	21.14%	0.54
109	1979/03/17 05:00:00	1979/03/17 08:00:00	4	0.34	21.33%	0.53
110	1991/03/19 00:00:00	1991/03/19 04:00:00	5	0.34	21.53%	0.53
111	1994/03/24 22:00:00	1994/03/25 01:00:00	4	0.34	21.72%	0.52
112	1995/01/10 14:00:00	1995/01/12 14:00:00	49	0.34	21.92%	0.52
113	1999/01/26 22:00:00	1999/01/26 23:00:00	2	0.34	22.11%	0.51
114	1952/12/02 01:00:00	1952/12/02 02:00:00	2	0.33	22.31%	0.51
115	1954/03/16 22:00:00	1954/03/16 23:00:00	2	0.33	22.50%	0.5
116	1954/11/11 02:00:00	1954/11/11 11:00:00	10	0.33	22.70%	0.5
117	1967/11/19 07:00:00	1967/11/20 03:00:00	21	0.33	22.90%	0.5
118	1993/11/30 04:00:00	1993/11/30 04:00:00	1	0.33	23.09%	0.49
119	2001/01/11 04:00:00	2001/01/12 12:00:00	33	0.33	23.29%	0.49
120	2007/11/30 08:00:00	2007/11/30 21:00:00	14	0.33	23.48%	0.48
121	1952/11/30 01:00:00	1952/11/30 05:00:00	5	0.32	23.68%	0.48
122	1959/02/11 09:00:00	1959/02/12 04:00:00	20	0.32	23.87%	0.48
123	1959/12/24 10:00:00	1959/12/24 14:00:00	5	0.32	24.07%	0.47
124	1960/02/01 20:00:00	1960/02/02 01:00:00	6	0.32	24.27%	0.47
125	1967/03/13 10:00:00	1967/03/13 21:00:00	12	0.32	24.46%	0.46
126	1973/03/20 08:00:00	1973/03/20 11:00:00	4	0.32	24.66%	0.46
127	1975/04/08 08:00:00	1975/04/09 00:00:00	17	0.32	24.85%	0.46
128	2007/04/20 15:00:00	2007/04/20 16:00:00	2	0.32	25.05%	0.45
129	1957/01/13 04:00:00	1957/01/13 09:00:00	6	0.31	25.24%	0.45
130	1958/03/15 18:00:00	1958/03/16 12:00:00	19	0.31	25.44%	0.45
131	1972/11/14 14:00:00	1972/11/14 16:00:00	3	0.31	25.64%	0.44
132	1987/12/04 21:00:00	1987/12/04 21:00:00	1	0.31	25.83%	0.44
133	1991/01/09 14:00:00	1991/01/09 15:00:00	2	0.31	26.03%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1993/06/05 13:00:00	1993/06/05 14:00:00	2	0.31	26.22%	0.43
135	2004/02/26 03:00:00	2004/02/26 09:00:00	7	0.31	26.42%	0.43
136	1966/12/05 02:00:00	1966/12/05 14:00:00	13	0.3	26.61%	0.43
137	1995/03/05 07:00:00	1995/03/06 00:00:00	18	0.3	26.81%	0.42
138	2003/04/14 11:00:00	2003/04/15 01:00:00	15	0.3	27.01%	0.42
139	2005/01/03 06:00:00	2005/01/04 11:00:00	30	0.3	27.20%	0.42
140	1954/01/18 21:00:00	1954/01/19 22:00:00	26	0.29	27.40%	0.41
141	1963/11/20 02:00:00	1963/11/21 07:00:00	30	0.29	27.59%	0.41
142	1964/11/17 16:00:00	1964/11/17 19:00:00	4	0.29	27.79%	0.41
143	1995/01/25 08:00:00	1995/01/26 10:00:00	27	0.29	27.98%	0.41
144	1996/11/21 15:00:00	1996/11/22 03:00:00	13	0.29	28.18%	0.4
145	1998/11/08 08:00:00	1998/11/08 08:00:00	1	0.29	28.38%	0.4
146	1956/04/12 21:00:00	1956/04/13 17:00:00	21	0.28	28.57%	0.4
147	1966/02/07 22:00:00	1966/02/08 00:00:00	3	0.28	28.77%	0.4
148	1967/04/11 07:00:00	1967/04/11 10:00:00	4	0.28	28.96%	0.39
149	1977/01/02 23:00:00	1977/01/03 05:00:00	7	0.28	29.16%	0.39
150	1983/03/24 03:00:00	1983/03/24 05:00:00	3	0.28	29.35%	0.39
151	1983/04/20 03:00:00	1983/04/20 05:00:00	3	0.28	29.55%	0.38
152	1985/11/29 06:00:00	1985/11/29 14:00:00	9	0.28	29.75%	0.38
153	1987/12/16 13:00:00	1987/12/17 09:00:00	21	0.28	29.94%	0.38
154	1988/04/20 03:00:00	1988/04/21 07:00:00	29	0.28	30.14%	0.38
155	1988/12/21 03:00:00	1988/12/21 07:00:00	5	0.28	30.33%	0.37
156	1997/01/15 15:00:00	1997/01/15 19:00:00	5	0.28	30.53%	0.37
157	2002/12/20 16:00:00	2002/12/20 20:00:00	5	0.28	30.72%	0.37
158	2006/03/11 07:00:00	2006/03/11 08:00:00	2	0.28	30.92%	0.37
159	1957/02/28 20:00:00	1957/03/01 11:00:00	16	0.27	31.12%	0.37
160	1958/03/20 22:00:00	1958/03/22 06:00:00	33	0.27	31.31%	0.36
161	1960/02/29 05:00:00	1960/03/01 06:00:00	26	0.27	31.51%	0.36
162	1965/11/16 10:00:00	1965/11/16 18:00:00	9	0.27	31.70%	0.36
163	1965/12/29 19:00:00	1965/12/29 20:00:00	2	0.27	31.90%	0.36
164	1970/02/28 13:00:00	1970/03/02 04:00:00	40	0.27	32.09%	0.35
165	1971/04/14 11:00:00	1971/04/14 12:00:00	2	0.27	32.29%	0.35
166	1972/11/16 11:00:00	1972/11/17 07:00:00	21	0.27	32.49%	0.35
167	1978/02/12 17:00:00	1978/02/14 00:00:00	32	0.27	32.68%	0.35
168	1980/02/13 12:00:00	1980/02/15 02:00:00	39	0.27	32.88%	0.35
169	1981/01/29 17:00:00	1981/01/29 19:00:00	3	0.27	33.07%	0.34
170	1982/01/01 06:00:00	1982/01/02 09:00:00	28	0.27	33.27%	0.34
171	1985/11/24 23:00:00	1985/11/25 05:00:00	7	0.27	33.46%	0.34
172	1987/10/11 16:00:00	1987/10/12 17:00:00	26	0.27	33.66%	0.34
173	2001/02/25 17:00:00	2001/02/27 18:00:00	50	0.27	33.86%	0.34
174	2003/12/25 00:00:00	2003/12/25 19:00:00	20	0.27	34.05%	0.33
175	1956/01/26 19:00:00	1956/01/27 08:00:00	14	0.26	34.25%	0.33
176	1978/01/09 16:00:00	1978/01/10 23:00:00	32	0.26	34.44%	0.33
177	1980/03/05 23:00:00	1980/03/06 12:00:00	14	0.26	34.64%	0.33
178	1982/12/07 22:00:00	1982/12/08 00:00:00	3	0.26	34.83%	0.33
179	1985/12/11 03:00:00	1985/12/11 09:00:00	7	0.26	35.03%	0.32
180	1986/09/25 01:00:00	1986/09/25 06:00:00	6	0.26	35.23%	0.32

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1990/01/17 00:00:00	1990/01/17 02:00:00	3	0.26	35.42%	0.32
182	1991/03/20 07:00:00	1991/03/21 09:00:00	27	0.26	35.62%	0.32
183	1998/01/29 17:00:00	1998/01/29 20:00:00	4	0.26	35.81%	0.32
184	2005/01/07 13:00:00	2005/01/07 20:00:00	8	0.26	36.01%	0.32
185	1955/01/10 09:00:00	1955/01/10 11:00:00	3	0.25	36.20%	0.31
186	1955/01/18 15:00:00	1955/01/18 19:00:00	5	0.25	36.40%	0.31
187	1960/01/14 17:00:00	1960/01/14 21:00:00	5	0.25	36.59%	0.31
188	1965/04/08 14:00:00	1965/04/09 23:00:00	34	0.25	36.79%	0.31
189	1976/07/22 11:00:00	1976/07/22 13:00:00	3	0.25	36.99%	0.31
190	1982/01/20 06:00:00	1982/01/21 12:00:00	31	0.25	37.18%	0.31
191	1992/12/07 10:00:00	1992/12/07 16:00:00	7	0.25	37.38%	0.3
192	1957/01/28 03:00:00	1957/01/29 19:00:00	41	0.24	37.57%	0.3
193	1958/01/26 09:00:00	1958/01/26 10:00:00	2	0.24	37.77%	0.3
194	1966/12/03 07:00:00	1966/12/03 17:00:00	11	0.24	37.96%	0.3
195	1969/01/24 07:00:00	1969/01/26 20:00:00	62	0.24	38.16%	0.3
196	1974/12/04 08:00:00	1974/12/04 10:00:00	3	0.24	38.36%	0.3
197	1975/03/08 08:00:00	1975/03/08 13:00:00	6	0.24	38.55%	0.29
198	1979/03/19 03:00:00	1979/03/20 03:00:00	25	0.24	38.75%	0.29
199	1998/02/07 17:00:00	1998/02/08 20:00:00	28	0.24	38.94%	0.29
200	1951/12/29 22:00:00	1951/12/30 14:00:00	17	0.23	39.14%	0.29
201	1958/04/03 10:00:00	1958/04/03 12:00:00	3	0.23	39.33%	0.29
202	1964/01/21 07:00:00	1964/01/22 09:00:00	27	0.23	39.53%	0.29
203	1965/04/03 05:00:00	1965/04/03 06:00:00	2	0.23	39.73%	0.29
204	1976/02/06 04:00:00	1976/02/06 07:00:00	4	0.23	39.92%	0.28
205	1976/07/08 12:00:00	1976/07/08 14:00:00	3	0.23	40.12%	0.28
206	1995/04/18 10:00:00	1995/04/18 12:00:00	3	0.23	40.31%	0.28
207	2001/04/07 17:00:00	2001/04/07 19:00:00	3	0.23	40.51%	0.28
208	1952/03/07 09:00:00	1952/03/08 10:00:00	26	0.22	40.70%	0.28
209	1965/03/31 14:00:00	1965/03/31 18:00:00	5	0.22	40.90%	0.28
210	1970/12/21 08:00:00	1970/12/21 09:00:00	2	0.22	41.10%	0.28
211	1993/01/06 03:00:00	1993/01/08 00:00:00	46	0.22	41.29%	0.28
212	1993/01/30 23:00:00	1993/01/31 00:00:00	2	0.22	41.49%	0.27
213	2001/12/09 17:00:00	2001/12/09 19:00:00	3	0.22	41.68%	0.27
214	1951/11/23 05:00:00	1951/11/23 06:00:00	2	0.21	41.88%	0.27
215	1958/04/06 17:00:00	1958/04/07 15:00:00	23	0.21	42.07%	0.27
216	1967/11/21 12:00:00	1967/11/21 14:00:00	3	0.21	42.27%	0.27
217	1973/02/13 00:00:00	1973/02/13 03:00:00	4	0.21	42.47%	0.27
218	1976/03/01 15:00:00	1976/03/01 19:00:00	5	0.21	42.66%	0.27
219	1982/04/01 09:00:00	1982/04/01 12:00:00	4	0.21	42.86%	0.27
220	1987/04/04 15:00:00	1987/04/04 16:00:00	2	0.21	43.05%	0.26
221	2000/03/05 17:00:00	2000/03/05 19:00:00	3	0.21	43.25%	0.26
222	1952/01/17 21:00:00	1952/01/18 08:00:00	12	0.2	43.44%	0.26
223	1953/03/01 22:00:00	1953/03/01 23:00:00	2	0.2	43.64%	0.26
224	1954/03/30 04:00:00	1954/03/30 05:00:00	2	0.2	43.84%	0.26
225	1965/02/06 19:00:00	1965/02/06 22:00:00	4	0.2	44.03%	0.26
226	1966/11/07 14:00:00	1966/11/07 17:00:00	4	0.2	44.23%	0.26
227	1968/04/01 20:00:00	1968/04/01 20:00:00	1	0.2	44.42%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	1973/02/15 11:00:00	1973/02/15 12:00:00	2	0.2	44.62%	0.25
229	1988/11/14 06:00:00	1988/11/14 08:00:00	3	0.2	44.81%	0.25
230	1990/04/04 08:00:00	1990/04/04 10:00:00	3	0.2	45.01%	0.25
231	1994/02/17 10:00:00	1994/02/17 12:00:00	3	0.2	45.21%	0.25
232	1994/03/07 01:00:00	1994/03/07 06:00:00	6	0.2	45.40%	0.25
233	2002/12/16 17:00:00	2002/12/16 19:00:00	3	0.2	45.60%	0.25
234	1962/03/19 00:00:00	1962/03/19 03:00:00	4	0.19	45.79%	0.25
235	1969/03/21 13:00:00	1969/03/21 13:00:00	1	0.19	45.99%	0.25
236	1969/11/07 09:00:00	1969/11/07 10:00:00	2	0.19	46.18%	0.25
237	1978/03/09 16:00:00	1978/03/09 17:00:00	2	0.19	46.38%	0.25
238	1983/09/29 23:00:00	1983/09/30 00:00:00	2	0.19	46.58%	0.24
239	1987/02/25 01:00:00	1987/02/25 02:00:00	2	0.19	46.77%	0.24
240	1988/04/14 19:00:00	1988/04/15 00:00:00	6	0.19	46.97%	0.24
241	1997/12/06 17:00:00	1997/12/06 18:00:00	2	0.19	47.16%	0.24
242	2001/11/24 17:00:00	2001/11/24 19:00:00	3	0.19	47.36%	0.24
243	1952/01/13 03:00:00	1952/01/13 13:00:00	11	0.18	47.55%	0.24
244	1958/02/25 07:00:00	1958/02/25 09:00:00	3	0.18	47.75%	0.24
245	1960/11/05 20:00:00	1960/11/06 11:00:00	16	0.18	47.95%	0.24
246	1966/12/06 18:00:00	1966/12/06 21:00:00	4	0.18	48.14%	0.24
247	1970/11/30 03:00:00	1970/11/30 23:00:00	21	0.18	48.34%	0.24
248	1973/03/08 12:00:00	1973/03/08 15:00:00	4	0.18	48.53%	0.23
249	1973/03/11 12:00:00	1973/03/12 09:00:00	22	0.18	48.73%	0.23
250	1977/01/05 19:00:00	1977/01/07 06:00:00	36	0.18	48.92%	0.23
251	1981/03/01 10:00:00	1981/03/02 13:00:00	28	0.18	49.12%	0.23
252	1982/01/05 07:00:00	1982/01/05 16:00:00	10	0.18	49.32%	0.23
253	1984/12/27 02:00:00	1984/12/27 20:00:00	19	0.18	49.51%	0.23
254	1992/01/05 09:00:00	1992/01/06 04:00:00	20	0.18	49.71%	0.23
255	1992/01/07 19:00:00	1992/01/07 23:00:00	5	0.18	49.90%	0.23
256	1995/01/07 15:00:00	1995/01/08 06:00:00	16	0.18	50.10%	0.23
257	1997/01/25 20:00:00	1997/01/26 05:00:00	10	0.18	50.29%	0.23
258	1954/12/09 23:00:00	1954/12/10 00:00:00	2	0.17	50.49%	0.23
259	1957/10/14 04:00:00	1957/10/14 06:00:00	3	0.17	50.68%	0.22
260	1959/04/26 06:00:00	1959/04/26 07:00:00	2	0.17	50.88%	0.22
261	1963/02/09 18:00:00	1963/02/11 00:00:00	31	0.17	51.08%	0.22
262	1977/03/24 21:00:00	1977/03/25 03:00:00	7	0.17	51.27%	0.22
263	1978/02/07 17:00:00	1978/02/09 01:00:00	33	0.17	51.47%	0.22
264	1978/03/11 21:00:00	1978/03/12 11:00:00	15	0.17	51.66%	0.22
265	1981/01/28 06:00:00	1981/01/28 07:00:00	2	0.17	51.86%	0.22
266	1981/03/05 02:00:00	1981/03/05 08:00:00	7	0.17	52.05%	0.22
267	1984/12/18 22:00:00	1984/12/20 03:00:00	30	0.17	52.25%	0.22
268	1985/02/09 09:00:00	1985/02/09 12:00:00	4	0.17	52.45%	0.22
269	1986/03/10 06:00:00	1986/03/10 20:00:00	15	0.17	52.64%	0.22
270	1996/10/30 13:00:00	1996/10/30 15:00:00	3	0.17	52.84%	0.22
271	2006/02/28 00:00:00	2006/02/28 07:00:00	8	0.17	53.03%	0.21
272	2006/12/10 00:00:00	2006/12/10 00:00:00	1	0.17	53.23%	0.21
273	1955/02/27 19:00:00	1955/02/27 20:00:00	2	0.16	53.42%	0.21
274	1958/09/24 04:00:00	1958/09/24 04:00:00	1	0.16	53.62%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1959/12/10 03:00:00	1959/12/10 03:00:00	1	0.16	53.82%	0.21
276	1966/01/30 07:00:00	1966/01/30 20:00:00	14	0.16	54.01%	0.21
277	1969/02/18 07:00:00	1969/02/18 15:00:00	9	0.16	54.21%	0.21
278	1969/02/20 04:00:00	1969/02/20 05:00:00	2	0.16	54.40%	0.21
279	1970/03/04 22:00:00	1970/03/05 01:00:00	4	0.16	54.60%	0.21
280	1971/02/17 09:00:00	1971/02/17 11:00:00	3	0.16	54.79%	0.21
281	1972/01/18 22:00:00	1972/01/19 03:00:00	6	0.16	54.99%	0.21
282	1973/02/11 07:00:00	1973/02/11 14:00:00	8	0.16	55.19%	0.21
283	1976/07/15 12:00:00	1976/07/15 16:00:00	5	0.16	55.38%	0.21
284	1977/05/08 13:00:00	1977/05/09 04:00:00	16	0.16	55.58%	0.2
285	1978/02/05 10:00:00	1978/02/06 11:00:00	26	0.16	55.77%	0.2
286	1979/03/27 05:00:00	1979/03/28 10:00:00	30	0.16	55.97%	0.2
287	1980/03/25 23:00:00	1980/03/26 00:00:00	2	0.16	56.16%	0.2
288	1981/02/08 21:00:00	1981/02/09 06:00:00	10	0.16	56.36%	0.2
289	1982/02/10 13:00:00	1982/02/10 19:00:00	7	0.16	56.56%	0.2
290	1982/03/14 15:00:00	1982/03/14 23:00:00	9	0.16	56.75%	0.2
291	1983/03/21 04:00:00	1983/03/21 05:00:00	2	0.16	56.95%	0.2
292	1983/11/12 01:00:00	1983/11/12 19:00:00	19	0.16	57.14%	0.2
293	1984/11/24 17:00:00	1984/11/24 21:00:00	5	0.16	57.34%	0.2
294	1984/12/07 23:00:00	1984/12/08 01:00:00	3	0.16	57.53%	0.2
295	1993/03/28 02:00:00	1993/03/28 03:00:00	2	0.16	57.73%	0.2
296	1998/05/12 17:00:00	1998/05/12 19:00:00	3	0.16	57.93%	0.2
297	2005/02/11 11:00:00	2005/02/12 06:00:00	20	0.16	58.12%	0.2
298	1957/03/16 09:00:00	1957/03/16 10:00:00	2	0.15	58.32%	0.2
299	1959/02/21 09:00:00	1959/02/21 17:00:00	9	0.15	58.51%	0.19
300	1960/01/25 20:00:00	1960/01/25 21:00:00	2	0.15	58.71%	0.19
301	1961/01/26 10:00:00	1961/01/26 15:00:00	6	0.15	58.90%	0.19
302	1974/01/07 15:00:00	1974/01/08 05:00:00	15	0.15	59.10%	0.19
303	1974/03/08 00:00:00	1974/03/08 11:00:00	12	0.15	59.30%	0.19
304	1978/03/04 14:00:00	1978/03/04 15:00:00	2	0.15	59.49%	0.19
305	1978/12/16 23:00:00	1978/12/18 13:00:00	39	0.15	59.69%	0.19
306	1980/01/18 03:00:00	1980/01/18 04:00:00	2	0.15	59.88%	0.19
307	1980/03/10 16:00:00	1980/03/10 16:00:00	1	0.15	60.08%	0.19
308	1980/12/07 11:00:00	1980/12/07 12:00:00	2	0.15	60.27%	0.19
309	1983/04/29 08:00:00	1983/04/29 09:00:00	2	0.15	60.47%	0.19
310	1984/10/17 06:00:00	1984/10/17 07:00:00	2	0.15	60.67%	0.19
311	1988/12/15 20:00:00	1988/12/16 14:00:00	19	0.15	60.86%	0.19
312	2004/04/01 21:00:00	2004/04/01 22:00:00	2	0.15	61.06%	0.19
313	2007/08/26 11:00:00	2007/08/26 11:00:00	1	0.15	61.25%	0.19
314	1951/08/28 09:00:00	1951/08/28 11:00:00	3	0.14	61.45%	0.19
315	1951/12/11 23:00:00	1951/12/12 04:00:00	6	0.14	61.64%	0.18
316	1952/12/30 19:00:00	1952/12/30 23:00:00	5	0.14	61.84%	0.18
317	1957/04/20 15:00:00	1957/04/20 18:00:00	4	0.14	62.04%	0.18
318	1957/12/05 04:00:00	1957/12/05 05:00:00	2	0.14	62.23%	0.18
319	1962/02/08 09:00:00	1962/02/08 19:00:00	11	0.14	62.43%	0.18
320	1963/04/26 02:00:00	1963/04/26 03:00:00	2	0.14	62.62%	0.18
321	1976/12/30 15:00:00	1976/12/30 16:00:00	2	0.14	62.82%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1983/02/26 13:00:00	1983/02/26 13:00:00	1	0.14	63.01%	0.18
323	1987/01/06 19:00:00	1987/01/07 05:00:00	11	0.14	63.21%	0.18
324	1989/03/25 12:00:00	1989/03/25 14:00:00	3	0.14	63.41%	0.18
325	1992/02/06 12:00:00	1992/02/06 19:00:00	8	0.14	63.60%	0.18
326	1994/03/19 02:00:00	1994/03/20 06:00:00	29	0.14	63.80%	0.18
327	2000/02/20 17:00:00	2000/02/21 19:00:00	27	0.14	63.99%	0.18
328	1954/03/22 12:00:00	1954/03/23 11:00:00	24	0.13	64.19%	0.18
329	1958/03/06 09:00:00	1958/03/06 15:00:00	7	0.13	64.38%	0.18
330	1965/11/14 20:00:00	1965/11/15 02:00:00	7	0.13	64.58%	0.18
331	1966/02/06 11:00:00	1966/02/06 17:00:00	7	0.13	64.77%	0.18
332	1969/02/22 02:00:00	1969/02/22 08:00:00	7	0.13	64.97%	0.18
333	1969/04/05 21:00:00	1969/04/05 21:00:00	1	0.13	65.17%	0.17
334	1978/01/19 08:00:00	1978/01/19 11:00:00	4	0.13	65.36%	0.17
335	1979/01/31 08:00:00	1979/01/31 09:00:00	2	0.13	65.56%	0.17
336	1980/04/23 04:00:00	1980/04/23 04:00:00	1	0.13	65.75%	0.17
337	1982/01/29 00:00:00	1982/01/29 00:00:00	1	0.13	65.95%	0.17
338	1983/03/17 05:00:00	1983/03/17 05:00:00	1	0.13	66.14%	0.17
339	1983/03/18 06:00:00	1983/03/18 18:00:00	13	0.13	66.34%	0.17
340	1984/12/16 03:00:00	1984/12/16 03:00:00	1	0.13	66.54%	0.17
341	1995/01/23 23:00:00	1995/01/24 01:00:00	3	0.13	66.73%	0.17
342	1996/02/27 21:00:00	1996/02/27 22:00:00	2	0.13	66.93%	0.17
343	1996/12/11 08:00:00	1996/12/11 18:00:00	11	0.13	67.12%	0.17
344	1998/01/09 17:00:00	1998/01/09 19:00:00	3	0.13	67.32%	0.17
345	2006/04/04 17:00:00	2006/04/04 22:00:00	6	0.13	67.51%	0.17
346	1952/11/23 00:00:00	1952/11/23 00:00:00	1	0.12	67.71%	0.17
347	1957/01/07 14:00:00	1957/01/07 18:00:00	5	0.12	67.91%	0.17
348	1959/01/06 08:00:00	1959/01/06 08:00:00	1	0.12	68.10%	0.17
349	1959/02/16 03:00:00	1959/02/16 20:00:00	18	0.12	68.30%	0.17
350	1981/12/30 08:00:00	1981/12/30 11:00:00	4	0.12	68.49%	0.17
351	1983/04/18 08:00:00	1983/04/18 08:00:00	1	0.12	68.69%	0.17
352	1983/12/03 16:00:00	1983/12/03 17:00:00	2	0.12	68.88%	0.17
353	2006/03/28 21:00:00	2006/03/28 22:00:00	2	0.12	69.08%	0.16
354	1965/12/16 03:00:00	1965/12/16 08:00:00	6	0.11	69.28%	0.16
355	1973/03/05 08:00:00	1973/03/05 09:00:00	2	0.11	69.47%	0.16
356	1976/02/10 07:00:00	1976/02/10 08:00:00	2	0.11	69.67%	0.16
357	1976/08/30 11:00:00	1976/08/30 12:00:00	2	0.11	69.86%	0.16
358	1983/02/08 06:00:00	1983/02/08 07:00:00	2	0.11	70.06%	0.16
359	1983/03/06 05:00:00	1983/03/06 06:00:00	2	0.11	70.25%	0.16
360	1992/03/02 10:00:00	1992/03/02 19:00:00	10	0.11	70.45%	0.16
361	1994/02/07 14:00:00	1994/02/07 16:00:00	3	0.11	70.65%	0.16
362	1996/02/26 13:00:00	1996/02/26 14:00:00	2	0.11	70.84%	0.16
363	1959/12/21 07:00:00	1959/12/21 08:00:00	2	0.1	71.04%	0.16
364	1964/03/23 00:00:00	1964/03/23 22:00:00	23	0.1	71.23%	0.16
365	1965/01/24 07:00:00	1965/01/24 08:00:00	2	0.1	71.43%	0.16
366	1992/03/22 16:00:00	1992/03/23 03:00:00	12	0.1	71.62%	0.16
367	1995/04/16 08:00:00	1995/04/16 09:00:00	2	0.1	71.82%	0.16
368	1952/12/20 10:00:00	1952/12/20 14:00:00	5	0.09	72.02%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1957/01/26 07:00:00	1957/01/26 08:00:00	2	0.09	72.21%	0.16
370	1960/09/11 04:00:00	1960/09/11 06:00:00	3	0.09	72.41%	0.16
371	1976/02/08 16:00:00	1976/02/08 23:00:00	8	0.09	72.60%	0.16
372	1976/04/15 18:00:00	1976/04/15 18:00:00	1	0.09	72.80%	0.16
373	1979/02/21 05:00:00	1979/02/21 06:00:00	2	0.09	72.99%	0.16
374	1994/01/27 14:00:00	1994/01/27 14:00:00	1	0.09	73.19%	0.16
375	1996/01/31 03:00:00	1996/02/01 08:00:00	30	0.09	73.39%	0.16
376	1996/02/21 09:00:00	1996/02/21 09:00:00	1	0.09	73.58%	0.15
377	1998/03/25 17:00:00	1998/03/26 18:00:00	26	0.09	73.78%	0.15
378	1998/03/31 17:00:00	1998/03/31 19:00:00	3	0.09	73.97%	0.15
379	1999/02/04 16:00:00	1999/02/04 18:00:00	3	0.09	74.17%	0.15
380	1999/04/11 22:00:00	1999/04/12 03:00:00	6	0.09	74.36%	0.15
381	2004/02/02 23:00:00	2004/02/03 00:00:00	2	0.09	74.56%	0.15
382	2008/02/24 08:00:00	2008/02/24 10:00:00	3	0.09	74.76%	0.15
383	1952/01/25 06:00:00	1952/01/25 11:00:00	6	0.08	74.95%	0.15
384	1954/01/24 10:00:00	1954/01/24 14:00:00	5	0.08	75.15%	0.15
385	1954/03/24 19:00:00	1954/03/25 04:00:00	10	0.08	75.34%	0.15
386	1955/01/16 11:00:00	1955/01/16 16:00:00	6	0.08	75.54%	0.15
387	1955/04/30 20:00:00	1955/05/01 05:00:00	10	0.08	75.73%	0.15
388	1956/01/31 09:00:00	1956/01/31 11:00:00	3	0.08	75.93%	0.15
389	1957/12/17 05:00:00	1957/12/17 06:00:00	2	0.08	76.13%	0.15
390	1967/01/24 18:00:00	1967/01/24 23:00:00	6	0.08	76.32%	0.15
391	1975/04/17 08:00:00	1975/04/17 08:00:00	1	0.08	76.52%	0.15
392	1978/11/21 17:00:00	1978/11/21 17:00:00	1	0.08	76.71%	0.15
393	1986/01/30 05:00:00	1986/01/30 06:00:00	2	0.08	76.91%	0.15
394	1986/01/31 18:00:00	1986/01/31 18:00:00	1	0.08	77.10%	0.15
395	1992/12/27 21:00:00	1992/12/28 03:00:00	7	0.08	77.30%	0.15
396	1996/12/09 18:00:00	1996/12/09 18:00:00	1	0.08	77.50%	0.15
397	1998/12/06 06:00:00	1998/12/06 06:00:00	1	0.08	77.69%	0.15
398	1962/02/15 19:00:00	1962/02/16 11:00:00	17	0.07	77.89%	0.15
399	1963/11/15 18:00:00	1963/11/15 19:00:00	2	0.07	78.08%	0.15
400	1965/12/14 16:00:00	1965/12/14 17:00:00	2	0.07	78.28%	0.15
401	1967/04/19 18:00:00	1967/04/19 20:00:00	3	0.07	78.47%	0.15
402	1970/01/16 17:00:00	1970/01/16 19:00:00	3	0.07	78.67%	0.14
403	1977/12/26 05:00:00	1977/12/26 16:00:00	12	0.07	78.86%	0.14
404	1979/03/01 09:00:00	1979/03/01 12:00:00	4	0.07	79.06%	0.14
405	1982/11/10 00:00:00	1982/11/10 01:00:00	2	0.07	79.26%	0.14
406	1993/02/23 20:00:00	1993/02/23 21:00:00	2	0.07	79.45%	0.14
407	1993/03/25 23:00:00	1993/03/26 03:00:00	5	0.07	79.65%	0.14
408	1960/11/12 23:00:00	1960/11/12 23:00:00	1	0.06	79.84%	0.14
409	1961/11/25 18:00:00	1961/11/25 20:00:00	3	0.06	80.04%	0.14
410	1962/02/21 05:00:00	1962/02/21 07:00:00	3	0.06	80.23%	0.14
411	1962/03/06 10:00:00	1962/03/06 20:00:00	11	0.06	80.43%	0.14
412	1970/02/10 22:00:00	1970/02/11 03:00:00	6	0.06	80.63%	0.14
413	1971/12/27 17:00:00	1971/12/28 14:00:00	22	0.06	80.82%	0.14
414	1973/02/07 04:00:00	1973/02/07 04:00:00	1	0.06	81.02%	0.14
415	1975/03/10 11:00:00	1975/03/10 23:00:00	13	0.06	81.21%	0.14

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
416	1976/02/07 09:00:00	1976/02/07 10:00:00	2	0.06	81.41%	0.14
417	1983/02/02 16:00:00	1983/02/02 17:00:00	2	0.06	81.60%	0.14
418	1986/03/08 18:00:00	1986/03/08 19:00:00	2	0.06	81.80%	0.14
419	1988/02/02 06:00:00	1988/02/02 16:00:00	11	0.06	82.00%	0.14
420	1952/04/10 16:00:00	1952/04/10 19:00:00	4	0.05	82.19%	0.14
421	1962/02/19 10:00:00	1962/02/19 12:00:00	3	0.05	82.39%	0.14
422	1963/04/17 05:00:00	1963/04/17 07:00:00	3	0.05	82.58%	0.14
423	1974/10/29 05:00:00	1974/10/29 10:00:00	6	0.05	82.78%	0.14
424	1978/03/02 11:00:00	1978/03/02 13:00:00	3	0.05	82.97%	0.14
425	1981/02/25 21:00:00	1981/02/25 23:00:00	3	0.05	83.17%	0.14
426	1982/09/26 04:00:00	1982/09/26 05:00:00	2	0.05	83.37%	0.14
427	1982/11/30 11:00:00	1982/11/30 13:00:00	3	0.05	83.56%	0.14
428	1986/04/06 05:00:00	1986/04/06 10:00:00	6	0.05	83.76%	0.14
429	1988/01/05 17:00:00	1988/01/05 17:00:00	1	0.05	83.95%	0.14
430	1995/01/16 10:00:00	1995/01/16 10:00:00	1	0.05	84.15%	0.14
431	2000/10/27 09:00:00	2000/10/27 09:00:00	1	0.05	84.34%	0.14
432	2004/12/05 16:00:00	2004/12/05 17:00:00	2	0.05	84.54%	0.13
433	1955/03/11 02:00:00	1955/03/11 02:00:00	1	0.04	84.74%	0.13
434	1958/03/27 13:00:00	1958/03/27 14:00:00	2	0.04	84.93%	0.13
435	1971/02/23 04:00:00	1971/02/23 04:00:00	1	0.04	85.13%	0.13
436	1972/11/11 08:00:00	1972/11/11 09:00:00	2	0.04	85.32%	0.13
437	1975/02/03 11:00:00	1975/02/03 13:00:00	3	0.04	85.52%	0.13
438	1979/02/14 04:00:00	1979/02/14 05:00:00	2	0.04	85.71%	0.13
439	1980/10/16 04:00:00	1980/10/16 06:00:00	3	0.04	85.91%	0.13
440	1983/02/07 05:00:00	1983/02/07 05:00:00	1	0.04	86.11%	0.13
441	1985/12/02 23:00:00	1985/12/02 23:00:00	1	0.04	86.30%	0.13
442	1986/02/08 04:00:00	1986/02/08 09:00:00	6	0.04	86.50%	0.13
443	1986/03/13 20:00:00	1986/03/13 22:00:00	3	0.04	86.69%	0.13
444	1986/10/09 21:00:00	1986/10/10 00:00:00	4	0.04	86.89%	0.13
445	1986/12/06 16:00:00	1986/12/07 03:00:00	12	0.04	87.08%	0.13
446	1988/12/22 23:00:00	1988/12/22 23:00:00	1	0.04	87.28%	0.13
447	1999/01/25 06:00:00	1999/01/25 11:00:00	6	0.04	87.48%	0.13
448	2000/02/13 17:00:00	2000/02/13 18:00:00	2	0.04	87.67%	0.13
449	2007/12/07 07:00:00	2007/12/07 08:00:00	2	0.04	87.87%	0.13
450	1955/02/17 06:00:00	1955/02/17 08:00:00	3	0.03	88.06%	0.13
451	1960/02/10 06:00:00	1960/02/10 07:00:00	2	0.03	88.26%	0.13
452	1964/12/27 10:00:00	1964/12/27 10:00:00	1	0.03	88.45%	0.13
453	1967/04/21 23:00:00	1967/04/22 00:00:00	2	0.03	88.65%	0.13
454	1973/02/28 02:00:00	1973/02/28 02:00:00	1	0.03	88.85%	0.13
455	1979/01/09 13:00:00	1979/01/09 13:00:00	1	0.03	89.04%	0.13
456	1979/10/20 13:00:00	1979/10/20 15:00:00	3	0.03	89.24%	0.13
457	1983/11/20 10:00:00	1983/11/20 10:00:00	1	0.03	89.43%	0.13
458	1988/08/24 04:00:00	1988/08/24 04:00:00	1	0.03	89.63%	0.13
459	1991/03/15 14:00:00	1991/03/15 14:00:00	1	0.03	89.82%	0.13
460	1992/03/27 05:00:00	1992/03/27 05:00:00	1	0.03	90.02%	0.13
461	1995/01/21 04:00:00	1995/01/21 04:00:00	1	0.03	90.22%	0.13
462	1996/01/22 06:00:00	1996/01/22 07:00:00	2	0.03	90.41%	0.13

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
463	1997/01/03 06:00:00	1997/01/03 06:00:00	1	0.03	90.61%	0.13
464	1998/02/19 17:00:00	1998/02/19 18:00:00	2	0.03	90.80%	0.13
465	1999/03/25 14:00:00	1999/03/25 17:00:00	4	0.03	91.00%	0.13
466	1952/03/13 00:00:00	1952/03/13 00:00:00	1	0.02	91.19%	0.12
467	1957/01/10 03:00:00	1957/01/10 06:00:00	4	0.02	91.39%	0.12
468	1957/10/31 00:00:00	1957/10/31 02:00:00	3	0.02	91.59%	0.12
469	1960/11/26 18:00:00	1960/11/26 20:00:00	3	0.02	91.78%	0.12
470	1961/11/20 17:00:00	1961/11/20 17:00:00	1	0.02	91.98%	0.12
471	1969/01/20 04:00:00	1969/01/20 09:00:00	6	0.02	92.17%	0.12
472	1971/12/22 08:00:00	1971/12/22 11:00:00	4	0.02	92.37%	0.12
473	1975/02/09 20:00:00	1975/02/09 21:00:00	2	0.02	92.56%	0.12
474	1985/01/08 02:00:00	1985/01/08 02:00:00	1	0.02	92.76%	0.12
475	1990/01/31 01:00:00	1990/01/31 01:00:00	1	0.02	92.95%	0.12
476	1994/01/24 23:00:00	1994/01/25 03:00:00	5	0.02	93.15%	0.12
477	1998/04/11 17:00:00	1998/04/11 18:00:00	2	0.02	93.35%	0.12
478	2004/03/02 00:00:00	2004/03/02 00:00:00	1	0.02	93.54%	0.12
479	2005/03/22 22:00:00	2005/03/22 22:00:00	1	0.02	93.74%	0.12
480	1955/04/22 05:00:00	1955/04/22 05:00:00	1	0.01	93.93%	0.12
481	1962/01/22 05:00:00	1962/01/22 06:00:00	2	0.01	94.13%	0.12
482	1969/01/28 17:00:00	1969/01/28 19:00:00	3	0.01	94.32%	0.12
483	1972/12/04 16:00:00	1972/12/04 18:00:00	3	0.01	94.52%	0.12
484	1973/03/06 23:00:00	1973/03/07 00:00:00	2	0.01	94.72%	0.12
485	1977/12/18 06:00:00	1977/12/18 06:00:00	1	0.01	94.91%	0.12
486	1982/01/10 19:00:00	1982/01/10 19:00:00	1	0.01	95.11%	0.12
487	1982/03/26 04:00:00	1982/03/26 04:00:00	1	0.01	95.30%	0.12
488	1983/04/12 23:00:00	1983/04/12 23:00:00	1	0.01	95.50%	0.12
489	1983/12/27 08:00:00	1983/12/27 08:00:00	1	0.01	95.69%	0.12
490	1992/03/08 01:00:00	1992/03/08 01:00:00	1	0.01	95.89%	0.12
491	1993/01/10 13:00:00	1993/01/10 13:00:00	1	0.01	96.09%	0.12
492	1997/01/23 07:00:00	1997/01/23 10:00:00	4	0.01	96.28%	0.12
493	2001/03/06 17:00:00	2001/03/06 18:00:00	2	0.01	96.48%	0.12
494	2006/01/02 13:00:00	2006/01/02 14:00:00	2	0.01	96.67%	0.12
495	2006/03/21 01:00:00	2006/03/21 02:00:00	2	0.01	96.87%	0.12
496	2007/02/28 05:00:00	2007/02/28 05:00:00	1	0.01	97.06%	0.12
497	2008/02/03 10:00:00	2008/02/03 11:00:00	2	0.01	97.26%	0.12
498	1953/04/27 22:00:00	1953/04/27 22:00:00	1	0	97.46%	0.12
499	1957/01/05 11:00:00	1957/01/05 11:00:00	1	0	97.65%	0.12
500	1960/01/10 17:00:00	1960/01/10 17:00:00	1	0	97.85%	0.12
501	1960/02/08 23:00:00	1960/02/08 23:00:00	1	0	98.04%	0.12
502	1969/01/14 10:00:00	1969/01/14 10:00:00	1	0	98.24%	0.12
503	1975/11/28 16:00:00	1975/11/28 16:00:00	1	0	98.43%	0.12
504	1979/02/02 04:00:00	1979/02/02 04:00:00	1	0	98.63%	0.12
505	1982/12/29 20:00:00	1982/12/29 20:00:00	1	0	98.83%	0.12
506	1983/03/22 20:00:00	1983/03/22 20:00:00	1	0	99.02%	0.12
507	1983/12/09 16:00:00	1983/12/09 16:00:00	1	0	99.22%	0.11
508	1988/04/23 10:00:00	1988/04/23 10:00:00	1	0	99.41%	0.11
509	1998/12/01 16:00:00	1998/12/01 18:00:00	3	0	99.61%	0.11

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
510	2006/02/19 03:00:00	2006/02/19 04:00:00	2	0	99.80%	0.11
--End of Data-----------------						

SWMM.out file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
SWMM.out time stamp: 3/16/2021 1:46:28 PM

Peak Flow Statistics Table Values

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
1	1995/01/04 15:00:00	1995/01/06 01:00:00	35	0.74	0.24%	58
2	1969/02/23 23:00:00	1969/02/26 22:00:00	72	0.26	0.49%	29
3	2003/02/25 14:00:00	2003/02/27 23:00:00	58	0.26	0.73%	19.33
4	1958/02/03 04:00:00	1958/02/05 05:00:00	50	0.25	0.97%	14.5
5	1978/02/28 00:00:00	1978/03/02 18:00:00	67	0.25	1.21%	11.6
6	1979/01/15 13:00:00	1979/01/16 09:00:00	21	0.25	1.46%	9.67
7	2004/10/27 02:00:00	2004/10/28 13:00:00	36	0.24	1.70%	8.29
8	1952/01/16 07:00:00	1952/01/19 01:00:00	67	0.23	1.94%	7.25
9	1980/02/16 18:00:00	1980/02/21 22:00:00	125	0.23	2.18%	6.44
10	1993/01/12 19:00:00	1993/01/19 09:00:00	159	0.23	2.43%	5.8
11	2005/02/18 05:00:00	2005/02/19 20:00:00	40	0.23	2.67%	5.27
12	1965/11/22 04:00:00	1965/11/24 04:00:00	49	0.22	2.91%	4.83
13	1978/01/03 18:00:00	1978/01/06 18:00:00	73	0.22	3.16%	4.46
14	1982/03/17 11:00:00	1982/03/19 03:00:00	41	0.22	3.40%	4.14
15	2000/10/29 22:00:00	2000/10/31 00:00:00	27	0.22	3.64%	3.87
16	1958/04/01 12:00:00	1958/04/04 00:00:00	61	0.21	3.88%	3.63
17	1978/02/05 11:00:00	1978/02/11 03:00:00	137	0.2	4.13%	3.41
18	1980/03/02 20:00:00	1980/03/04 01:00:00	30	0.2	4.37%	3.22
19	1991/12/29 15:00:00	1991/12/30 20:00:00	30	0.2	4.61%	3.05
20	1998/02/03 14:00:00	1998/02/04 18:00:00	29	0.2	4.85%	2.9
21	1970/12/19 02:00:00	1970/12/20 05:00:00	28	0.19	5.10%	2.76
22	1980/01/28 20:00:00	1980/01/30 20:00:00	49	0.19	5.34%	2.64
23	1983/02/27 16:00:00	1983/02/28 09:00:00	18	0.19	5.58%	2.52
24	1998/02/22 15:00:00	1998/02/24 23:00:00	57	0.19	5.83%	2.42
25	1978/01/14 15:00:00	1978/01/17 21:00:00	79	0.18	6.07%	2.32
26	1983/01/27 07:00:00	1983/01/29 21:00:00	63	0.18	6.31%	2.23
27	1998/02/16 17:00:00	1998/02/18 14:00:00	46	0.18	6.55%	2.15
28	2004/10/18 07:00:00	2004/10/21 10:00:00	76	0.18	6.80%	2.07
29	2008/01/27 00:00:00	2008/01/28 12:00:00	37	0.18	7.04%	2
30	1952/11/15 13:00:00	1952/11/16 11:00:00	23	0.17	7.28%	1.93
31	1961/12/01 19:00:00	1961/12/03 05:00:00	35	0.17	7.52%	1.87
32	1985/11/11 09:00:00	1985/11/12 12:00:00	28	0.17	7.77%	1.81
33	1991/02/27 18:00:00	1991/03/02 05:00:00	60	0.17	8.01%	1.76
34	1993/02/18 12:00:00	1993/02/20 14:00:00	51	0.17	8.25%	1.71
35	1994/02/03 23:00:00	1994/02/05 02:00:00	28	0.17	8.50%	1.66
36	1995/03/11 02:00:00	1995/03/12 16:00:00	39	0.17	8.74%	1.61
37	2008/02/22 02:00:00	2008/02/24 14:00:00	61	0.17	8.98%	1.57
38	1986/02/14 23:00:00	1986/02/16 07:00:00	33	0.16	9.22%	1.53
39	2008/01/05 04:00:00	2008/01/07 19:00:00	64	0.16	9.47%	1.49

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
40	1963/03/16 23:00:00	1963/03/17 18:00:00	20	0.15	9.71%	1.45
41	1972/01/16 20:00:00	1972/01/17 17:00:00	22	0.15	9.95%	1.42
42	1979/01/05 07:00:00	1979/01/07 06:00:00	48	0.15	10.19%	1.38
43	1982/12/22 23:00:00	1982/12/23 12:00:00	14	0.15	10.44%	1.35
44	1998/02/14 15:00:00	1998/02/15 11:00:00	21	0.15	10.68%	1.32
45	2005/02/21 03:00:00	2005/02/24 01:00:00	71	0.15	10.92%	1.29
46	1960/04/27 07:00:00	1960/04/28 01:00:00	19	0.14	11.17%	1.26
47	1968/03/08 04:00:00	1968/03/09 08:00:00	29	0.14	11.41%	1.23
48	1969/02/06 08:00:00	1969/02/07 07:00:00	24	0.14	11.65%	1.21
49	1977/08/17 01:00:00	1977/08/18 05:00:00	29	0.14	11.89%	1.18
50	1980/01/09 04:00:00	1980/01/13 01:00:00	94	0.14	12.14%	1.16
51	1983/12/24 18:00:00	1983/12/26 07:00:00	38	0.14	12.38%	1.14
52	1986/03/15 21:00:00	1986/03/17 04:00:00	32	0.14	12.62%	1.12
53	1992/02/12 17:00:00	1992/02/13 23:00:00	31	0.14	12.86%	1.09
54	1993/02/08 00:00:00	1993/02/09 03:00:00	28	0.14	13.11%	1.07
55	2005/01/07 13:00:00	2005/01/12 00:00:00	108	0.14	13.35%	1.06
56	2005/04/28 08:00:00	2005/04/28 16:00:00	9	0.14	13.59%	1.04
57	1958/02/19 09:00:00	1958/02/20 05:00:00	21	0.13	13.83%	1.02
58	1962/01/20 13:00:00	1962/01/22 23:00:00	59	0.13	14.08%	1
59	1963/09/17 08:00:00	1963/09/19 15:00:00	56	0.13	14.32%	0.98
60	1971/12/24 07:00:00	1971/12/25 23:00:00	41	0.13	14.56%	0.97
61	1981/03/19 19:00:00	1981/03/20 10:00:00	16	0.13	14.81%	0.95
62	1983/03/01 13:00:00	1983/03/04 13:00:00	73	0.13	15.05%	0.94
63	1983/10/01 01:00:00	1983/10/01 15:00:00	15	0.13	15.29%	0.92
64	1988/12/24 21:00:00	1988/12/25 15:00:00	19	0.13	15.53%	0.91
65	1991/03/25 06:00:00	1991/03/27 20:00:00	63	0.13	15.78%	0.89
66	1997/01/12 16:00:00	1997/01/14 03:00:00	36	0.13	16.02%	0.88
67	2001/01/26 16:00:00	2001/01/27 21:00:00	30	0.13	16.26%	0.87
68	2003/02/11 17:00:00	2003/02/13 23:00:00	55	0.13	16.50%	0.85
69	2007/01/30 23:00:00	2007/01/31 07:00:00	9	0.13	16.75%	0.84
70	1965/12/10 06:00:00	1965/12/10 23:00:00	18	0.12	16.99%	0.83
71	1968/12/25 18:00:00	1968/12/26 12:00:00	19	0.12	17.23%	0.82
72	1977/12/28 17:00:00	1977/12/30 08:00:00	40	0.12	17.48%	0.81
73	1979/11/07 18:00:00	1979/11/08 06:00:00	13	0.12	17.72%	0.8
74	1983/11/24 22:00:00	1983/11/25 13:00:00	16	0.12	17.96%	0.78
75	1988/11/25 07:00:00	1988/11/26 00:00:00	18	0.12	18.20%	0.77
76	2001/02/13 17:00:00	2001/02/15 09:00:00	41	0.12	18.45%	0.76
77	2004/12/31 14:00:00	2005/01/01 04:00:00	15	0.12	18.69%	0.75
78	1952/03/15 20:00:00	1952/03/17 01:00:00	30	0.11	18.93%	0.74
79	1960/02/01 22:00:00	1960/02/02 18:00:00	21	0.11	19.17%	0.73
80	1966/12/03 07:00:00	1966/12/07 07:00:00	97	0.11	19.42%	0.73
81	1967/12/18 17:00:00	1967/12/20 01:00:00	33	0.11	19.66%	0.72
82	1969/01/24 07:00:00	1969/01/29 00:00:00	114	0.11	19.90%	0.71
83	1975/04/08 08:00:00	1975/04/09 17:00:00	34	0.11	20.15%	0.7
84	1978/09/05 18:00:00	1978/09/06 13:00:00	20	0.11	20.39%	0.69
85	1990/02/17 16:00:00	1990/02/18 11:00:00	20	0.11	20.63%	0.68
86	1992/02/15 12:00:00	1992/02/16 03:00:00	16	0.11	20.87%	0.67

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
87	1994/03/24 22:00:00	1994/03/25 21:00:00	24	0.11	21.12%	0.67
88	1995/01/10 19:00:00	1995/01/13 06:00:00	60	0.11	21.36%	0.66
89	1995/03/05 07:00:00	1995/03/06 17:00:00	35	0.11	21.60%	0.65
90	1996/11/21 16:00:00	1996/11/22 23:00:00	32	0.11	21.84%	0.64
91	1999/01/26 22:00:00	1999/01/27 10:00:00	13	0.11	22.09%	0.64
92	2002/11/08 17:00:00	2002/11/09 04:00:00	12	0.11	22.33%	0.63
93	2004/02/26 04:00:00	2004/02/27 03:00:00	24	0.11	22.57%	0.62
94	2005/01/03 08:00:00	2005/01/04 23:00:00	40	0.11	22.82%	0.62
95	2006/10/14 01:00:00	2006/10/14 04:00:00	4	0.11	23.06%	0.61
96	2007/11/30 08:00:00	2007/12/01 15:00:00	32	0.11	23.30%	0.6
97	1954/01/18 23:00:00	1954/01/20 15:00:00	41	0.1	23.54%	0.6
98	1957/01/13 04:00:00	1957/01/14 02:00:00	23	0.1	23.79%	0.59
99	1957/05/10 23:00:00	1957/05/11 14:00:00	16	0.1	24.03%	0.59
100	1958/03/15 19:00:00	1958/03/17 03:00:00	33	0.1	24.27%	0.58
101	1958/03/20 22:00:00	1958/03/22 22:00:00	49	0.1	24.51%	0.57
102	1959/02/11 09:00:00	1959/02/12 07:00:00	23	0.1	24.76%	0.57
103	1960/01/12 02:00:00	1960/01/12 23:00:00	22	0.1	25.00%	0.56
104	1963/11/20 03:00:00	1963/11/21 19:00:00	41	0.1	25.24%	0.56
105	1965/11/14 22:00:00	1965/11/17 11:00:00	62	0.1	25.49%	0.55
106	1973/11/22 23:00:00	1973/11/23 13:00:00	15	0.1	25.73%	0.55
107	1978/03/30 15:00:00	1978/03/31 14:00:00	24	0.1	25.97%	0.54
108	1980/02/14 00:00:00	1980/02/15 14:00:00	39	0.1	26.21%	0.54
109	1985/11/29 06:00:00	1985/11/30 08:00:00	27	0.1	26.46%	0.53
110	1986/11/18 03:00:00	1986/11/18 20:00:00	18	0.1	26.70%	0.53
111	1987/12/16 15:00:00	1987/12/17 23:00:00	33	0.1	26.94%	0.52
112	1988/01/17 10:00:00	1988/01/18 04:00:00	19	0.1	27.18%	0.52
113	1988/12/21 03:00:00	1988/12/21 20:00:00	18	0.1	27.43%	0.51
114	1991/03/19 00:00:00	1991/03/21 16:00:00	65	0.1	27.67%	0.51
115	2003/03/15 15:00:00	2003/03/16 23:00:00	33	0.1	27.91%	0.5
116	2003/04/14 14:00:00	2003/04/15 15:00:00	26	0.1	28.16%	0.5
117	2004/02/22 07:00:00	2004/02/23 16:00:00	34	0.1	28.40%	0.5
118	2004/12/28 09:00:00	2004/12/30 00:00:00	40	0.1	28.64%	0.49
119	1952/12/02 01:00:00	1952/12/02 11:00:00	11	0.09	28.88%	0.49
120	1954/02/13 19:00:00	1954/02/14 16:00:00	22	0.09	29.13%	0.48
121	1956/01/25 17:00:00	1956/01/28 00:00:00	56	0.09	29.37%	0.48
122	1957/01/28 03:00:00	1957/01/30 05:00:00	51	0.09	29.61%	0.48
123	1959/12/24 12:00:00	1959/12/25 01:00:00	14	0.09	29.85%	0.47
124	1960/01/14 17:00:00	1960/01/15 11:00:00	19	0.09	30.10%	0.47
125	1964/11/17 16:00:00	1964/11/18 02:00:00	11	0.09	30.34%	0.46
126	1965/04/08 14:00:00	1965/04/10 04:00:00	39	0.09	30.58%	0.46
127	1966/02/06 13:00:00	1966/02/08 10:00:00	46	0.09	30.83%	0.46
128	1967/01/22 17:00:00	1967/01/23 17:00:00	25	0.09	31.07%	0.45
129	1967/03/13 11:00:00	1967/03/14 10:00:00	24	0.09	31.31%	0.45
130	1967/11/30 16:00:00	1967/12/01 00:00:00	9	0.09	31.55%	0.45
131	1972/11/16 11:00:00	1972/11/17 17:00:00	31	0.09	31.80%	0.44
132	1976/09/10 05:00:00	1976/09/11 07:00:00	27	0.09	32.04%	0.44
133	1977/01/03 03:00:00	1977/01/03 15:00:00	13	0.09	32.28%	0.44

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
134	1978/01/09 16:00:00	1978/01/11 06:00:00	39	0.09	32.52%	0.43
135	1978/02/12 17:00:00	1978/02/14 10:00:00	42	0.09	32.77%	0.43
136	1980/03/05 23:00:00	1980/03/06 21:00:00	23	0.09	33.01%	0.43
137	1981/11/28 03:00:00	1981/11/29 08:00:00	30	0.09	33.25%	0.42
138	1983/04/20 03:00:00	1983/04/21 11:00:00	33	0.09	33.50%	0.42
139	1988/04/20 07:00:00	1988/04/21 12:00:00	30	0.09	33.74%	0.42
140	1992/03/20 22:00:00	1992/03/21 14:00:00	17	0.09	33.98%	0.41
141	1992/12/07 10:00:00	1992/12/08 04:00:00	19	0.09	34.22%	0.41
142	1993/11/30 04:00:00	1993/11/30 04:00:00	1	0.09	34.47%	0.41
143	1995/01/25 08:00:00	1995/01/26 18:00:00	35	0.09	34.71%	0.41
144	2001/01/11 04:00:00	2001/01/12 18:00:00	39	0.09	34.95%	0.4
145	2001/02/25 16:00:00	2001/02/28 01:00:00	58	0.09	35.19%	0.4
146	2002/12/20 16:00:00	2002/12/21 22:00:00	31	0.09	35.44%	0.4
147	1952/11/30 01:00:00	1952/11/30 19:00:00	19	0.08	35.68%	0.4
148	1954/11/11 02:00:00	1954/11/11 21:00:00	20	0.08	35.92%	0.39
149	1955/01/18 15:00:00	1955/01/19 09:00:00	19	0.08	36.17%	0.39
150	1956/04/12 20:00:00	1956/04/14 08:00:00	37	0.08	36.41%	0.39
151	1957/02/28 23:00:00	1957/03/01 19:00:00	21	0.08	36.65%	0.38
152	1958/01/25 04:00:00	1958/01/26 20:00:00	41	0.08	36.89%	0.38
153	1958/04/06 17:00:00	1958/04/08 06:00:00	38	0.08	37.14%	0.38
154	1960/02/29 06:00:00	1960/03/01 14:00:00	33	0.08	37.38%	0.38
155	1965/04/03 05:00:00	1965/04/03 13:00:00	9	0.08	37.62%	0.37
156	1967/11/19 08:00:00	1967/11/20 08:00:00	25	0.08	37.86%	0.37
157	1972/11/14 14:00:00	1972/11/14 22:00:00	9	0.08	38.11%	0.37
158	1973/03/20 08:00:00	1973/03/20 19:00:00	12	0.08	38.35%	0.37
159	1977/01/05 19:00:00	1977/01/07 17:00:00	47	0.08	38.59%	0.37
160	1979/03/17 05:00:00	1979/03/17 12:00:00	8	0.08	38.83%	0.36
161	1982/01/01 07:00:00	1982/01/02 13:00:00	31	0.08	39.08%	0.36
162	1982/12/07 22:00:00	1982/12/08 12:00:00	15	0.08	39.32%	0.36
163	1983/03/24 03:00:00	1983/03/24 16:00:00	14	0.08	39.56%	0.36
164	1985/11/25 01:00:00	1985/11/25 18:00:00	18	0.08	39.81%	0.35
165	1986/09/25 02:00:00	1986/09/25 14:00:00	13	0.08	40.05%	0.35
166	1987/10/12 10:00:00	1987/10/13 08:00:00	23	0.08	40.29%	0.35
167	1993/01/06 03:00:00	1993/01/08 07:00:00	53	0.08	40.53%	0.35
168	1997/01/15 16:00:00	1997/01/16 08:00:00	17	0.08	40.78%	0.35
169	1998/01/29 17:00:00	1998/01/30 03:00:00	11	0.08	41.02%	0.34
170	1998/02/07 17:00:00	1998/02/09 06:00:00	38	0.08	41.26%	0.34
171	2006/03/11 07:00:00	2006/03/11 18:00:00	12	0.08	41.50%	0.34
172	1951/12/29 23:00:00	1951/12/31 02:00:00	28	0.07	41.75%	0.34
173	1952/03/07 14:00:00	1952/03/08 17:00:00	28	0.07	41.99%	0.34
174	1954/03/16 22:00:00	1954/03/16 22:00:00	1	0.07	42.23%	0.33
175	1955/01/10 10:00:00	1955/01/10 18:00:00	9	0.07	42.48%	0.33
176	1960/11/05 20:00:00	1960/11/06 11:00:00	16	0.07	42.72%	0.33
177	1964/01/21 07:00:00	1964/01/22 19:00:00	37	0.07	42.96%	0.33
178	1965/12/29 19:00:00	1965/12/30 00:00:00	6	0.07	43.20%	0.33
179	1967/04/11 07:00:00	1967/04/11 19:00:00	13	0.07	43.45%	0.32
180	1967/11/21 12:00:00	1967/11/21 21:00:00	10	0.07	43.69%	0.32

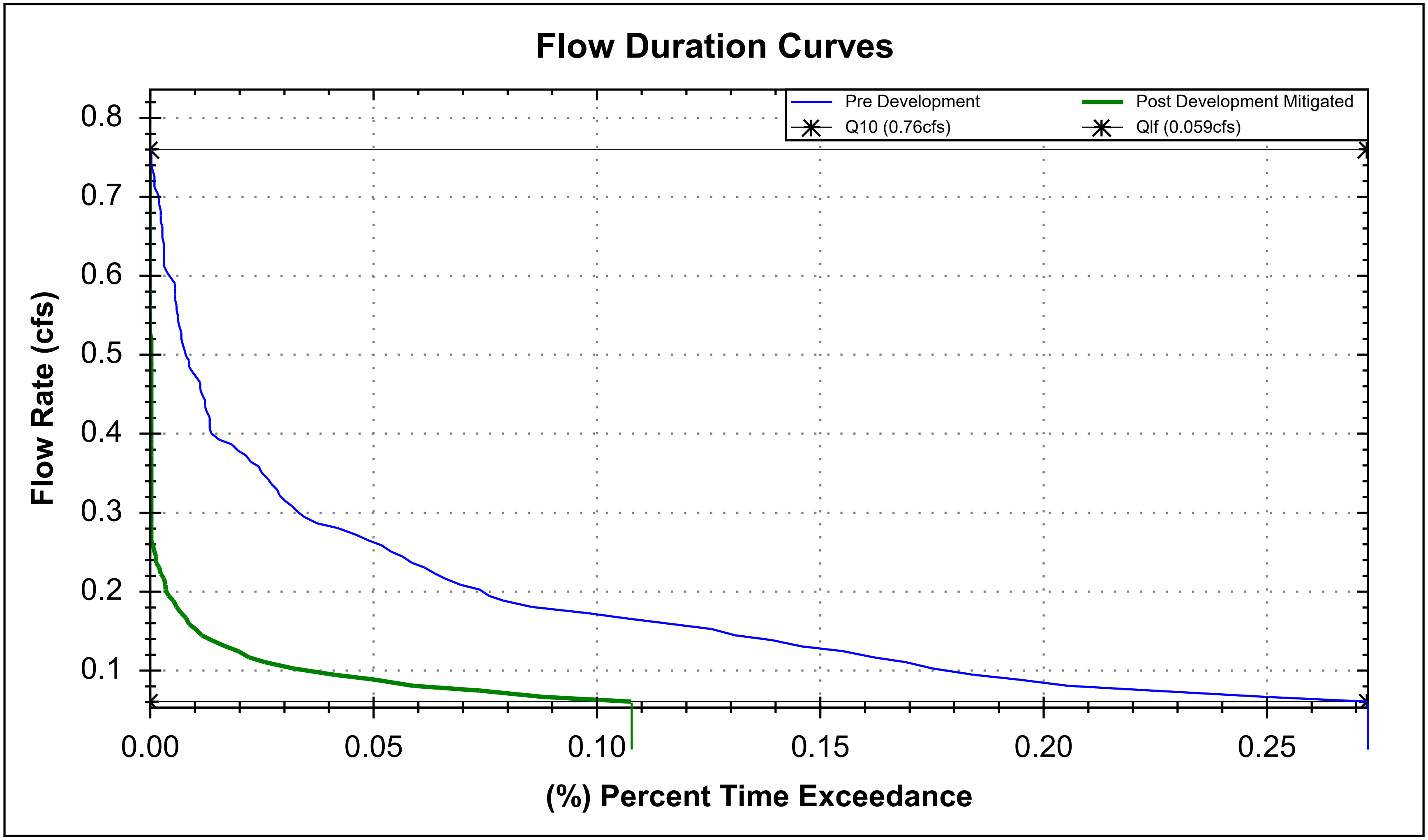
Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
181	1970/02/28 13:00:00	1970/03/02 10:00:00	46	0.07	43.93%	0.32
182	1970/12/21 08:00:00	1970/12/21 16:00:00	9	0.07	44.17%	0.32
183	1973/02/13 00:00:00	1973/02/13 13:00:00	14	0.07	44.42%	0.32
184	1976/07/22 10:00:00	1976/07/23 02:00:00	17	0.07	44.66%	0.32
185	1978/03/09 16:00:00	1978/03/09 23:00:00	8	0.07	44.90%	0.31
186	1979/03/19 03:00:00	1979/03/20 15:00:00	37	0.07	45.15%	0.31
187	1981/01/29 18:00:00	1981/01/30 14:00:00	21	0.07	45.39%	0.31
188	1981/03/01 11:00:00	1981/03/03 03:00:00	41	0.07	45.63%	0.31
189	1984/12/27 02:00:00	1984/12/28 08:00:00	31	0.07	45.87%	0.31
190	1985/12/11 04:00:00	1985/12/11 18:00:00	15	0.07	46.12%	0.31
191	1987/12/04 21:00:00	1987/12/04 21:00:00	1	0.07	46.36%	0.3
192	1990/01/17 00:00:00	1990/01/17 12:00:00	13	0.07	46.60%	0.3
193	1991/01/09 14:00:00	1991/01/09 14:00:00	1	0.07	46.84%	0.3
194	1992/01/05 09:00:00	1992/01/06 14:00:00	30	0.07	47.09%	0.3
195	1992/01/07 19:00:00	1992/01/08 14:00:00	20	0.07	47.33%	0.3
196	1995/01/07 18:00:00	1995/01/08 20:00:00	27	0.07	47.57%	0.3
197	1995/04/18 10:00:00	1995/04/18 21:00:00	12	0.07	47.82%	0.29
198	1997/01/25 22:00:00	1997/01/26 21:00:00	24	0.07	48.06%	0.29
199	2000/03/05 17:00:00	2000/03/06 03:00:00	11	0.07	48.30%	0.29
200	2001/12/09 17:00:00	2001/12/10 03:00:00	11	0.07	48.54%	0.29
201	2003/12/25 18:00:00	2003/12/25 22:00:00	5	0.07	48.79%	0.29
202	2007/04/20 15:00:00	2007/04/20 15:00:00	1	0.07	49.03%	0.29
203	1951/11/23 05:00:00	1951/11/23 05:00:00	1	0.06	49.27%	0.29
204	1954/03/30 04:00:00	1954/03/30 04:00:00	1	0.06	49.51%	0.28
205	1962/03/19 00:00:00	1962/03/19 08:00:00	9	0.06	49.76%	0.28
206	1963/02/09 19:00:00	1963/02/11 09:00:00	39	0.06	50.00%	0.28
207	1966/01/30 07:00:00	1966/01/31 02:00:00	20	0.06	50.24%	0.28
208	1973/02/15 11:00:00	1973/02/15 14:00:00	4	0.06	50.49%	0.28
209	1973/03/11 12:00:00	1973/03/12 12:00:00	25	0.06	50.73%	0.28
210	1974/12/04 09:00:00	1974/12/04 15:00:00	7	0.06	50.97%	0.28
211	1975/03/08 09:00:00	1975/03/08 17:00:00	9	0.06	51.21%	0.28
212	1976/02/06 04:00:00	1976/02/07 14:00:00	35	0.06	51.46%	0.27
213	1977/05/08 15:00:00	1977/05/09 18:00:00	28	0.06	51.70%	0.27
214	1978/03/11 21:00:00	1978/03/12 19:00:00	23	0.06	51.94%	0.27
215	1979/03/27 20:00:00	1979/03/28 17:00:00	22	0.06	52.18%	0.27
216	1982/01/05 08:00:00	1982/01/05 22:00:00	15	0.06	52.43%	0.27
217	1982/01/20 06:00:00	1982/01/21 15:00:00	34	0.06	52.67%	0.27
218	1982/04/01 09:00:00	1982/04/01 20:00:00	12	0.06	52.91%	0.27
219	1986/03/10 06:00:00	1986/03/11 05:00:00	24	0.06	53.16%	0.27
220	1987/02/25 01:00:00	1987/02/25 04:00:00	4	0.06	53.40%	0.26
221	1988/11/14 06:00:00	1988/11/14 12:00:00	7	0.06	53.64%	0.26
222	1994/02/17 11:00:00	1994/02/17 22:00:00	12	0.06	53.88%	0.26
223	1998/05/12 17:00:00	1998/05/12 18:00:00	2	0.06	54.13%	0.26
224	1998/11/08 08:00:00	1998/11/08 08:00:00	1	0.06	54.37%	0.26
225	2000/02/20 17:00:00	2000/02/22 03:00:00	35	0.06	54.61%	0.26
226	2001/04/07 17:00:00	2001/04/08 00:00:00	8	0.06	54.85%	0.26
227	2001/11/24 17:00:00	2001/11/24 18:00:00	2	0.06	55.10%	0.26

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
228	2005/02/11 03:00:00	2005/02/12 18:00:00	40	0.06	55.34%	0.25
229	1952/01/13 04:00:00	1952/01/13 21:00:00	18	0.05	55.58%	0.25
230	1953/03/01 22:00:00	1953/03/01 22:00:00	1	0.05	55.83%	0.25
231	1954/03/22 12:00:00	1954/03/25 08:00:00	69	0.05	56.07%	0.25
232	1957/01/07 13:00:00	1957/01/08 04:00:00	16	0.05	56.31%	0.25
233	1957/10/14 04:00:00	1957/10/14 05:00:00	2	0.05	56.55%	0.25
234	1958/02/25 07:00:00	1958/02/25 14:00:00	8	0.05	56.80%	0.25
235	1959/02/16 03:00:00	1959/02/17 02:00:00	24	0.05	57.04%	0.25
236	1959/02/21 10:00:00	1959/02/22 01:00:00	16	0.05	57.28%	0.25
237	1960/01/25 20:00:00	1960/01/25 23:00:00	4	0.05	57.52%	0.25
238	1962/02/08 10:00:00	1962/02/09 09:00:00	24	0.05	57.77%	0.24
239	1965/02/06 21:00:00	1965/02/07 05:00:00	9	0.05	58.01%	0.24
240	1969/02/18 07:00:00	1969/02/18 21:00:00	15	0.05	58.25%	0.24
241	1969/02/20 04:00:00	1969/02/20 10:00:00	7	0.05	58.50%	0.24
242	1969/02/22 02:00:00	1969/02/22 17:00:00	16	0.05	58.74%	0.24
243	1970/03/04 22:00:00	1970/03/05 08:00:00	11	0.05	58.98%	0.24
244	1970/11/30 14:00:00	1970/12/01 10:00:00	21	0.05	59.22%	0.24
245	1971/04/14 11:00:00	1971/04/14 11:00:00	1	0.05	59.47%	0.24
246	1973/03/08 12:00:00	1973/03/08 20:00:00	9	0.05	59.71%	0.24
247	1974/03/08 00:00:00	1974/03/08 22:00:00	23	0.05	59.95%	0.24
248	1976/07/08 13:00:00	1976/07/08 21:00:00	9	0.05	60.19%	0.23
249	1976/07/15 14:00:00	1976/07/16 02:00:00	13	0.05	60.44%	0.23
250	1977/03/24 22:00:00	1977/03/25 16:00:00	19	0.05	60.68%	0.23
251	1978/03/04 14:00:00	1978/03/05 04:00:00	15	0.05	60.92%	0.23
252	1980/01/18 03:00:00	1980/01/19 04:00:00	26	0.05	61.17%	0.23
253	1980/10/16 04:00:00	1980/10/16 06:00:00	3	0.05	61.41%	0.23
254	1981/02/09 00:00:00	1981/02/09 15:00:00	16	0.05	61.65%	0.23
255	1981/03/05 02:00:00	1981/03/05 21:00:00	20	0.05	61.89%	0.23
256	1982/02/10 13:00:00	1982/02/11 01:00:00	13	0.05	62.14%	0.23
257	1983/02/08 06:00:00	1983/02/08 06:00:00	1	0.05	62.38%	0.23
258	1983/02/26 13:00:00	1983/02/26 13:00:00	1	0.05	62.62%	0.23
259	1983/03/06 05:00:00	1983/03/06 06:00:00	2	0.05	62.86%	0.22
260	1983/03/18 06:00:00	1983/03/19 02:00:00	21	0.05	63.11%	0.22
261	1983/11/12 17:00:00	1983/11/13 04:00:00	12	0.05	63.35%	0.22
262	1984/11/24 17:00:00	1984/11/24 21:00:00	5	0.05	63.59%	0.22
263	1984/12/18 22:00:00	1984/12/20 08:00:00	35	0.05	63.83%	0.22
264	1985/02/09 10:00:00	1985/02/09 21:00:00	12	0.05	64.08%	0.22
265	1988/08/24 04:00:00	1988/08/24 04:00:00	1	0.05	64.32%	0.22
266	1988/12/15 20:00:00	1988/12/16 20:00:00	25	0.05	64.56%	0.22
267	1993/01/31 00:00:00	1993/01/31 06:00:00	7	0.05	64.81%	0.22
268	1993/03/28 02:00:00	1993/03/28 10:00:00	9	0.05	65.05%	0.22
269	1993/06/05 13:00:00	1993/06/05 13:00:00	1	0.05	65.29%	0.22
270	1996/12/09 18:00:00	1996/12/12 05:00:00	60	0.05	65.53%	0.22
271	1998/01/09 17:00:00	1998/01/11 00:00:00	32	0.05	65.78%	0.21
272	2002/12/16 17:00:00	2002/12/16 17:00:00	1	0.05	66.02%	0.21
273	2006/04/04 18:00:00	2006/04/05 09:00:00	16	0.05	66.26%	0.21
274	1952/12/30 19:00:00	1952/12/31 04:00:00	10	0.04	66.50%	0.21

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
275	1954/12/09 23:00:00	1954/12/09 23:00:00	1	0.04	66.75%	0.21
276	1955/02/27 20:00:00	1955/02/28 01:00:00	6	0.04	66.99%	0.21
277	1957/04/20 15:00:00	1957/04/20 21:00:00	7	0.04	67.23%	0.21
278	1965/12/16 03:00:00	1965/12/16 18:00:00	16	0.04	67.48%	0.21
279	1966/11/07 15:00:00	1966/11/08 00:00:00	10	0.04	67.72%	0.21
280	1969/03/21 13:00:00	1969/03/21 22:00:00	10	0.04	67.96%	0.21
281	1969/04/05 21:00:00	1969/04/05 21:00:00	1	0.04	68.20%	0.21
282	1969/11/07 09:00:00	1969/11/07 09:00:00	1	0.04	68.45%	0.21
283	1972/01/18 22:00:00	1972/01/19 14:00:00	17	0.04	68.69%	0.21
284	1973/02/07 04:00:00	1973/02/07 04:00:00	1	0.04	68.93%	0.2
285	1973/02/11 07:00:00	1973/02/11 16:00:00	10	0.04	69.17%	0.2
286	1974/01/07 17:00:00	1974/01/08 14:00:00	22	0.04	69.42%	0.2
287	1976/02/08 16:00:00	1976/02/10 15:00:00	48	0.04	69.66%	0.2
288	1978/01/19 08:00:00	1978/01/19 14:00:00	7	0.04	69.90%	0.2
289	1979/01/31 08:00:00	1979/01/31 15:00:00	8	0.04	70.15%	0.2
290	1980/03/10 15:00:00	1980/03/10 16:00:00	2	0.04	70.39%	0.2
291	1980/03/25 23:00:00	1980/03/26 03:00:00	5	0.04	70.63%	0.2
292	1980/12/07 11:00:00	1980/12/07 16:00:00	6	0.04	70.87%	0.2
293	1983/03/17 02:00:00	1983/03/17 05:00:00	4	0.04	71.12%	0.2
294	1983/03/21 04:00:00	1983/03/21 15:00:00	12	0.04	71.36%	0.2
295	1983/04/18 08:00:00	1983/04/18 08:00:00	1	0.04	71.60%	0.2
296	1984/12/08 00:00:00	1984/12/08 06:00:00	7	0.04	71.84%	0.2
297	1992/03/22 16:00:00	1992/03/23 17:00:00	26	0.04	72.09%	0.2
298	1994/02/07 14:00:00	1994/02/08 09:00:00	20	0.04	72.33%	0.2
299	1994/03/07 01:00:00	1994/03/07 14:00:00	14	0.04	72.57%	0.19
300	1994/03/19 04:00:00	1994/03/20 13:00:00	34	0.04	72.82%	0.19
301	1996/01/31 06:00:00	1996/02/01 12:00:00	31	0.04	73.06%	0.19
302	1996/02/26 13:00:00	1996/02/26 19:00:00	7	0.04	73.30%	0.19
303	1996/02/27 21:00:00	1996/02/28 03:00:00	7	0.04	73.54%	0.19
304	1997/12/06 17:00:00	1997/12/06 17:00:00	1	0.04	73.79%	0.19
305	1998/03/25 17:00:00	1998/03/26 20:00:00	28	0.04	74.03%	0.19
306	1998/03/31 17:00:00	1998/03/31 21:00:00	5	0.04	74.27%	0.19
307	2006/02/28 06:00:00	2006/02/28 14:00:00	9	0.04	74.51%	0.19
308	1958/03/06 10:00:00	1958/03/07 03:00:00	18	0.03	74.76%	0.19
309	1962/02/19 11:00:00	1962/02/21 13:00:00	51	0.03	75.00%	0.19
310	1965/03/31 14:00:00	1965/04/01 22:00:00	33	0.03	75.24%	0.19
311	1967/01/24 18:00:00	1967/01/25 07:00:00	14	0.03	75.49%	0.19
312	1975/03/10 11:00:00	1975/03/11 13:00:00	27	0.03	75.73%	0.19
313	1975/04/17 08:00:00	1975/04/17 08:00:00	1	0.03	75.97%	0.19
314	1976/03/01 16:00:00	1976/03/01 23:00:00	8	0.03	76.21%	0.19
315	1976/04/15 18:00:00	1976/04/15 18:00:00	1	0.03	76.46%	0.18
316	1978/12/17 01:00:00	1978/12/19 18:00:00	66	0.03	76.70%	0.18
317	1979/02/14 03:00:00	1979/02/14 05:00:00	3	0.03	76.94%	0.18
318	1979/02/21 01:00:00	1979/02/21 07:00:00	7	0.03	77.18%	0.18
319	1982/03/14 22:00:00	1982/03/15 05:00:00	8	0.03	77.43%	0.18
320	1984/12/16 03:00:00	1984/12/16 05:00:00	3	0.03	77.67%	0.18
321	1987/04/04 15:00:00	1987/04/04 16:00:00	2	0.03	77.91%	0.18

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
322	1995/01/24 00:00:00	1995/01/24 04:00:00	5	0.03	78.16%	0.18
323	1998/02/19 17:00:00	1998/02/20 01:00:00	9	0.03	78.40%	0.18
324	1998/04/11 17:00:00	1998/04/11 18:00:00	2	0.03	78.64%	0.18
325	1951/12/11 23:00:00	1951/12/12 11:00:00	13	0.02	78.88%	0.18
326	1952/04/10 16:00:00	1952/04/10 18:00:00	3	0.02	79.13%	0.18
327	1952/12/20 11:00:00	1952/12/20 19:00:00	9	0.02	79.37%	0.18
328	1954/01/24 10:00:00	1954/01/25 11:00:00	26	0.02	79.61%	0.18
329	1955/04/30 20:00:00	1955/05/01 02:00:00	7	0.02	79.85%	0.18
330	1956/01/31 09:00:00	1956/01/31 13:00:00	5	0.02	80.10%	0.18
331	1957/03/16 09:00:00	1957/03/16 10:00:00	2	0.02	80.34%	0.18
332	1957/12/17 05:00:00	1957/12/17 05:00:00	1	0.02	80.58%	0.18
333	1962/03/06 20:00:00	1962/03/06 20:00:00	1	0.02	80.83%	0.17
334	1963/04/17 05:00:00	1963/04/17 07:00:00	3	0.02	81.07%	0.17
335	1965/01/24 07:00:00	1965/01/24 07:00:00	1	0.02	81.31%	0.17
336	1965/12/14 16:00:00	1965/12/14 17:00:00	2	0.02	81.55%	0.17
337	1970/01/16 17:00:00	1970/01/16 23:00:00	7	0.02	81.80%	0.17
338	1971/12/27 17:00:00	1971/12/28 17:00:00	25	0.02	82.04%	0.17
339	1977/12/26 05:00:00	1977/12/27 00:00:00	20	0.02	82.28%	0.17
340	1983/04/29 08:00:00	1983/04/29 13:00:00	6	0.02	82.52%	0.17
341	1986/01/30 04:00:00	1986/01/30 06:00:00	3	0.02	82.77%	0.17
342	1986/01/31 18:00:00	1986/01/31 18:00:00	1	0.02	83.01%	0.17
343	1986/03/13 22:00:00	1986/03/13 22:00:00	1	0.02	83.25%	0.17
344	1988/02/02 08:00:00	1988/02/02 22:00:00	15	0.02	83.50%	0.17
345	1988/04/14 19:00:00	1988/04/15 04:00:00	10	0.02	83.74%	0.17
346	1991/10/26 23:00:00	1991/10/27 01:00:00	3	0.02	83.98%	0.17
347	1995/04/16 06:00:00	1995/04/16 09:00:00	4	0.02	84.22%	0.17
348	1998/12/06 06:00:00	1998/12/06 06:00:00	1	0.02	84.47%	0.17
349	1999/02/04 17:00:00	1999/02/05 07:00:00	15	0.02	84.71%	0.17
350	1999/04/12 01:00:00	1999/04/12 03:00:00	3	0.02	84.95%	0.17
351	2001/03/06 17:00:00	2001/03/06 18:00:00	2	0.02	85.19%	0.17
352	2004/04/01 21:00:00	2004/04/01 22:00:00	2	0.02	85.44%	0.17
353	1952/01/25 08:00:00	1952/01/25 14:00:00	7	0.01	85.68%	0.16
354	1957/01/26 07:00:00	1957/01/26 07:00:00	1	0.01	85.92%	0.16
355	1959/12/10 03:00:00	1959/12/10 03:00:00	1	0.01	86.17%	0.16
356	1959/12/21 07:00:00	1959/12/21 11:00:00	5	0.01	86.41%	0.16
357	1960/02/10 07:00:00	1960/02/10 07:00:00	1	0.01	86.65%	0.16
358	1961/01/26 11:00:00	1961/01/26 11:00:00	1	0.01	86.89%	0.16
359	1963/04/26 02:00:00	1963/04/26 02:00:00	1	0.01	87.14%	0.16
360	1967/04/19 18:00:00	1967/04/19 18:00:00	1	0.01	87.38%	0.16
361	1969/01/20 06:00:00	1969/01/20 11:00:00	6	0.01	87.62%	0.16
362	1970/02/11 02:00:00	1970/02/11 06:00:00	5	0.01	87.86%	0.16
363	1971/02/17 09:00:00	1971/02/17 10:00:00	2	0.01	88.11%	0.16
364	1973/03/05 08:00:00	1973/03/05 08:00:00	1	0.01	88.35%	0.16
365	1976/08/30 10:00:00	1976/08/30 12:00:00	3	0.01	88.59%	0.16
366	1979/03/01 10:00:00	1979/03/01 20:00:00	11	0.01	88.83%	0.16
367	1982/01/29 00:00:00	1982/01/29 00:00:00	1	0.01	89.08%	0.16
368	1983/02/24 22:00:00	1983/02/24 22:00:00	1	0.01	89.32%	0.16

Rank	Start Date	End Date	Duration (hr)	Peak (cfs)	Frequency (%)	Return Period (Yr)
369	1983/12/09 16:00:00	1983/12/09 16:00:00	1	0.01	89.56%	0.16
370	1983/12/27 08:00:00	1983/12/27 11:00:00	4	0.01	89.81%	0.16
371	1985/12/02 23:00:00	1985/12/03 00:00:00	2	0.01	90.05%	0.16
372	1986/02/08 09:00:00	1986/02/08 16:00:00	8	0.01	90.29%	0.16
373	1986/04/06 10:00:00	1986/04/06 10:00:00	1	0.01	90.53%	0.16
374	1987/01/07 05:00:00	1987/01/07 06:00:00	2	0.01	90.78%	0.16
375	1988/04/23 10:00:00	1988/04/23 10:00:00	1	0.01	91.02%	0.16
376	1992/02/06 18:00:00	1992/02/07 14:00:00	21	0.01	91.26%	0.15
377	1992/03/02 18:00:00	1992/03/02 23:00:00	6	0.01	91.50%	0.15
378	1992/12/27 21:00:00	1992/12/28 05:00:00	9	0.01	91.75%	0.15
379	1993/01/10 13:00:00	1993/01/10 13:00:00	1	0.01	91.99%	0.15
380	1994/01/27 14:00:00	1994/01/27 14:00:00	1	0.01	92.23%	0.15
381	1995/01/16 10:00:00	1995/01/16 10:00:00	1	0.01	92.48%	0.15
382	1996/01/22 06:00:00	1996/01/22 07:00:00	2	0.01	92.72%	0.15
383	1996/02/21 09:00:00	1996/02/21 09:00:00	1	0.01	92.96%	0.15
384	1996/10/30 14:00:00	1996/10/30 14:00:00	1	0.01	93.20%	0.15
385	2000/02/13 17:00:00	2000/02/13 17:00:00	1	0.01	93.45%	0.15
386	2000/04/17 17:00:00	2000/04/17 19:00:00	3	0.01	93.69%	0.15
387	2004/02/02 23:00:00	2004/02/02 23:00:00	1	0.01	93.93%	0.15
388	2006/03/28 21:00:00	2006/03/28 22:00:00	2	0.01	94.17%	0.15
389	1952/03/10 21:00:00	1952/03/10 21:00:00	1	0	94.42%	0.15
390	1952/11/23 00:00:00	1952/11/23 00:00:00	1	0	94.66%	0.15
391	1953/01/07 19:00:00	1953/01/08 09:00:00	15	0	94.90%	0.15
392	1955/01/16 15:00:00	1955/01/16 17:00:00	3	0	95.15%	0.15
393	1957/01/10 07:00:00	1957/01/10 13:00:00	7	0	95.39%	0.15
394	1961/11/25 18:00:00	1961/11/25 20:00:00	3	0	95.63%	0.15
395	1962/02/16 11:00:00	1962/02/16 11:00:00	1	0	95.87%	0.15
396	1964/03/23 00:00:00	1964/03/23 22:00:00	23	0	96.12%	0.15
397	1965/04/04 22:00:00	1965/04/04 23:00:00	2	0	96.36%	0.15
398	1967/04/21 23:00:00	1967/04/21 23:00:00	1	0	96.60%	0.15
399	1968/04/01 20:00:00	1968/04/01 20:00:00	1	0	96.84%	0.15
400	1969/01/14 11:00:00	1969/01/14 14:00:00	4	0	97.09%	0.15
401	1981/01/28 06:00:00	1981/01/28 06:00:00	1	0	97.33%	0.15
402	1982/11/30 14:00:00	1982/11/30 14:00:00	1	0	97.57%	0.14
403	1983/02/07 05:00:00	1983/02/07 05:00:00	1	0	97.82%	0.14
404	1983/03/22 20:00:00	1983/03/22 21:00:00	2	0	98.06%	0.14
405	1983/09/29 23:00:00	1983/09/29 23:00:00	1	0	98.30%	0.14
406	1983/12/03 16:00:00	1983/12/03 22:00:00	7	0	98.54%	0.14
407	1988/12/18 19:00:00	1988/12/18 19:00:00	1	0	98.79%	0.14
408	1990/04/04 08:00:00	1990/04/04 08:00:00	1	0	99.03%	0.14
409	1997/01/03 06:00:00	1997/01/03 06:00:00	1	0	99.27%	0.14
410	1999/01/25 08:00:00	1999/01/25 08:00:00	1	0	99.51%	0.14
411	2001/03/10 17:00:00	2001/03/10 18:00:00	2	0	99.76%	0.14
--End of Data-----------------						


Flow Duration Curves
Pre Development
Post Development Mitigated
Q10 (0.76cfs)
Qlf (0.059cfs)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
Flow Rate (cfs)
0.00
0.05
0.10
0.15
0.20
0.25
(%) Percent Time Exceedance

Compare Post-Development Curve to Pre-Development Curve
Flow Control Upper Limit: 0.76 (cfs)
Flow Control Lower Limit: 0.059 (cfs)

post-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out
post-development time stamp: 3/16/2021 1:46:28 PM
Compared to:
pre-development SWMM file: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out
pre-development time stamp: 3/12/2021 3:55:33 PM

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
0	0.06	0.11	0.27	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
1	0.07	0.09	0.25	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
2	0.07	0.07	0.22	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
3	0.08	0.06	0.21	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
4	0.09	0.05	0.19	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
5	0.09	0.04	0.18	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
6	0.10	0.03	0.18	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
7	0.11	0.03	0.17	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
8	0.12	0.02	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
9	0.12	0.02	0.16	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
10	0.13	0.02	0.15	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
11	0.14	0.01	0.14	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
12	0.14	0.01	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
13	0.15	0.01	0.13	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
14	0.16	0.01	0.12	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
15	0.17	0.01	0.11	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
16	0.17	0.01	0.10	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
17	0.18	0.01	0.09	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
18	0.19	0.01	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
19	0.19	0.00	0.08	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
20	0.20	0.00	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
21	0.21	0.00	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
22	0.21	0.00	0.07	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
23	0.22	0.00	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
24	0.23	0.00	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
25	0.24	0.00	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
26	0.24	0.00	0.06	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
27	0.25	0.00	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
28	0.26	0.00	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
29	0.26	0.00	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
30	0.27	0.00	0.05	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
31	0.28	0.00	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
32	0.29	0.00	0.04	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
33	0.29	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
34	0.30	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
35	0.31	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
36	0.31	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
37	0.32	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
38	0.33	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
39	0.34	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
40	0.34	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
41	0.35	0.00	0.03	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
42	0.36	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
43	0.36	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
44	0.37	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
45	0.38	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
46	0.38	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
47	0.39	0.00	0.02	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
48	0.40	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
49	0.41	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
50	0.41	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
51	0.42	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
52	0.43	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
53	0.43	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
54	0.44	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
55	0.45	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
56	0.46	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
57	0.46	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
58	0.47	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
59	0.48	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
60	0.48	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
61	0.49	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
62	0.50	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
63	0.51	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
64	0.51	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
65	0.52	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
66	0.53	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
67	0.53	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
68	0.54	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
69	0.55	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Post PT #	Flow Rate (cfs)	Post Dev % Exceed	Pre Dev % Exceed	%Ex post < %Ex pre	%Ex post > %Ex pre	%Ex post > 110% %Ex pre	Pass/Fail
70	0.55	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
71	0.56	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
72	0.57	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
73	0.58	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
74	0.58	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
75	0.59	0.00	0.01	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
76	0.60	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
77	0.60	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
78	0.61	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
79	0.62	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
80	0.63	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
81	0.63	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
82	0.64	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
83	0.65	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
84	0.65	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
85	0.66	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
86	0.67	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
87	0.68	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
88	0.68	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
89	0.69	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
90	0.70	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
91	0.70	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
92	0.71	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
93	0.72	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
94	0.72	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
95	0.73	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
96	0.74	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
97	0.75	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
98	0.75	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration
99	0.76	0.00	0.00	TRUE	FALSE	FALSE	Pass: Post Duration <= Pre Duration

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038PRE.out				
time stamp: 3/12/2021 3:55:33 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.06	113	1356	0.273
2	0.07	126	1243	0.250
3	0.07	94	1117	0.225
4	0.08	56	1023	0.206
5	0.09	49	967	0.194
6	0.09	45	918	0.185
7	0.10	31	873	0.176
8	0.11	34	842	0.169
9	0.12	36	808	0.162
10	0.12	46	772	0.155
11	0.13	33	726	0.146
12	0.14	41	693	0.139
13	0.14	26	652	0.131
14	0.15	42	626	0.126
15	0.16	56	584	0.117
16	0.17	39	528	0.106
17	0.17	64	489	0.098
18	0.18	31	425	0.085
19	0.19	15	394	0.079
20	0.19	12	379	0.076
21	0.20	20	367	0.074
22	0.21	18	347	0.070
23	0.21	11	329	0.066
24	0.22	12	318	0.064
25	0.23	14	306	0.062
26	0.24	10	292	0.059
27	0.24	12	282	0.057
28	0.25	12	270	0.054
29	0.26	13	258	0.052
30	0.26	17	245	0.049
31	0.27	19	228	0.046
32	0.28	23	209	0.042
33	0.29	13	186	0.037
34	0.29	7	173	0.035
35	0.30	7	166	0.033
36	0.31	7	159	0.032
37	0.31	8	152	0.031
38	0.32	2	144	0.029
39	0.33	6	142	0.029
40	0.34	4	136	0.027
41	0.34	6	132	0.027
42	0.35	5	126	0.025
43	0.36	9	121	0.024
44	0.36	5	112	0.023
45	0.37	8	107	0.022
46	0.38	7	99	0.020
47	0.38	15	92	0.018
48	0.39	8	77	0.015
49	0.40	1	69	0.014
50	0.41	1	68	0.014
51	0.41	0	67	0.013

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	0.42	3	67	0.013
53	0.43	2	64	0.013
54	0.43	0	62	0.012
55	0.44	4	62	0.012
56	0.45	1	58	0.012
57	0.46	1	57	0.011
58	0.46	3	56	0.011
59	0.47	6	53	0.011
60	0.48	2	47	0.009
61	0.48	1	45	0.009
62	0.49	4	44	0.009
63	0.50	1	40	0.008
64	0.51	1	39	0.008
65	0.51	2	38	0.008
66	0.52	1	36	0.007
67	0.53	2	35	0.007
68	0.53	1	33	0.007
69	0.54	0	32	0.006
70	0.55	1	32	0.006
71	0.55	0	31	0.006
72	0.56	2	31	0.006
73	0.57	1	29	0.006
74	0.58	0	28	0.006
75	0.58	0	28	0.006
76	0.59	5	28	0.006
77	0.60	3	23	0.005
78	0.60	3	20	0.004
79	0.61	0	17	0.003
80	0.62	0	17	0.003
81	0.63	1	17	0.003
82	0.63	0	16	0.003
83	0.64	2	16	0.003
84	0.65	0	14	0.003
85	0.65	0	14	0.003
86	0.66	1	14	0.003
87	0.67	0	13	0.003
88	0.68	1	13	0.003
89	0.68	1	12	0.002
90	0.69	0	11	0.002
91	0.70	2	11	0.002
92	0.70	3	9	0.002
93	0.71	1	6	0.001
94	0.72	0	5	0.001
95	0.72	2	5	0.001
96	0.73	1	3	0.001
97	0.74	0	2	0.000
98	0.75	0	2	0.000
99	0.75	2	2	0.000
100	0.76	0	0	0.000
---------End of Data-----------------				

Duration Table Summary at Project Discharge Point				
file name: V:\19\19038\Engineering\TM\Storm\Working Files\Hydromod\SWMM Files\19038POST.out				
time stamp: 3/16/2021 1:46:28 PM				
DISCHARGE		Number of periods when discharge was equal to or greater than DISCHARGE column but less than that shown on the next line		
Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
1	0.06	98	536	0.108
2	0.07	71	438	0.088
3	0.07	73	367	0.074
4	0.08	44	294	0.059
5	0.09	44	250	0.050
6	0.09	46	206	0.041
7	0.10	31	160	0.032
8	0.11	18	129	0.026
9	0.12	13	111	0.022
10	0.12	14	98	0.020
11	0.13	15	84	0.017
12	0.14	10	69	0.014
13	0.14	7	59	0.012
14	0.15	7	52	0.010
15	0.16	5	45	0.009
16	0.17	5	40	0.008
17	0.17	5	35	0.007
18	0.18	4	30	0.006
19	0.19	4	26	0.005
20	0.19	4	22	0.004
21	0.20	0	18	0.004
22	0.21	1	18	0.004
23	0.21	5	17	0.003
24	0.22	1	12	0.002
25	0.23	4	11	0.002
26	0.24	0	7	0.001
27	0.24	1	7	0.001
28	0.25	2	6	0.001
29	0.26	2	4	0.001
30	0.26	0	2	0.000
31	0.27	0	2	0.000
32	0.28	0	2	0.000
33	0.29	0	2	0.000
34	0.29	0	2	0.000
35	0.30	0	2	0.000
36	0.31	0	2	0.000
37	0.31	0	2	0.000
38	0.32	0	2	0.000
39	0.33	0	2	0.000
40	0.34	0	2	0.000
41	0.34	0	2	0.000
42	0.35	0	2	0.000
43	0.36	0	2	0.000
44	0.36	0	2	0.000
45	0.37	0	2	0.000
46	0.38	0	2	0.000
47	0.38	0	2	0.000
48	0.39	0	2	0.000
49	0.40	0	2	0.000
50	0.41	0	2	0.000
51	0.41	0	2	0.000

Bin Number	Discharge Rate (cfs)	Number of Periods	Total Periods Exceeding	Percent Time Exceeded
52	0.42	0	2	0.000
53	0.43	0	2	0.000
54	0.43	0	2	0.000
55	0.44	0	2	0.000
56	0.45	0	2	0.000
57	0.46	0	2	0.000
58	0.46	0	2	0.000
59	0.47	0	2	0.000
60	0.48	0	2	0.000
61	0.48	0	2	0.000
62	0.49	0	2	0.000
63	0.50	0	2	0.000
64	0.51	0	2	0.000
65	0.51	0	2	0.000
66	0.52	1	2	0.000
67	0.53	0	1	0.000
68	0.53	0	1	0.000
69	0.54	0	1	0.000
70	0.55	0	1	0.000
71	0.55	0	1	0.000
72	0.56	0	1	0.000
73	0.57	0	1	0.000
74	0.58	0	1	0.000
75	0.58	0	1	0.000
76	0.59	0	1	0.000
77	0.60	0	1	0.000
78	0.60	0	1	0.000
79	0.61	0	1	0.000
80	0.62	0	1	0.000
81	0.63	0	1	0.000
82	0.63	0	1	0.000
83	0.64	0	1	0.000
84	0.65	0	1	0.000
85	0.65	0	1	0.000
86	0.66	0	1	0.000
87	0.67	0	1	0.000
88	0.68	0	1	0.000
89	0.68	0	1	0.000
90	0.69	0	1	0.000
91	0.70	0	1	0.000
92	0.70	0	1	0.000
93	0.71	0	1	0.000
94	0.72	0	1	0.000
95	0.72	0	1	0.000
96	0.73	1	1	0.000
97	0.74	0	0	0.000
98	0.75	0	0	0.000
99	0.75	0	0	0.000
100	0.76	0	0	0.000
---------End of Data-----------------				

END OF STATISTICS ANALYSIS

Underdrain and Drawdown Results

The following table summarizes the underdrain coefficients used for each of the BMP units and translates the C factor coefficient to an equivalent round orifice diameter based on 1/16th inch increments. The drawdown equations are based on standard falling head drawdown theory. The primary drawdown number of interest is the surface drawdown based on vector concerns. The various soil and gravel storage layer calculations consider the void ratio and porosity of the respective layer. It should be noted that these drawdown calculations only consider the volume of water within the bioretention units. If the bioretention unit utilizes any storage above the berm height, then that storage drawdown is in addition to the values shown in the table below. Those calculations, if present, are shown elsewhere in the report. The derivation and explanation of the equations used to determine the values displayed in the chart are discussed in the following two sections of this portion of the report.

Sub Cat Name*	LID Process*	LID Area (sf)*	Orifice D (1/16in)	UD C factor*	T surf (in)*	T soil (in)*	T store (in)*	n (soil)*	e (store)*	Drawdown surface (hr)	Drawdown Soil (hr)	Drawdown Storage (hr)	Drawdown total (hr)
BMP-A	BMP-A	17,236	29	0.062419406	6	21	18	0.4	0.67	14.8	25.7	54.5	95.0
BMP-B	BMP-B	10,862	24	0.067839747	6	21	15	0.4	0.67	14.2	25.1	45.8	85.1
BMP-C	BMP-C	1,486	12	0.123927151	6	21	15	0.4	0.67	7.8	13.7	25.1	46.6
BMP-D	BMP-D	597	12	0.308576531	6	21	18	0.4	0.67	3.0	5.2	11.0	19.2
BMP-E	BMP-E	2,189	16	0.149603979	6	21	15	0.4	0.67	6.4	11.4	20.8	38.6
BMP-F	BMP-F	4,691	16	0.069810917	6	21	18	0.4	0.67	13.3	22.9	48.8	85.0

The character * in the column heading indicates that the values was read directly from the SWMM inp file.
Assume: orifice coefficient C_o = 0.61, void ratio for surface = 1.0, centroid of underdrain orifice is located at h=0

Underdrain C Factor Equations

Based on the slotted drain example in the SWMM Drain Advisor (EPA SWMM 5.1 Help/Contents/Reference/Special Dialog Forms/LID Editors/LID Control Editor/LID Drain System/Drain Advisor) the underdrain coefficient C is the ratio of the orifice area (total slot area) to the LID area times a constant (60,000).

SWMM Ex: If the drain consists of slotted pipes where the slots act as orifices, then the drain exponent would be 0.5 and the drain coefficient would be 60,000 times the ratio of total slot area to LID area. For example, drain pipe with five 1/4" diameter holes per foot spaced 50 feet apart would have an area ratio of 0.000035 and a drain coefficient of 2.

The 60,000 constant in the above example corresponds to the combined constants in the standard orifice equation:

(Standard Orifice Equation)

$$q=C_oA_o\sqrt{2g}\sqrt{h}\ (cfs)$$

and

(SWMM Underdrain Equation (per unit area))

$$q=q/A_{LID}$$

$$or$$

$$q=C_oA_o/A_{LID}\sqrt{2g}\sqrt{h}\ (cfs/sf)$$

With a Co=0.6 and converting $\sqrt{2g}$ to units of inches and hours the constant becomes 60,046.

So the underdrain C factor per unit area of the LID becomes:

$$C=60{,}046\ A_o/A_{LID}\ (in^{\wedge 1/2}/hr)$$

$$and$$

$$q=C*h^{1/2}$$

Drawdown Equations

The drawdown equations presented in the chart are the drawdown times for the respective layers within the bioretention unit (only). If the bioretention unit includes storage ponding above the berm height, then the drawdown time for the storage portion is in addition to the values shown in the chart. Those calculations (if present) are shown elsewhere in the report. For most cases the storage drawdown time will be comparatively short as compared to the bioretention drawdown times.

To derive a general formula that relates drawdown time for each layer of the bioretention unit in terms of the SWMM C factor, we set the change in water volume with respect to time equal to the standard orifice equation (found in the County Hydraulics manual):

$$q = \frac{dh}{dt}\, nAp = CoAo\sqrt{2gh}$$

Where n = porosity of the layer, A_P = area of the BMP unit, Co = orifice coefficient, Ao = area of the orifice, and g = gravity constant. The porosity n for the surface layer is 1.0, and the values for the soil and storage layers read from the SWMM LID definitions.

Solving the definite integral from h1 to h2

$$\int_{h=h1}^{h=h2} h^{-0.5} dh = \int_{t=0}^{t=T} \frac{CoAo\sqrt{2g}}{nAp}\; dt$$

$$2(\sqrt{h2} - \sqrt{h1}) = \frac{CoAo\sqrt{2g}}{nAp}\;(T)$$

$$Or$$

$$2n\left(\sqrt{h2} - \sqrt{h1}\right) = C\;(T)$$

$$where{:}\; C = \frac{CoAo\sqrt{2g}}{Ap} \quad (in^{\wedge 1/2}/hr)$$

Solving for T:

$$T = \frac{2n\left(\sqrt{h2} - \sqrt{h1}\right)}{C} \quad (hr)$$

Where h2(in) is the total beginning head above the underdrain orifice at t=0 and h1(in) is the total ending head above the orifice at t=T. Ex: h2 for surface = depth of gravel storage plus depth of soil layer plus berm height, and h1 for surface = depth of gravel storage plus depth of soil layer.

8.2 Hydromodification Management Points of Compliance

- List and describe all points of compliance (POCs) for flow control for hydromodification management.
- For each POC, provide a POC identification name or number, and a receiving channel identification name or number correlating to the project's HMP Exhibit (see Attachment 2).

POC name or #	Channel name or #	POC Description
POC-1	Un named tributary to Escondido Creek	Discharge location of the self-mitigating and treated developed portions of the project tributary to an unnamed tributary of the Escondido Creek
POC-2	Un named natural channel tributary to existing public storm drain system	Discharge location of the self-mitigating and treated developed portions of the project tributary to a natural channel leaving the project to the west and ultimately tributary to San Marcos Creek
POC-3	Eastern drain inlet to public storm drain system along San Elijo Road	Discharge location of the self-mitigating portion of the project frontage and a portion of the Green Streets treated access road entering a public storm drain inlet of the San Elijo public road improvements.
POC-4	Western drain inlet to public storm drain system crossing San Elijo Road.	Discharge location of the treated developed portions of the project entering a public storm drain system leading from the south side of San Elijo Road and discharging to a natural channel on the opposite side of said road.

8.3 Geomorphic Assessment of Receiving Water Channels

Insert Geomorphic Assessment behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.3.

No Geomorphic assessment has been performed for this project. Calculations assume the default of receiving channel is of high sensitivity to erosion and compare developed hydromodification discharges to 10% of the predevelopment Q2 flows.

8.4 Vector Control Plan

Insert Vector Control Plan behind this cover page or submit as a separate stand-alone document labeled Sub-attachment 8.4.

All drainage detention facilities on this project are designed to drawdown in less than 96 hour and therefore no vector control plan is required. Drawdown calculations can be found in Attachment 7.4.

9.0 General Requirements

- Complete the table below to indicate which compliance pathway was selected in PDP SWQMP Table 6. Include the corresponding sub-attachment with your SWQMP submittal. Other sub-attachments do not need to be included.
- See the BMPDM sections and appendices listed under "BMPDM Design Resources" for additional explanation of design requirements. Constructed features must fully satisfy the requirements described in these resources, and any other guidance identified by the County.
- DMA Exhibits and Construction Plans: CCSYAs and applicable BMPs identified and described in this attachment must be shown on DMA Exhibits and all applicable construction plans submitted for the project. See Attachment 2 for additional instruction on exhibits and plans.

Sub-attachments	BMPDM Design Resources
☐ **9.1: Documentation of Hydromodification Management Exemption**[1]	Section 1.6
☒ **9.2: Watershed Management Area Analysis (WMAA) Mapping**[1]	Appendix H.1.1.2
☐ **9.3: Resource Protection Ordinance (RPO) Methods**	Appendix H.1.1.1
☐ **9.4: No Net Impact Analysis**	Appendix H.4

[1] The San Diego County Regional comprehensive WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/

9.2 Watershed Management Area Analysis (WMAA) Mapping (BMPDM Appendix H.1.1.2)

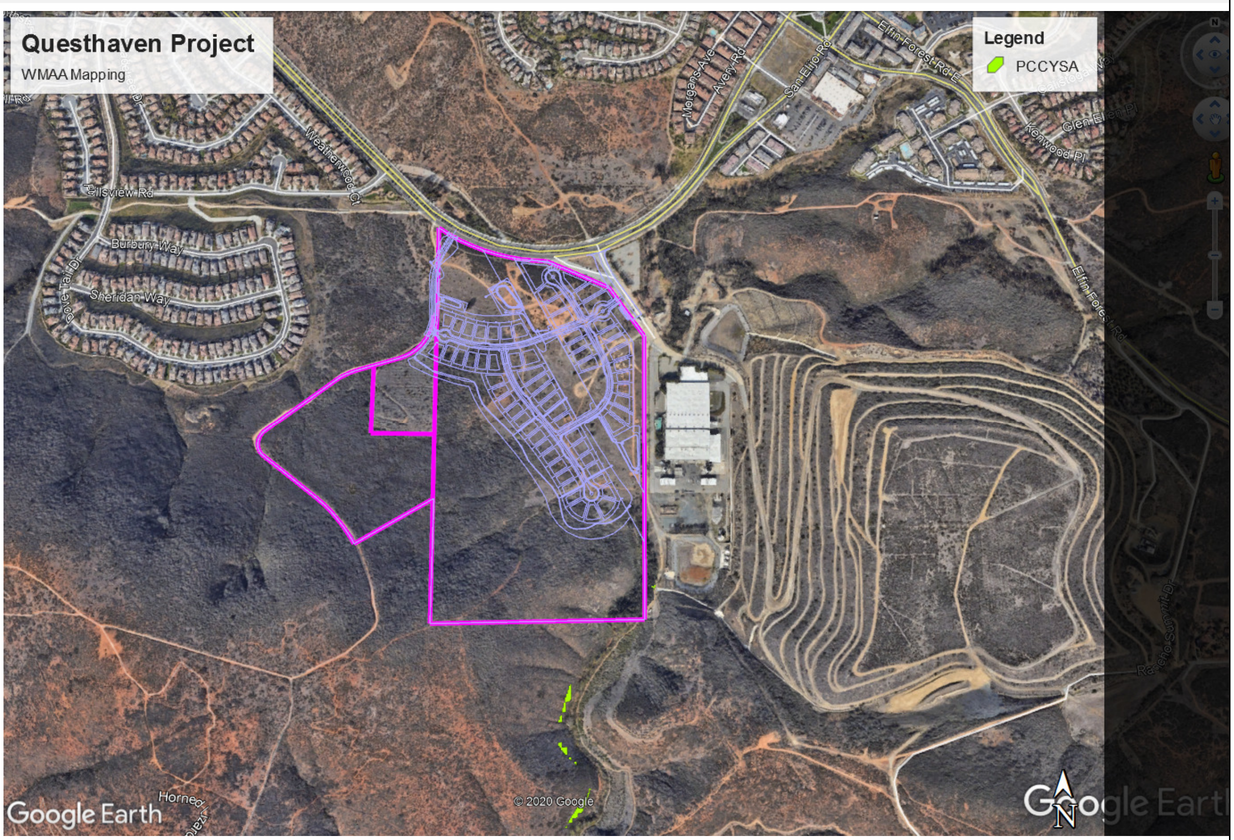
Watershed Management Area Analysis (WMAA) mapping is a simple way to screen projects to determine the presence of onsite or offsite upstream Potential Critical Coarse Sediment Yield Areas (PCCSYAs). The San Diego County Regional WMAA mapping data can be found on the Project Clean Water website here: http://www.projectcleanwater.org/download/wmaa_attc_data/ .[3]

- Based on the WMAA map and the proposed project design, demonstrate below that both of the following conditions apply to the PDP:

  (a) Less than 5% of PCCSYAs will be impacted (built on or obstructed) by the PDP, <u>and</u>

  (b) All upstream offsite PCCYSAs will be bypassed (see BMPDM Appendix H.3).

A. Mapping Results -- At a minimum, show: (1) the project footprint, (2) areas of proposed development, (3) impacted onsite PCCSYAs, (4) offsite tributary areas[4], and (5) bypass of upstream offsite PCCSYAs.



[3] Applicants may refine initial mapping results using options identified in BMPDM Appendix H.1.2.

[4] Tributary areas must be shown to demonstrate that upstream offsite PCCSYAs do not exist. If bypassing these areas, only the bypass should be shown.

B. Explanation -- Provide documentation as needed to demonstrate that (1) impacts to PCCSYAs are below 5%, and (2) upstream offsite PCCYSAs are effectively bypassed. Add pages as necessary.

By observation of the mapping results, it can be seen that there are no areas of PCCSYAs within the project boundary.

By observation of the mapping, the only PCCSYAs near the project are to the south and are located in an area that discharges to the east and is not tributary to the project.

Exhibit A: Legal Description of Property

LEGAL DESCRIPTION

Real property in the unincorporated area of the County of San Diego, State of California, described as follows:

THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 33, TOWNSHIP 12 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTING THEREFROM THE WESTERLY 100 FEET OF THE NORTHERLY 100 FEET THEREOF.

ALSO EXCEPTING THEREFROM ALL THAT PORTION OF THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 33, TOWNSHIP 12, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, DESCRIBED AS FOLLOWS:

COMMENCING AT THE TRUE POINT OF BEGINNING AT THE NORTHEAST CORNER OF SAID WEST HALF OF THE NORTHWEST QUARTER OF SECTION 33, SAID CORNER BEARS SOUTH 89°37'05" EAST, 1,333.93 FEET FROM THE NORTHWEST CORNER OF SAID SECTION 33; THENCE CONTINUING ALONG SAID EASTERLY LINE, SOUTH 00°04'06" WEST, 909.01 FEET; THENCE LEAVING SAID EASTERLY LINE, NORTH 35°44'18" WEST, 388.93 FEET; THENCE NORTH 66°24'18" WEST, 587.78 FEET; THENCE AT RIGHT ANGLES, NORTH 23°35'42" EAST, TO THE SOUTH MOST BOUNDARY OF THE QUESTHAVEN ROAD EASEMENT, A 50' EASEMENT FOR PUBLIC HIGHWAY TO THE COUNTY OF SAN DIEGO PER BOOK 1507, PAGE 245 OF DEEDS; THENCE CONTINUING NORTHWESTERLY ALONG SAID EASEMENT BOUNDARY TO THE POINT WHICH INTERSECTS THE NORTHERLY LINE OF SAID SECTION 33; THENCE SOUTH 89°37'05" EAST TO THE TRUE POINT OF BEGINNING.

ALSO EXCEPTING THEREFROM THAT PORTION DESCRIBED IN GRANT DEED TO THE CITY OF SAN MARCOS RECORDED JUNE 6, 2003, AS INSTRUMENT NO. 2003-0670399 OF OFFICIAL RECORDS.

APN: 223-080-46-00

Order Number: LJ-4663113 (06)

First American Title

11.0 Cover Sheet and General Requirements

- All Structural BMPs must have a plan and mechanism to ensure on-going maintenance. Use the table below to document the types of agreements to be submitted for the PDP and submit them under cover of this sheet.
- See BMPDM Section 7.3 for a description of maintenance categories and responsibilities. Note that since Category 3 and 4 BMPs are County-maintained, they do not require maintenance agreements.

a. Applicability of Maintenance Agreements

Check the boxes below to indicate which types of agreements are included with this attachment.

☒ Maintenance Notification (Category 1 BMPs)

- Exhibit A: Project Site Vicinity; Project Site Map; and a map for each BMP and its Drainage Management Area
- Exhibit B: BMP Maintenance Plan (see below)

☒ Stormwater Maintenance Agreement (Category 2 BMPs)

- Exhibit A: Legal Description of Property
- Exhibit B: BMP Maintenance Plan (see below)
- Exhibit C: Project Site Vicinity Map

Maintenance agreement templates and instructions are provided on the County's website:

www.sandiegocounty.gov/stormwater under the Development Resources tab.

PDP applicants contact County staff to ensure they have the most current forms.

b. Maintenance Plan Requirements

Use this checklist to confirm that each maintenance plan includes the following that as applicable.

☒ Specific **maintenance indicators and actions** for proposed structural BMP(s). These must be based on based on maintenance indicators presented in BMP Design Fact Sheets in Appendix E and enhanced to reflect actual proposed components of the structural BMP(s).

☒ **Access** to inspect and perform maintenance on the structural BMP(s).

☒ Features 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.

Exhibit B: BMP Maintenance Plan

SD-1
Tree Wells

BMP MAINTENANCE FACT SHEET
FOR
SITE DESIGN BMP SD-1 TREE WELLS

Tree wells as site design BMPs are trees planted in configurations that allow storm water runoff to be directed into the soil immediately surrounding the tree. The tree may be contained within a planter box or structural cells. The surrounding area will be graded to direct runoff to the tree well. There may be features such as tree grates, suspended pavement design, or shallow surface depressions designed to allow runoff into the tree well. Typical tree well components include:

- Trees of the appropriate species for site conditions and constraints
- Available growing space based on tree species, soil type, water availability, surrounding land uses, and project goals
- Entrance/opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression)
- Optional suspended pavement design to provide structural support for adjacent pavement without requiring compaction of underlying layers
- Optional root barrier devices as needed; a root barrier is a device installed in the ground, between a tree and the sidewalk, intended to guide roots down and away from the sidewalk in order to prevent sidewalk lifting from tree roots
- Optional tree grates; to be considered to maximize available space for pedestrian circulation and to protect tree roots from compaction related to pedestrian circulation; tree grates are typically made up of porous material that will allow the runoff to soak through
- Optional shallow surface depression for ponding of excess runoff
- Optional planter box drain

Normal Expected Maintenance

Tree health shall be maintained as part of normal landscape maintenance. Additionally, ensure that storm water runoff can be conveyed into the tree well as designed. That is, the opening that allows storm water runoff to flow into the tree well (e.g., a curb opening, tree grate, or surface depression) shall not be blocked, filled, re-graded, or otherwise changed in a manner that prevents storm water from draining into the tree well. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

Tree wells are site design BMPs that normally do not require maintenance actions beyond routine landscape maintenance. The normal expected maintenance described above ensures the BMP functionality. If changes have been made to the tree well entrance / opening such that runoff is prevented from draining into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well, or a surface depression has been filled so runoff flows away from the tree well), the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance will be required to restore drainage into the tree well as designed.

Surface ponding of runoff directed into tree wells is expected to infiltrate/evapotranspirate within 24-96 hours following a storm event. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging or compaction of the soils surrounding the tree. Loosen or replace the soils to restore drainage.

Other Special Considerations

Site design BMPs, such as tree wells, installed within a new development or redevelopment project are components of an overall storm water management strategy for the project. The presence of site design BMPs within a project is usually a factor in the determination of the amount of runoff to be managed with structural BMPs (i.e., the amount of runoff expected to reach downstream retention or biofiltration basins that process storm water runoff from the project as a whole). When site design BMPs are not maintained or are removed, this can lead to clogging or failure of downstream structural BMPs due to greater delivery of runoff and pollutants than intended for the structural BMP. Therefore, the [City Engineer] may require confirmation of maintenance of site design BMPs as part of their structural BMP maintenance documentation requirements. Site design BMPs that have been installed as part of the project should not be removed, nor should they be bypassed by re-routing roof drains or re-grading surfaces within the project. If changes are necessary, consult the [City Engineer] to determine requirements.

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR SD-1 TREE WELLS		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Tree health	Routine actions as necessary to maintain tree health.	• Inspect monthly. • Maintenance when needed.
Dead or diseased tree	Remove dead or diseased tree. Replace per original plans.	• Inspect monthly. • Maintenance when needed.
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health	Loosen or replace soils surrounding the tree to restore drainage.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	Disperse any standing water from the tree well to nearby landscaping. Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water).	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well)	Make repairs as appropriate to restore drainage into the tree well.	• Inspect monthly. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet SD-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

Property / Development Name:	Responsible Party Name and Phone Number:
Property Address of BMP:	Responsible Party Address:

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 1 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased tree Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased tree ☐ Replace per original plans ☐ Other / Comments:		
Standing water in tree well for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to tree health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Loosen or replace soils surrounding the tree to restore drainage ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR SD-1 TREE WELLS PAGE 2 of 2			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Disperse any standing water from the tree well to nearby landscaping ☐ Loosen or replace soils surrounding the tree to restore drainage (and prevent standing water) ☐ Other / Comments:		
Entrance / opening to the tree well is blocked such that storm water will not drain into the tree well (e.g., a curb inlet opening is blocked by debris or a grate is clogged causing runoff to flow around instead of into the tree well; or a surface depression is filled such that runoff drains away from the tree well) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make repairs as appropriate to restore drainage into the tree well ☐ Other / Comments:		

BF-1
Biofiltration

BMP MAINTENANCE FACT SHEET
FOR
STRUCTURAL BMP BF-1 BIOFILTRATION

Biofiltration facilities are vegetated surface water systems that filter water through vegetation, and soil or engineered media prior to discharge via underdrain or overflow to the downstream conveyance system. Biofiltration facilities have limited or no infiltration. They are typically designed to provide enough hydraulic head to move flows through the underdrain connection to the storm drain system. Typical biofiltration components include:

- Inflow distribution mechanisms (e.g., perimeter flow spreader or filter strips)
- Energy dissipation mechanism for concentrated inflows (e.g., splash blocks or riprap)
- Shallow surface ponding for captured flows
- Side slope and basin bottom vegetation selected based on climate and ponding depth
- Non-floating mulch layer
- Media layer (planting mix or engineered media) capable of supporting vegetation growth
- Filter course layer consisting of aggregate to prevent the migration of fines into uncompacted native soils or the aggregate storage layer
- Aggregate storage layer with underdrain(s)
- Impermeable liner or uncompacted native soils at the bottom of the facility
- Overflow structure

Normal Expected Maintenance

Biofiltration requires routine maintenance to: remove accumulated materials such as sediment, trash or debris; maintain vegetation health; maintain infiltration capacity of the media layer; replenish mulch; and maintain integrity of side slopes, inlets, energy dissipators, and outlets. A summary table of standard inspection and maintenance indicators is provided within this Fact Sheet.

Non-Standard Maintenance or BMP Failure

If any of the following scenarios are observed, the BMP is not performing as intended to protect downstream waterways from pollution and/or erosion. Corrective maintenance, increased inspection and maintenance, BMP replacement, or a different BMP type will be required.

- The BMP is not drained between storm events. Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
- Sediment, trash, or debris accumulation greater than 25% of the surface ponding volume within one month. This means the load from the tributary drainage area is too high, reducing BMP function or clogging the BMP. This would require pretreatment measures within the tributary area draining to the BMP to intercept the materials. Pretreatment components, especially for sediment, will extend the life of components that are more expensive to replace such as media, filter course, and aggregate layers.
- Erosion due to concentrated storm water runoff flow that is not readily corrected by adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.

Other Special Considerations

Biofiltration is a vegetated structural BMP. Vegetated structural BMPs that are constructed in the vicinity of, or connected to, an existing jurisdictional water or wetland could inadvertently result in creation of expanded waters or wetlands. As such, vegetated structural BMPs have the potential to come under the jurisdiction of the United States Army Corps of Engineers, SDRWQCB, California Department of Fish and Wildlife, or the United States Fish and Wildlife Service. This could result in the need for specific resource agency permits and costly mitigation to perform maintenance of the structural BMP. Along with proper placement of a structural BMP, **routine maintenance is key to preventing this scenario**.

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION		
The property owner is responsible to ensure inspection, operation and maintenance of permanent BMPs on their property unless responsibility has been formally transferred to an agency, community facilities district, homeowners association, property owners association, or other special district. Maintenance frequencies listed in this table are average/typical frequencies. Actual maintenance needs are site-specific, and maintenance may be required more frequently. Maintenance must be performed whenever needed, based on maintenance indicators presented in this table. The BMP owner is responsible for conducting regular inspections to see when maintenance is needed based on the maintenance indicators. During the first year of operation of a structural BMP, inspection is recommended at least once prior to August 31 and then monthly from September through May. Inspection during a storm event is also recommended. After the initial period of frequent inspections, the minimum inspection and maintenance frequency can be determined based on the results of the first year inspections.		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Accumulation of sediment, litter, or debris	Remove and properly dispose of accumulated materials, without damage to the vegetation or compaction of the media layer.	• Inspect monthly. If the BMP is 25% full* or more in one month, increase inspection frequency to monthly plus after every 0.1-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Obstructed inlet or outlet structure	Clear blockage.	• Inspect monthly and after every 0.5-inch or larger storm event. • Remove any accumulated materials found at each inspection.
Damage to structural components such as weirs, inlet or outlet structures	Repair or replace as applicable	• Inspect annually. • Maintenance when needed.
Poor vegetation establishment	Re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Dead or diseased vegetation	Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans.	• Inspect monthly. • Maintenance when needed.
Overgrown vegetation	Mow or trim as appropriate.	• Inspect monthly. • Maintenance when needed.
2/3 of mulch has decomposed, or mulch has been removed	Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches.	• Inspect monthly. • Replenish mulch annually, or more frequently when needed based on inspection.

*"25% full" is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

SUMMARY OF STANDARD INSPECTION AND MAINTENANCE FOR BF-1 BIOFILTRATION (Continued from previous page)		
Threshold/Indicator	**Maintenance Action**	**Typical Maintenance Frequency**
Erosion due to concentrated irrigation flow	Repair/re-seed/re-plant eroded areas and adjust the irrigation system.	• Inspect monthly. • Maintenance when needed.
Erosion due to concentrated storm water runoff flow	Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.	• Inspect after every 0.5-inch or larger storm event. If erosion due to storm water flow has been observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed. If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction.
Standing water in BMP for longer than 24 hours following a storm event Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health	Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils.	• Inspect monthly and after every 0.5-inch or larger storm event. If standing water is observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology	If mosquitos/larvae are observed: first, immediately remove any standing water by dispersing to nearby landscaping; second, make corrective measures as applicable to restore BMP drainage to prevent standing water. If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.	• Inspect monthly and after every 0.5-inch or larger storm event. If mosquitos are observed, increase inspection frequency to after every 0.1-inch or larger storm event. • Maintenance when needed.
Underdrain clogged	Clear blockage.	• Inspect if standing water is observed for longer than 24-96 hours following a storm event. • Maintenance when needed.

References

American Mosquito Control Association.
http://www.mosquito.org/
California Storm Water Quality Association (CASQA). 2003. Municipal BMP Handbook.
https://www.casqa.org/resources/bmp-handbooks/municipal-bmp-handbook
County of San Diego. 2014. Low Impact Development Handbook.
http://www.sandiegocounty.gov/content/sdc/dpw/watersheds/susmp/lid.html
San Diego County Copermittees. 2016. Model BMP Design Manual, Appendix E, Fact Sheet BF-1.
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=250&Itemid=220

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BF-1
Biofiltration

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	
Property / Development Name:	Responsible Party Name and Phone Number:	
Property Address of BMP:	Responsible Party Address:	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 1 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Accumulation of sediment, litter, or debris Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove and properly dispose of accumulated materials, without damage to the vegetation ☐ If sediment, litter, or debris accumulation exceeds 25% of the surface ponding volume within one month (25% full*), add a forebay or other pre-treatment measures within the tributary area draining to the BMP to intercept the materials. ☐ Other / Comments:		
Poor vegetation establishment Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		

*“25% full” is defined as ¼ of the depth from the design bottom elevation to the crest of the outflow structure (e.g., if the height to the outflow opening is 12 inches from the bottom elevation, then the materials must be removed when there is 3 inches of accumulation – this should be marked on the outflow structure).

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 2 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Dead or diseased vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove dead or diseased vegetation, re-seed, re-plant, or re-establish vegetation per original plans ☐ Other / Comments:		
Overgrown vegetation Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Mow or trim as appropriate ☐ Other / Comments:		
2/3 of mulch has decomposed, or mulch has been removed Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Remove decomposed fraction and top off with fresh mulch to a total depth of 3 inches ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 3 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Erosion due to concentrated irrigation flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas and adjust the irrigation system ☐ Other / Comments:		
Erosion due to concentrated storm water runoff flow Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair/re-seed/re-plant eroded areas, and make appropriate corrective measures such as adding erosion control blankets, adding stone at flow entry points, or minor re-grading to restore proper drainage according to the original plan ☐ If the issue is not corrected by restoring the BMP to the original plan and grade, the [City Engineer] shall be contacted prior to any additional repairs or reconstruction ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 4 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Obstructed inlet or outlet structure Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Underdrain clogged (inspect underdrain if standing water is observed for longer than 24-96 hours following a storm event) Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Clear blockage ☐ Other / Comments:		
Damage to structural components such as weirs, inlet or outlet structures Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Repair or replace as applicable ☐ Other / Comments:		

Date:	Inspector:	BMP ID No.:
Permit No.:	APN(s):	

INSPECTION AND MAINTENANCE CHECKLIST FOR BF-1 BIOFILTRATION PAGE 5 of 5			
Threshold/Indicator	**Maintenance Recommendation**	**Date**	**Description of Maintenance Conducted**
Standing water in BMP for longer than 24-96 hours following a storm event* Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Make appropriate corrective measures such as adjusting irrigation system, removing obstructions of debris or invasive vegetation, clearing underdrains, or repairing/replacing clogged or compacted soils ☐ Other / Comments:		
Presence of mosquitos/larvae For images of egg rafts, larva, pupa, and adult mosquitos, see http://www.mosquito.org/biology Maintenance Needed? ☐ YES ☐ NO ☐ N/A	☐ Apply corrective measures to remove standing water in BMP when standing water occurs for longer than 24-96 hours following a storm event.** ☐ Other / Comments:		

*Surface ponding longer than approximately 24 hours following a storm event may be detrimental to vegetation health, and surface ponding longer than approximately 96 hours following a storm event poses a risk of vector (mosquito) breeding. Poor drainage can result from clogging of the media layer, filter course, aggregate storage layer, underdrain, or outlet structure. The specific cause of the drainage issue must be determined and corrected.
**If mosquitos persist following corrective measures to remove standing water, or if the BMP design does not meet the 96-hour drawdown criteria due to release rates controlled by an orifice installed on the underdrain, the [City Engineer] shall be contacted to determine a solution. A different BMP type, or a Vector Management Plan prepared with concurrence from the County of San Diego Department of Environmental Health, may be required.

Exhibit C: Project Site Vicinity Map